1905831 - R8 SDMS

Hecla Mining Company ("Hecla") responds to United States and Coeur d'Alene Tribe's First Set of Proposed Findings of Fact as follows:

I. GENERAL OBSERVATIONS

The United States and Coeur d'Alene Tribe's First Set of Proposed Findings of Fact ("Proposed Findings") are unnecessarily voluminous. Embedded in them are many assumptions, half-truths and speculative statements, followed by references to the record which do not support the statements. Because commenting on each statement would involve an unnecessary level of detail and would ultimately not be helpful to the Court, Hecla will address categories of issues in this Response and then will submit its own Proposed Findings of Fact at the conclusion of the Defendants' case. It is Hecla's goal in this Response to assist the Court in organizing the mass of information submitted to it, so the Court can decipher what really is and is not relevant, and what is and is not disputed.

II. HECLA'S CORPORATE PEDIGREE

Plaintiffs and Hecla are in substantial agreement regarding what historic companies are now subsumed in Hecla's corporate pedigree. Hecla merged with, or is the successor to, the following companies which existed for the following time periods: Day Mines, Inc., 1947-1982 (it then merged with Hecla); Sherman Lead Company, 1918-1947 (it then consolidated into Day Mines, Inc.); Tamarack and Custer Consolidated Mining Company, 1912-1947 (it then consolidated into Day Mines, Inc.); Dayrock Mining Company, 1928-1947 (it then consolidated into Day Mines, Inc.); and Lucky Friday Silver-Lead Mines Company, 1939-1964 (it then

merged into Hecla). However, the Plaintiffs confuse a corporate merger with a purchase of assets and so erroneously place Gold Hunter Mining Company, Gold Hunter Mining Inc. and Hercules Mining Company, a general partnership, in Hecla's corporate pedigree.

The general rule is that when two corporations merge by statutory merger, stock merger or consolidation, the remaining corporation steps into the shoes of the acquired entity with respect to its liabilities. This fundamental concept of successorship is well-established, including in the context of the Comprehensive Environmental Response Compensation and Liability Act, 42 U.S.C. 9607 et seq. ("CERCLA"). Smith Land & Improvement Corp. v. Celotex Corp., 851 F.2d 86, 91 (3rd Cir. 1988), cited with approval in Louisiana-Pacific Corp. v. ASARCO, Inc., 909 F.2d 1260, 1262-63 (9th Cir. 1990). The assumption of liability occurs by operation of statutes governing corporate formation, (e.g. 8 Delaware Corp. Code § 259(a)) or by a clear rule of common law. 15 Fletcher, Cyclopedia of the Law of Private Corporations, § 7118 (1999).

However, when one company simply purchases the assets of another, liability does not transfer to the purchasing company. Kline v. Johns-Manville, 745 F.2d 1217 (9th Cir. 1984). "The general rule, which is well settled, is that where one company sells or otherwise transfers all its assets to another company, the latter is not liable for the debts and liabilities of the transferor." 15 Fletcher, Cyclopedia of the Law of Private Corporations, § 7122. The only exceptions to this Asset Purchase Rule are: 1) express assumptions of liability, 2) de facto mergers, 3) fraud, or 4) when the purchasing corporation is merely a continuation of the selling

corporation. Atchison, Topeka and Santa Fe Ry. Co. v. Brown & Bryant, Inc., 159 F.3d 358, 361 (9th Cir. 1998).

The exception for de facto mergers only applies where there is a showing that the acquired corporation's stock was paid for with shares of stock in the new corporation. Louisiana-Pacific, 909 F.2d at 1264. Travis v. Harris, 565 F.2d 443, 446 (7th Cir. 1977). There are no facts in the record to support application of the de facto merger, express assumption or fraud exceptions to the disputed asset sales in this case. The "mere continuation" exception is addressed below.

A. Hercules Partnership.

Hecla has succeeded to the liabilities of Hercules Mining Company, which was formed in 1923 and then consolidated into Day Mines, Inc. in 1947. Hecla has not succeeded to liabilities of a general partnership of individuals doing business from 1889 until 1923, under the name of the Hercules Mining Company (the "Hercules Partnership"). The Hercules Partnership sold its assets to the Hercules Mining Company in 1923. Trial Exhibit 13192. The Hercules Mining Company did not succeed to the liabilities of the Hercules Partnership, because the transaction constituted an asset purchase with no assignment of liabilities.

The United States appears to argue that because the Hercules Mining Company corporation continued in the same business as the partnership, the asset sale falls under the "mere continuation" exception to the Asset Purchase Rule. The "mere continuation" exception requires a showing that there has been a corporate reorganization. 15 Fletcher, Cyclopedia of

the Law of Private Corporations, § 7122; Forest Laboratories, Inc. v. The Pillsbury Co., 452 F.2d 621, 625 (7th Cir. 1971). The exception applies only where a corporation existed and simply changed its name, such that both the seller and purchaser of assets were actually the same legal entity. Fehl v. S.W.C. Corp., 433 F. Supp. 939, 946-47 (D. Del. 1977)(quoting Ozan Lumber Co. v. Davis Sewing Machine Co., 284 F. 161 (D. Del. 1922)). "The test is not the continuation of the business operation but the continuation of the corporate entity." Travis v. Harris Corp., 565 F.2d 443, 447 (7th Cir. 1977)(quoting National Dairy Prod. Corp. v. Borden Co., 363 F. Supp. 978 (E.D. Wis. 1973). No case law supports the position that under this rule, a corporation can ever be the "mere continuation" of a partnership. By definition, the exception applies only if the seller of assets is a corporation.

Given this, the facts do not support application of the "mere continuation" exception to Hercules Mining Company. A partnership is an entity fundamentally different from a corporation. The Hercules Partnership's general partners had unlimited personal liability for the acts of this partnership. According to Plaintiffs' claims, those individuals should be defendants in this case. They have not been named, and Plaintiffs are trying to improperly shift their personal liability to Hecla.

In making its argument, the United States appears to be relying upon a broader version of the "mere continuation" exception known as the "continuity of enterprise theory." Atchison, 159 F.3d at 364. The "continuity of enterprise" theory has been explicitly rejected by the Ninth Circuit. Id.

The United States has not met its burden of proof with respect to applicability of an exception to the Asset Purchase Rule, and thus Hecla did not succeed to the liabilities of the Hercules Partnership.

B. Gold Hunter.

In paragraph 187 of the Proposed Findings, the Plaintiffs explain that the assets of Gold Hunter Mining Company were conveyed to Gold Hunter Mines, Inc., in 1955. The only operational history presented at trial was that the Gold Hunter Mine began operations in 1902 and ended "sometime during the Korean War." Proposed Findings, ¶¶ 179-180. The Gold Hunter Mill operated between 1889 and 1949. Proposed Findings, ¶ 185. Plaintiffs are asserting that the properties were conveyed to Gold Hunter Mines, Inc., after all operations ceased. It is undisputed that the transaction was purely a sale of assets. Proposed Findings, ¶ 187.

In August 1962, Gold Hunter Mines, Inc. conveyed assets to Day Mines, Inc., a company in Hecla's corporate pedigree. Proposed Findings, ¶ 187. The Proposed Findings state that when the sale of assets occurred, all assets were transferred so that "the business and mining operations of Gold Hunter Mines, Inc., could be continued as a going concern." Paragraph 187; inexplicably leaving unaddressed the more than 10-year gap between when Gold Hunter Mines, Inc.'s activities ceased and Day Mines purchase of the assets in 1962. Both the asset sales to Gold Hunter Mines, Inc. and to Day Mines, Inc. are covered by the Asset Purchase Rule and did not include liabilities. There is a total failure of proof supporting any exception to the Asset

Purchase Rule for these two asset sales. Therefore, Gold Hunter Mining Company and Gold Hunter Mines, Inc. are not part of Hecla's corporate pedigree.

C. Interstate Callahan Property.

The Proposed Findings regarding the Interstate Callahan Mine and Mill are inconsistent and incomprehensible, in terms of both corporate history and the related geography. Proposed Findings ¶¶ 203-208 state that the Interstate Callahan Mill was owned and operated by a company identified simply as "Interstate Callahan" from 1913-1923. Proposed Findings, ¶ 206. The United States then mixes in a discussion of the "Interstate Callahan Mine" the "Interstate-Callahan Group" and the "Interstate-Callahan Claims." Proposed Findings, ¶ 203. None of these terms are ever located or defined and it is unclear whether they refer to some or all of the same mining or millsite claims, whether those claims were patented or unpatented, and if unpatented, if and when they have lapsed and reverted to the United States. For the facts alleged in Proposed Findings ¶ 203, the United States cites three sources: first, Hecla's responses to selected requests for admissions, none of which provide the requisite clarifying as to which properties are being referred to; second, a simple map with small dots labeled the "Callahan Mine Adits" and something called "Amazon No. 2" (neither of which appear to be in the Nine Mile Creek Drainage), the "Interstate Callahan Mine" and the "Interstate Callahan Millsite" (which are not shown as being on the same or adjacent sites), and the "Galena Mill" Government Exhibit 206 (copy attached), apparently admitted as to Callahan Mining Company, Tr., pp. 565-566; third, is Dr. Quivik's equally non-specific testimony with respect to the same,

that the map is "representative of the groups of mines that the Interstate-Callahan Company assembled to form its group of mines that it operated." Tr., p. 565. The "Interstate Callahan Company" referred to by Dr. Quivik does not even appear in the Proposed Findings concerning the Interstate Callahan Mining and Mill in ¶¶ 203-208.

The United States simply has never delineated what geography and features constitute "the Interstate Callahan Claims." See, e.g., Tr., pp. 8131-8132, including Hecla's response to request for admissions 914, 916, 917, all of which are denials. Further, there is no allegation in the Proposed Findings and no evidence (nor is it true) that Hecla is a corporate successor to any entity called "Interstate Callahan" or anything similar to it.

Throughout the trial, the United States attempted to hold Callahan Mining Corporation responsible for this Site. Then, in a confusing display during the last minutes of its case in chief, the United States tried to pull Hecla into the mix never explaining exactly what it was trying to hold Hecla responsible for. Tr., pp. 8122-8132. In the Proposed Findings, the United States has used broad statements and similar names to confuse. The "Interstate Callahan Mine and Mill" section of the Proposed Findings is a good example of why the Proposed Findings should not be relied upon by this Court as a fair summary of trial testimony.

III. FAILURE OF PROOF ON NON-COMINGLED RELEASES

The Court has made it clear that causation for comingled releases are analyzed under a "contributing factor/more than a *de minimis* amount" analysis, while non-comingled releases must be proved to be the "sole or proximate cause of injury to the natural resources." Court

Order dated March 30, 2001, p. 11. As discussed below and by way of illustration, with respect to non-comingled Basin releases, in some cases there has been a failure of proof of Hecla's ownership, in many cases there has been a failure of proof of a release, and in every case there has been a failure of proof of causation of injury to natural resources.

A. Adit Discharges.

The evidence presented on adit discharges is remarkably inconclusive. Taking one of the most studied adits, the Hercules No. 5 as an example, the United States' own expert witness, Callie Ridolfi admitted that the data submitted in evidence were from three different samples collected by three different entities (using different techniques) on three different dates, with analytical results from three different laboratories, apparently all with different detection limits. Tr., pp. 7569-7571. Even comparing sampling results at similar flow rates, metals levels were wildly variable, cadmium levels differed one hundred-fold, lead levels differed six hundred-fold and zinc differed sixty-fold. Tr., pp. 7571-7572. No evidence was presented on metals loading over time from the Hercules No. 5 Adit. There is no "sole or proximate-cause" evidence that the water coming from the Hercules No. 5 Adit increases or decreases metals concentrations in the waters to which it discharges. There is no evidence of any harm to anything from the discharge. This is just one example of a shocking lack of proof after three months of testimony of any injury whatsoever from this non-comingled release.

In keeping with the testimony, Proposed Findings ¶ 144, simply alleges a release containing lead, cadmium and zinc at the Hercules No. 5 Adit. No volumes, no concentrations

and no metals loads are alleged. There is no statement of resulting injury nor, on the face of the evidence, could there be. This same formula is generally repeated for other alleged adit discharges (see, e.g., Proposed Findings, ¶¶ 117, 131, 144, 157, 165, 183, 192, 204). The result is a complete lack of evidence of causation of injury for adit discharges.

B. Waste Rock.

The evidence on waste rock is even more inconclusive. For most of the waste rock piles no sampling was done. The United States attempts to rely on a purely speculative statement that rain water leaches metals from rock pile, regardless of the geology or other variables that Plaintiffs concede. (Callie Ridolfi said that waste rock piles "vary as far as concentrations of metal and also size fractions of the rock, anywhere from fine grain materials up to boulder or cobble." Tr., p. 7513) Ms. Ridolfi said the sampling technique involved a sieve to pick up a small amount of fine grained material which would fit in a zip-lock plastic bag. Tr., pp. 7574-7575. No evidence was presented that the samples were representative of waste rock in the field. No scientific evidence was presented proving any volume of metals released from the waste rock piles over what time period.

For one pile near the Tamarack No. 7 Adit, lead concentrations differed across the pile by a factor of two hundred and zinc by a factor of one hundred. Tr., p. 7576. Three zip-lock baggy size samples were taken to characterize a waste rock pile estimated at 350,000 cubic yards. Not even Ms. Ridolfi would say that the samples were indicative of the average concentration of the waste rock piles. Tr., p. 7576. The Proposed Findings states: "Data shows

that the waste rock pile at the Tamarack No. 7 waste rock pile contains cadmium, zinc and lead." Proposed Findings of Fact, ¶ 191. No information whatsoever is given on concentrations and amount of leached metal in rain water runoff, if any, when the leaching may have occurred, where the metals may have ended up and whether they affected any natural resource. There is a similar lack of proof to support Plaintiffs' claims regarding the ownership of and any releases from other waste rock piles, as well. See, e.g., Proposed Findings, ¶¶ 116, 130, 143, 156, 164, 172, 182 and 191. There is then a complete lack of proof that any waste rock piles owned by Hecla caused any damage to any natural resource.

C. Tailings Impoundments.

The Proposed Findings relating to tailings impoundments are similarly insufficient. For example, Plaintiffs presented no evidence as to who owns the Dayrock tailings impoundment. Further, the evidence fails to demonstrate the location of the Dayrock tailings pond and alleges only a discharge of water. Proposed Findings, ¶ 168. Proposed Findings relating to the Star Tailings Ponds includes a statement of alleged metals discharged concentration, but no volumes. Without reliable volume and concentration data, it is impossible to know whether the alleged discharge had any significance at all. No evidence was presented that the Star Ponds of any injury to natural resources attributable to the Ponds. Proposed Findings, ¶ 137. Similarly, there is no evidence presented regarding the amounts of metals which the Plaintiffs' claim have been released from the Lucky Friday Tailings Ponds over and above the amounts allowed by NPDES

Permits. Proposed Findings, ¶ 177. With respect to tailings impoundments, there is again a failure of proof regarding ownership, release and causation.

IV. A MINING COMPANY WHICH HAS ORE MILLED BY ANOTHER COMPANY IS NOT SUBJECT TO ARRANGER LIABILITY UNDER CERCLA

Ore produced from a mine owned by one company and sent to a mill owned by another company does not create a "arranger" liability under CERCLA. The Proposed Findings list occasions when Hecla produced ore at one of its mines and sent that ore to a mill owned by another company. See, e.g., Proposed Findings, ¶¶ 123, 124, 125, 138, 139, 178, 193. The Plaintiffs are asserting that in these circumstances Hecla becomes liable under CERCLA as an "arranger." CERCLA's definition of "disposal" necessarily includes the concept of waste. Catellus Development Corp. v. United States, 34 F.3d 748, 750 (9th Cir. 1994). The Ninth Circuit has clearly held that mineral ore is a useful product. It is not a waste and sending it to another company for processing does not constitute arranging for its disposal under CERCLA. A & W Smelter and Refiners, Inc. v. Clinton, 146 F.3d 1107, 1112 (9th Cir. 1998).

For example,¶ 124 of the Proposed Findings states that "from 1897-1900, ore from the Hecla Mine was milled at the Standard Mining Company Mill at Wallace, Idaho. Tailings generated at the Standard Mining Company Mill at Wallace, Idaho contained lead and zinc and were disposed into Canyon Creek." There is no allegation (nor is it true) that Hecla owned or operated the Standard Mining Company Mill. The Plaintiffs have argued that in these circumstances, Hecla acted as an arranger for disposal solely due to the fact that ore from its

mine was milled by another company. This is directly contrary to the rule in the Ninth Circuit. A & W Smelter and Refiners, Inc., 148 F.3d at 1112-1113.

V. CONCLUSION

Hecla requests that the points addressed above be considered by the Court when entering its Findings of Fact. In addition, Hecla endorses the points made by Defendant Asarco Incorporated in its briefing concerning Proposed Findings of Fact.

Dated this 11th day of May, 2001.

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CERTIFICATE OF SERVICE

I hereby certify that copies of the foregoing **HECLA MINING COMPANY'S INITIAL RESPONSE TO UNITED STATES AND COEUR D'ALENE TRIBE - FIRST SET OF PROPOSED FINDINGS OF FACT** was deposited in the United States mail, postage prepaid, this 11th day of May, 2001, addressed to:

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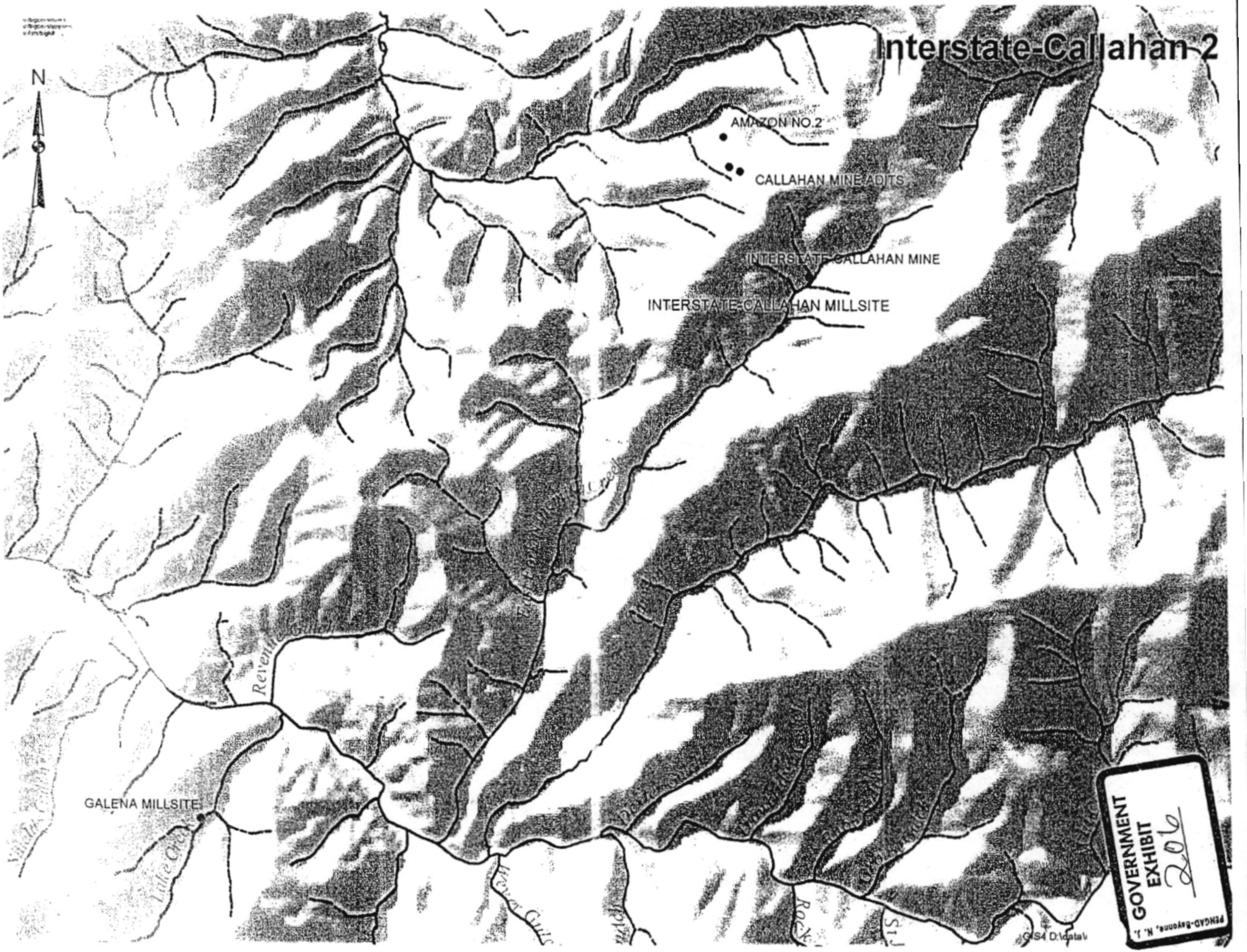
Interstate-Callahan 2



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UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE REGION 4

IN THE MATTER OF:	)	UNILATERAL ADMINISTRATIVE ORDER FOR REMOVAL RESPONSE ACTIVITIES
GROUSE CREEK MINE SITE	)	
CUSTER COUNTY, IDAHO	)	
	)	
	)	
	)	
HECLA MINING COMPANY,	)	
	)	
	)	Proceeding Under Section 106(a) of the Comprehensive Environmental Response, Compensation, and Liability Act, as amended, 42 U.S.C. § 9606(a)
	)	
	)	
	)	
	)	
Respondent.	)	
	)	

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I. JURISDICTION AND GENERAL PROVISIONS

1. This Order is issued pursuant to the authority vested in the President of the United States by Section 106(a) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended ("CERCLA"), 42 U.S.C. § 9606(a), and delegated to the Secretary of Agriculture by Executive Order No. 12580, as amended by Executive Order 13016, 61 Fed. Reg. 45871 (August 30, 1996). The Secretary has delegated this authority to the Under Secretary for Natural Resources and Environment ("Under Secretary"), to be exercised with the concurrence of the General Counsel. 7 C.F.R. § 2.20(a)(1)(vii).

2. This Order pertains to property known as the Grouse Creek Mine Site ("Site"), located in Custer County, approximately 19 miles northeast of Stanley, Idaho. The Site is located within Sections 19, 20, 29, 30, and 32 T13N, R15E of the Boise Meridian. The majority of land encompassing the Site is under the jurisdiction, custody and control of the Forest Service. This Order requires Hecla Mining Company ("Hecla" or "Respondent") to conduct removal actions described herein to abate an imminent and substantial endangerment to the public health, welfare, or the environment that may be presented by the actual or threatened release of hazardous substances at or from the Site.

3. The Under Secretary, through the United States Department of Agriculture ("USDA"), Forest Service ("Forest Service"), has notified the State of Idaho ("State") of this action pursuant to Section 106(a) of CERCLA, 42 U.S.C. § 9606(a).

II. PARTIES BOUND

4. This Order applies to and is binding upon Hecla and its successors and assigns. Any change in ownership or corporate status of Hecla including, but not limited to, any transfer of assets or real or personal property shall in no way alter Hecla's responsibilities under this

Order.

5. Hecla shall ensure that its contractors, subcontractors, and representatives receive a copy of this Order and comply with this Order. Hecla shall be responsible for any noncompliance with this Order.

III. DEFINITIONS

6. Unless otherwise expressly provided herein, terms used in this Order which are defined in CERCLA or in regulations promulgated under CERCLA shall have the meaning assigned to them in CERCLA or in such regulations. Whenever terms listed below are used in this Order or in the attached appendices, the following definitions shall apply:

"CERCLA" shall mean the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended, 42 U.S.C. §§ 9601, et seq.

"Day" shall mean a calendar day unless expressly stated to be a working day. "Working day" shall mean a day other than a Saturday, Sunday, or Federal holiday. In computing any period of time under this Order, where the last day would fall on a Saturday, Sunday, or Federal holiday, the period shall run until the close of business of the next working day.

"EPA" shall mean the United States Environmental Protection Agency and any successor departments or agencies of the United States.

"Forest Service" shall mean the United States Department of Agriculture, Forest Service and any successor departments or agencies of the United States.

"IDEQ" shall mean the State of Idaho, Department of Health and Welfare, Division of Environmental Quality and any successor departments or agencies of the State.

"National Contingency Plan" or "NCP" shall mean the National Oil and Hazardous Substances Pollution Contingency Plan promulgated pursuant to Section 105 of CERCLA, 42 U.S.C. § 9605, codified at 40 C.F.R. Part 300, and any amendments thereto.

"Order" shall mean this Unilateral Administrative Order and all attached appendices. In the event of conflict between this Order and any appendix, this Order shall control.

"Paragraph" shall mean a portion of this Order identified by an arabic numeral.

"RCRA" shall mean the Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act, as further amended, 42 U.S.C. §§ 6901, et seq.

"Removal Action" shall mean those activities to be undertaken by Hecla to implement the Statement of Work and other plans approved by the Forest Service.

"Under Secretary" shall mean the Under Secretary for Natural Resources and Environment, United States Department of Agriculture.

"Section" shall mean a portion of this Order identified by a roman numeral.

"Site" shall mean the Grouse Creek Mine Site, located in Custer County, Idaho. The majority of the Site is encompassed within the established boundaries of the Yankee Fork Ranger District, Salmon-Challis National Forest in Idaho. A minority portion of the Site is located on adjacent private lands owned by Hecla. The Site shall also include all real property to which hazardous substances have migrated.

"State" shall mean the State of Idaho.

"Statement of Work" or "SOW" shall mean the Statement of Work that is attached to this Order as Appendix A.

"USDA" shall mean the United States Department of Agriculture.

"Work" shall mean all activities Hecla is required to perform under this Order.

IV. FINDINGS OF FACT

7. The Grouse Creek Mine Site is a currently inactive open pit gold and silver mine with associated facilities located in Custer County, near Sunbeam, Idaho. The majority of land encompassing the Site is under the jurisdiction, custody and control of the Forest Service, within the established boundaries of the Yankee Fork Ranger District on the Salmon-Challis National Forest. A minority portion of the Site is located on adjacent private lands owned by Hecla.

8. The Site consists of an open pit, a tailings pond of approximately 60 acres with two embankments, a mill, and numerous other ancillary features, including a waste rock disposal facility used as a dump for storage of waste rock from the mine pit, and numerous capture ponds.

9. Hecla began construction at the Site in June 1993, after submitting a mining Plan of Operation to both the Forest Service and the State of Idaho. A Final Environmental Impact Statement/Record of Decision was issued in May of 1992 for Hecla to proceed with site development, and in June 1992 the State issued to Hecla an Authorization to Operate a Facility for Ore Processing by Cyanidation ("Cyanidation Permit"). The plan proposed by Hecla entailed developing two open pits, a conventional tailings pond with two embankments and a conventional mill utilizing a cyanidation process. The plan anticipated 49 million tons of waste rock and 15 million tons of ore produced, and an estimated total surface disturbance of 515 acres. Actual mine production began at 7,500 tons per day ore rock in October 1994. At that time, EPA issued a National Pollutant Discharge Elimination System ("NPDES") permit, pursuant to

Section 402 of the Clean Water Act, 33 U.S.C. § 1342, for discharges from the mine operations.

10. In August 1995, the liner in the tailings pond was breached. Cyanide-bearing tailings released into Jordan Creek, a tributary of the Yankee Fork of the Salmon River. Tailings pond underdrains have carried releases of cyanide at least since this failure. Only some of the cyanide-bearing waters have been contained in ponds or intercepted by groundwater wells and treated prior to release via an EPA-permitted NPDES outfall.

11. In April 1997, Hecla suspended mining operations at the Site due to unfavorable economic conditions. Both before and since that time, cyanide has been detected in both surface and groundwater monitoring stations downstream from the Site. The detection of cyanide in all the wells below the south embankment indicates that contaminated water is moving through the landslide deposit. Water quality monitoring has shown cyanide periodically detected at the farthest surface water quality monitoring station, located in wetlands, before entering the Yankee Fork of the Salmon River since March of 1999. Seven constituents detected by the monitoring exceed acute and chronic criteria in tailings pore water: aluminum, copper, arsenic, selenium, silver, zinc, and cyanide.

12. In addition to documented cyanide releases at and from the Site, acidic leachate is releasing, or has the potential to release, from the tailings embankments, the waste rock dump, and pit walls at the Site.

13. A 1997 report by SRK, Inc. states that cyanide, arsenic, sulfate, and copper are the four major contaminants of concern at the Site with potential to affect environmental organisms, specifically aquatic life in Jordan Creek, as well as human health. Also, acidic leachate can be detrimental to the environment. The potential sources of these constituents include: 1) the tailings pond supernatant liquid and pore water, and 2) runoff from storm events, snow melt, and

ground water (including seeps and springs) in contact with acidic waste rock material.

14. Some of the pertinent recent actions and occurrences at the Site include:

a. In August of 1995, a tailings line failure occurred. Cyanide-bearing tailings were released into Jordan Creek for approximately 40 minutes. Tailings pond underdrains have carried traces of cyanide since this failure. Cyanide-bearing waters have been contained in ponds or intercepted by groundwater wells and treated prior to release via an EPA-permitted NPDES outfall. Hecla paid a fine to the State of Idaho for NPDES outfall violations.

b. In the time period of July to December of 1998, weak acid dissociable ("WAD") cyanide was detected off-site, in stream, and down-stream from the mine. Hecla paid a fine to the State of Idaho for surface water quality violations.

c. In April of 1999, the Forest Service, the State, and EPA received the consolidated water quality monitoring report for the mine from Hecla. The Forest Service notified Hecla by letter of its concerns related to pervasive levels of WAD cyanide in Jordan Creek, with copies to the State, EPA, the National Marine Fisheries Service, and the United States Fish and Wildlife Service.

d. In April of 1999, Respondent orally notified the agencies that analytical results for surface water monitoring sites on Jordan Creek, downstream from the mine, exceeded cold-water biota standards for WAD cyanide. This oral notification was followed by written notification on April 30, 1999.

e. In May of 1999, Hecla reported, via telephone, that springs and seeps that feed Jordan Creek were contaminated with cyanide.

f. In May of 1999, as directed by the EPA, the Forest Service and the IDEQ, Hecla began daily sampling and submitted a response/mitigation plan to the agencies.

g. On June 15, 1999, IDEQ, after consulting with EPA and the Forest Service, issued a letter to Hecla requiring Hecla to perform certain activities at the Site to abate the threats to human health and the environment posed by the releases at the Site. In response to the June 15, 1999 letter from IDEQ, Hecla submitted a Work Plan to Evaluate Sources of Cyanide Entering Jordan Creek from Hecla Mining Company's Grouse Creek Unit on July 16, 1999 ("Site Characterization Work Plan"). IDEQ, in consultation with EPA and the Forest Service, approved the Site Characterization Work Plan subject to modification in accordance with comments in a letter dated July 30, 1999. This Order incorporates by reference the Site Characterization Work Plan and further modifies it in the SOW.

h. On July 26, 1999, the Forest Service signed an Action Memorandum to initiate construction of sumps to capture cyanide-bearing springs, and Hecla started this work on September 13, 1999.

j. On September 15, 1999, IDEQ sent a Notice of Violation to Hecla for violations of the Cyanidation Permit.

15. Potential contaminant release mechanisms or transport pathways for the hazardous substances at the Site include: 1) direct contact with contaminated soils or water; 2) fugitive dust generation and deposition from blowing dust originating from contaminated soils; 3) runoff and resultant erosion of contaminants into Jordan Creek; and 4) infiltration or percolation to ground water. In addition, the presence of sulfide minerals (especially pyrite and chalcopyrite) increases the potential for migration of metals. Oxidation of the sulfides results in the formation of sulfuric acid, which increases the solubility of many metals. (The acidic drainage from an historic adit shows that this process is already active at the Site.) The area's waste rock piles (including exposed tailings material, the waste rock dump, and embankments) contain sulfide-

bearing rock and show evidence of leaching and precipitation.

16. For cyanide, the potential receptors can be affected by direct contact with contaminated soils or water by site workers or visitors which may result in dermal contact or inadvertent ingestion of contaminants. Toxic levels of cyanide, if ingested, can cause death to species in aquatic habitats. Humans can be a secondary receptor from consumption of contaminated fish, game or livestock. Fugitive dust generation from the Site may pose inhalation exposure to site workers and visitors. Toxicity of cyanide to plant life is not known.

17. Adverse environmental impacts that may be occurring at the Site include:

a. Degradation of surface water quality in Jordan Creek due to elevated cyanide levels, and potentially low pH and associated metals: Direct ingestion of these contaminants can occur by humans, wildlife, aquatic species, and riparian flora and fauna.

b. Sorption and accumulation of metals in stream bed and bank sediments, of which metals can be directly taken into riparian and aquatic flora.

c. Endangerment of wildlife and human visitors at the Site due to inhalation or absorption of dusts from waste rock piles.

V. CONCLUSIONS OF LAW AND DETERMINATIONS

Based on the Findings of Fact set forth above, and the Administrative Record supporting this removal action, the Forest Service has determined that:

18. The Grouse Creek Mine Site is a "facility" as defined by Section 101(9) of CERCLA, 42 U.S.C. § 9601(9).

19. The contaminants found at the Site, as identified in the Findings of Fact above, include "hazardous substances," as defined by Section 101(14) of CERCLA, 42 U.S.C. § 9601(14).

20. Hecla is a "person" as defined by Section 101(21) of CERCLA, 42 U.S.C. 9601(21).

21. Hecla is liable under Section 107(a) of CERCLA, 42 U.S.C. § 9607(a), as a person who currently owns or operates the Site and who at the time of disposal of any hazardous substance owned or operated the Site.

22. The conditions described in the Findings of Fact above constitute an actual or threatened "release" of a hazardous substance from the facility as defined by Section 101(22) of CERCLA, 42 U.S.C. § 9601(22).

23. The conditions present at the Site constitute an imminent and substantial endangerment to public health, welfare, or the environment due to the Site's proximity to streams, campsites, and a road. Relevant factors include, but are not limited to, the following:

a. Actual or potential exposure to hazardous substances by nearby human populations, animals, or the food chain from hazardous substances; this factor is present at the Site because aquatic food chain organisms, terrestrial organisms, and human health are threatened by the ongoing releases of cyanide and other hazardous substances via the receiving stream and eventual migration to the Yankee Fork of the Salmon River.

b. High levels of hazardous substances in soils largely at or near the surface that may migrate; this factor is present at the Site because as cyanide and other hazardous substances attenuate in soils, they may still become available to the surface waters through storm water runoff events which, in turn, could elevate cyanide levels and levels of other hazardous substances in Jordan Creek. Also, cyanide complexes within soils can result in the

availability of heavy metals to the aquatic system.

c. Seasonal weather conditions that may cause hazardous substances to migrate or be released; this factor is present at the Site because low seasonal flows in Jordan Creek in the late summer and fall, and associated loss of dilution factor, will likely result in higher concentrations of cyanide and a higher potential for chronic and acute effects, especially on aquatic organisms.

24. The actual or threatened release of hazardous substances from the Site may present an imminent and substantial endangerment to the public health, welfare, or the environment within the meaning of Section 106(a) of CERCLA, 42 U.S.C. § 9606(a).

25. The removal actions required by this Order are necessary to protect the public health, welfare, or the environment, and are not inconsistent with the NCP and CERCLA.

VI. ORDER

26. Based upon the foregoing Findings of Fact, Conclusions of Law and Determinations, and the Administrative Record for this Site, the Under Secretary hereby orders that Hecla comply with the following provisions, including but not limited to all attachments to this Order, all documents incorporated by reference into this Order, and all schedules and deadlines in this Order, attached to this Order, or incorporated by reference into this Order, and perform the following actions:

27. NOTICE OF INTENT TO COMPLY. Hecla shall notify the Forest Service, in writing, within seven (7) days after the effective date of this Order of Hecla's intent to comply with this Order. Failure of Hecla to provide such notification shall be a violation of this Order by Hecla.

28. DESIGNATION OF CONTRACTOR, PROJECT COORDINATOR AND ON-SCENE COORDINATOR.

28.1 DESIGNATION OF CONTRACTOR. Hecla shall perform the removal action itself or retain a contractor to perform the removal action. Hecla shall notify the Forest Service of Hecla's qualifications or the name and qualifications of such contractor within ten (10) days of the effective date of this Order. Hecla shall also notify the Forest Service of the name(s) and qualifications of any other contractor(s) or subcontractor(s) retained to perform the removal action under this Order at least seven (7) days prior to commencement of such removal action. The Forest Service retains the right to disapprove of any, or all, of the contractors and/or subcontractors retained by Hecla, or of Hecla's choice of itself to do the removal action. If the Forest Service disapproves of a selected contractor or Hecla, Hecla shall retain a different contractor or notify the Forest Service that it will perform the removal action itself within fifteen (15) business days following the Forest Service's disapproval and shall notify the Forest Service of that contractor's name and qualifications or of Hecla's qualifications within fifteen (15) business days of the Forest Service's disapproval.

28.2 DESIGNATION OF PROJECT COORDINATOR. Within ten (10) days after the effective date of this Order, Hecla shall designate a Project Coordinator who shall be responsible for administration of all Hecla's actions required by the Order. Hecla shall submit the designated coordinator's name, address, telephone number, and qualifications to the Forest Service. To the greatest extent possible, the Project Coordinator shall be present on Site or readily available during Site work. The Forest Service retains the right to disapprove of any Project Coordinator named by Hecla. If the Forest Service disapproves of a selected Project Coordinator, Hecla shall retain a different Project Coordinator and shall notify the Forest Service

of that person's name and qualifications within ten (10) business days following the Forest Service's disapproval. Receipt by Hecla's Project Coordinator of any notice or communication from the Forest Service relating to this Order shall constitute receipt by Hecla.

28.3. ON-SCENE-COORDINATOR. The Forest Service's On-Scene-Coordinator (OSC) for the Site is Pat Trainor. EPA has designated Matt Wilkening as its On-Scene-Coordinator. Hecla shall direct all submissions required by this Order to both the Forest Service and EPA OSCs at the following addresses:

Pat Trainor
P.O. Box 1026
800 W. Lakeside
McCall, Idaho 83638
Phone (208) 253-0176
FAX (208) 253-0109

Matt Wilkening
EPA Region 10, Idaho Operations Office
U.S. Environmental Protection Agency
1435 N. Orchard Street
Boise, ID 83706
Phone (208) 378-5760
FAX: (208) 553-0163

29. WORK TO BE PERFORMED. Hecla shall perform, at a minimum, the following removal response activities:

29.1 DELIVERABLES. Within the time frame specified in the SOW, Hecla shall submit to the Forest Service for review and approval each deliverable specified in the SOW. A copy of each deliverable, including any revision, shall also be provided to EPA's On-Scene-Coordinator. Each deliverable shall include a description of and expeditious, detailed schedule for the implementation of the Work required by this Order. The SOW requires the following general response activities:

a. Submission of a Project Work Plan, as specified in the SOW, providing for interim measures for reducing tailings impoundment water volume; interim measures for Outfall 002; dewatering of the tailings impoundment; and prevention and control of acid drainage;

b. Collection and pump back of contaminated groundwater, as specified in the SOW;

c. Characterization of the nature and extent of contamination, as specified in the SOW;

d. Submission of a Quality Assurance and Sampling Plans, as specified in the SOW;

e. Submission of a Health and Safety Plan, as specified in the SOW;

f. De-watering of the tailings impoundment, as specified in the SOW;

g. Submission of a work plan for final reclamation and closure of the tailings impoundment, as specified in the SOW; and

h. Submission of a Final Report, as specified in the SOW.

29.2 IMPLEMENTATION. The Forest Service may approve, disapprove, require revisions to, or modify any deliverable. If the Forest Service requires revisions, Hecla shall submit a revised draft deliverable within fourteen (14) days of receipt of the Forest Service's notification of the required revisions. Hecla shall implement the deliverable as finally approved, in writing, by the Forest Service, in accordance with the schedule approved by the Forest Service. Once approved, or approved with modification, the deliverable, the schedule, and any subsequent modifications shall be fully enforceable under this Order. Hecla shall notify the Forest Service at least forty-eight (48) hours before performing any on-Site work pursuant to

the Forest Service approved deliverable. Hecla shall not commence any removal actions at the Site without prior Forest Service approval.

All Work performed pursuant to this Order, including all sample collection and analysis, shall be conducted in accordance with CERCLA, the NCP, and applicable EPA guidance documents.

29.3 HEALTH AND SAFETY PLAN. Within the time frame specified in the SOW, Hecla shall submit for Forest Service review and comment a plan that ensures the protection of the public health and safety during performance of on-Site work under this Order. This plan shall be prepared in accordance with EPA's Standard Operating Safety Guide, (November 1984, updated July 1988). In addition, this plan shall comply with all current applicable Occupational Safety and Health Administration ("OSHA") regulations, including but not limited to OSHA's Hazardous Waste Operations and Emergency Response regulations found at 29 C.F.R. § 1910.120. Hecla shall incorporate all changes to the plan recommended by the Forest Service, and implement the plan during the pendency of the removal action.

29.4 QUALITY ASSURANCE AND SAMPLING. All sampling and analyses performed pursuant to this Order shall conform to Forest Service direction and approval, and EPA guidance documents regarding sampling, quality assurance/quality control ("QA/QC"), data validation, and chain-of-custody procedures. Hecla shall ensure that the laboratory used to perform the analyses participates in a QA/QC program that complies with the appropriate EPA guidance. Hecla shall use the following documents, as appropriate, as guidance for QA/QC and sampling: "Quality Assurance/Quality Control Guidance for Removal Activities: Sampling QA/QC Plan and Data Validation Procedures," OSWER Directive Number 9360.4-01; "Environmental Response Team Standard Operating Procedures," OSWER Directive Numbers

9360.4-02 through 9360.4-08; "Guidance for the Data Quality Objectives Process, EPA QA/G-4," EPA/600/R-96/055, September 1994; and "EPA Guidance for Quality Assurance Project Plans, EPA QA/G-5," EPA/600/R-98/018, February 1998.

Upon request by the Forest Service, Hecla shall have the laboratory it retains analyze samples submitted by the Forest Service for quality-assurance monitoring. Hecla shall ensure that the laboratory used to perform the analyses participates in a QA/QC program that complies with appropriate EPA guidance. At a minimum, all sample analyzed as part of the Work shall be analyzed by a laboratory that participates in a QA/QC control program equivalent to that specified in the documents entitled "USEPA Contract Laboratory Program Statement of Work for Organic Analysis" (October 1986) and "USEPA Contract Laboratory Program Statement of Work for Inorganic Analysis" (July 1995). Hecla shall provide to the Forest Service the quality assurance/quality control procedures followed by all sampling teams and laboratories performing data collection and/or analysis.

Upon request by the Forest Service, Hecla shall allow the Forest Service or its authorized representatives to take split and/or duplicate samples of any samples collected by Hecla while performing actions under this Order. Hecla shall notify the Forest Service not less than seven (7) days in advance of any sample collection activity. The Forest Service shall have the right to take any additional samples that it deems necessary. Hecla shall submit to the Forest Service and EPA, within two (2) days of receipt by Hecla, all non-validated analytical data collected in connection withy this Order. Hecla shall provide the Forest Service and EPA with all validated data analyses within thirty (3) days after analysis.

29.5 REPORTING. Hecla shall submit a written progress report to the Forest Service concerning actions undertaken pursuant to this Order every tenth (10th) day of the month

after the date of receipt of the Forest Service's approval of the Work Plan until termination of this Order, unless otherwise directed by the OSC in writing. These reports shall describe all significant developments during the preceding period, including the actions performed and any problems encountered, analytical data received during the reporting period, and the developments anticipated during the next reporting period, including a schedule of work to be performed, anticipated problems, and planned resolutions of past or anticipated problems.

Hecla and any successor in title shall, at least thirty (30) days prior to the conveyance of any interest in real property at the Site, give written notice of this Order to the transferee and written notice to the Forest Service of the proposed conveyance, including the name and address of the transferee. The party conveying such an interest shall require that the transferee comply with Paragraph 30 of this Order (relating to access to property and information).

29.6 FINAL REPORT. Within thirty (30) days after completion of all removal actions required under this Order, Hecla shall submit, for Forest Service review and approval, a final report summarizing the actions taken to comply with this Order. The final report shall conform, at a minimum, with the requirements of 40 C.F.R. § 300.165. The final report shall include a good-faith estimate of total costs or a statement of actual costs incurred in complying with the Order, a listing of quantities and types of materials removed off-Site or handled on-Site, a discussion of removal and disposal options considered for those materials, a listing of the ultimate destinations of those materials, a presentation of the analytical results of all sampling and analyses performed, and accompanying appendices containing all relevant documentation generated during the removal action (e.g, manifests, invoices, bills, contracts, and permits). The final report shall also include the following certification signed by a person who supervised or

directed the preparation of that report:

> "Under penalty of law, I certify that to the best of my knowledge, after appropriate inquiries of all relevant persons involved in the preparation of the report, the information submitted is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

30. ACCESS TO PROPERTY AND INFORMATION. Hecla shall provide and/or obtain access to the Site and off-Site areas to which access is necessary to implement this Order.

30.1 Hecla shall provide access to all non-privileged records and documentation related to the conditions at the Site and the action conducted pursuant to this Order. Such access shall be provided to Forest Service and EPA employees, contractors, agents, consultants, designees, representatives, and State of Idaho representatives. These individuals shall be permitted to move freely at the Site and appropriate off-Site areas in order to conduct actions which the Forest Service determines to be necessary. Hecla shall submit to the Forest Service, upon receipt, the results of all sampling or tests and all other data generated by Hecla or its contractors, or on Hecla's behalf during implementation of this Order.

30.2 Hecla shall use its best efforts to obtain all necessary access agreements within seven (7) days after the effective date of this Order, or as otherwise specified, in writing, by the OSC. Hecla shall immediately notify the Forest Service if, after using its best efforts, it is unable to obtain such agreements. Hecla shall describe, in writing, its efforts to obtain access. The Forest Service may then assist Hecla in gaining access, to the extent necessary to effectuate the response activities described herein, using such means as the Forest Service deems

appropriate. The Forest Service reserves the right to seek reimbursement from Hecla for all costs and attorney's fees incurred by the United States in obtaining access for Hecla.

31. RECORD RETENTION, DOCUMENTATION, AVAILABILITY OF INFORMATION. Hecla shall preserve all documents and information relating to Work performed under this Order, or relating to the hazardous substances found on or released from the Site, for ten (10) years following completion of the response actions required by this Order. At the end of this ten (10) year period and before any document or information is destroyed, Hecla shall notify the Forest Service that such documents and information are available to the Forest Service for inspection, and, upon request, shall provide the originals or copies of such documents and information to the Forest Service. In addition, Hecla shall provide documents and information retained under this Section at any time before expiration of the ten (10) year period at the written request of the Forest Service.

31.1 Hecla may assert a business confidentiality claim pursuant to 40 C.F.R. § 2.203(b) with respect to part or all of any information submitted to the Forest Service pursuant to this Order, provided such claim is allowed by Section 104(e)(7) of CERCLA, 42 U.S.C. § 9604(e)(7). If no such claim accompanies the information when it is received by the Forest Service, the Forest Service may make it available to the public without further notice to Hecla.

31.2 Hecla shall maintain a running log of privileged documents on a document-by-document basis, containing the date, author(s), addressee(s), subject, the privilege or grounds claimed (e.g., attorney work product, attorney-client), and the factual basis for assertion of the privilege. Hecla shall keep the "privilege log" on file and available for inspection. The Forest Service may at any time challenge claims of privilege through negotiations or as otherwise provided by law or the Federal Rules of Civil Procedure.

32. OFF-SITE SHIPMENTS. All hazardous substances removed off-Site pursuant to this Order for treatment, storage, or disposal shall be treated, stored, or disposed of at a facility in compliance, as determined by the Forest Service, with 42 U.S.C. § 9621(d)(3) and the EPA "Revised Procedures for Implementing Off-Site Response Actions," OSWER Directive Number 9834.11, November 13, 1987. The Forest Service will provide information on the acceptability of a facility under Section 121(d)(3) of CERCLA, 42 U.S.C. § 9621(d)(3), and the above directive. Hecla shall give prior notification of out-of-state waste shipments consistent with OSWER Directive 9330.2-07.

33. COMPLIANCE WITH OTHER LAWS. Hecla shall perform all actions required pursuant to this Order in accordance with all applicable local, state, and federal laws and regulations except as provided in Section 121(e) of CERCLA, 42 U.S.C. § 9621(e), and 40 CFR § 300.415(i). In accordance with 40 C.F.R. § 300.415(i), all on-Site actions required pursuant to this Order shall, to the extent practicable, as determined by the Forest Service, considering the exigencies of the situation, attain applicable or relevant and appropriate requirements ("ARARs") under federal environmental, state environment, or facility siting laws. (See "The Superfund Removal Procedures for Consideration of ARARs During Removal Actions," EPA OSWER Directive 9360.3-02, August 1991.)

34. EMERGENCY RESPONSE AND NOTIFICATION OF RELEASES. If any incident, or change in Site conditions, during the actions conducted pursuant to this Order causes or threatens to cause an additional release of hazardous substances from the Site or an endangerment to the public health, welfare, or the environment, Hecla shall immediately take all appropriate action. Hecla shall take these actions in accordance with all applicable provisions of this Order, including, but not limited to, the Health and Safety Plan, in order to prevent, abate, or

minimize such release or endangerment caused or threatened by the release. Hecla shall also immediately notify the OSC and the EPA Region 10, Emergency Response and Site Cleanup Unit, 24-Hour Duty Officer, (206) 553-1263, of the incident or Site conditions. If Hecla fails to take action, then the Forest Service may respond to the release or endangerment and reserve the right to pursue cost recovery.

In the event of any release of a hazardous substance, Hecla shall immediately notify the OSC and the National Response Center at telephone number (800) 424-8802. Hecla shall also notify the EPA Region 10 Emergency Response and Site Cleanup Unit's 24-Hour Duty Officer at (206) 553-1263. Hecla shall submit a written report to the Forest Service within seven (7) days after each release, setting forth the events that occurred and the measures taken or to be taken to mitigate any release or endangerment caused or threatened by the release and to prevent the reoccurrence of such a release. This reporting requirement is in addition to, not in lieu of, reporting under Section 103 of CERCLA, 42 U.S.C. § 9603, and Section 304 of the Emergency Planning and Community Right-To-Know Act of 1986, 42 U.S.C. § 11004.

VII. AUTHORITY OF THE FOREST SERVICE ON-SCENE COORDINATOR

35. The OSC shall be responsible for overseeing the proper and complete implementation of this Order. The OSC shall have the authority vested in an OSC by the NCP, 40 C.F.R. § 300.120, including the authority to halt, conduct, or direct any action required by this Order, or to direct any other removal action undertaken by the Forest Service, Hecla or other entities at the Site. Absence of the OSC from the Site shall not be cause for stoppage of work unless specifically directed by the OSC.

36. The Forest Service and Hecla shall have the right to change their designated OSC or Project Coordinator. The Forest Service shall notify Hecla, and Hecla shall notify the Forest

Service at least seven (7) days before such a change is made. Notification may initially be made orally, but shall be followed promptly by written notice. (As noted in Paragraph 28 above, if the Forest Service disapproves of a designated Project Coordinator, Hecla shall retain a different Project Coordinator and shall notify the Forest Service of that person's name and qualifications within ten (10) business days following the Forest Service's disapproval.)

VIII. ENFORCEMENT: PENALTIES FOR NONCOMPLIANCE

37. Violation of any provision of this Order may subject Hecla to civil penalties of up to twenty-seven thousand five hundred dollars ($25,000.00) per violation per day, as provided in Section 106(b)(1) of CERCLA, 42 U.S.C. § 9606(b)(1). Should Hecla violate this Order or any portion hereof, the Forest Service may carry out the required actions unilaterally, pursuant to Section 104 of CERCLA, 42 U.S.C. § 9604, and/or may seek judicial enforcement of this Order pursuant to Section 106 of CERCLA, 42 U.S.C. § 9606.

IX. RESERVATION OF RIGHTS

38. Except as specifically provided in this Order, nothing herein shall limit the power and authority of USDA or United States to take, direct, or order all actions necessary to protect public health, welfare, or the environment or to prevent, abate, or minimize an actual or threatened release of hazardous substances, pollutants, or contaminants, or hazardous or solid waste on, at, or from the Site. Further, nothing herein shall prevent the United States from seeking legal or equitable relief to enforce the terms of this Order, from taking other legal or equitable action as it deems appropriate or necessary, or from requiring Hecla in the future to perform additional activities pursuant to CERCLA or any other applicable law. The United States reserves the right to bring an action against Hecla under Section 107 of CERCLA, 42 U.S.C. § 9607, for recovery of any response costs incurred by the United States related to this

Order or the Site and not reimbursed by Hecla.

X. OTHER CLAIMS

39. By issuance of this Order, the United States and the Forest Service assume no liability for injuries or damages to persons or property resulting from any acts or omissions of Hecla. The United States or Forest Service shall not be deemed a party to any contract entered into by Hecla or its directors, officers, employees, agents, successors, representatives, assigns, contractors, or consultants in carrying out activities pursuant to this Order.

40. This Order does not constitute a pre-authorization of funds under Section 111(a)(2) of CERCLA, 42 U.S.C. § 9611(a)(2).

41. Nothing in this Order shall constitute a satisfaction of or release from any claim or cause of action against Hecla or any person not a party to this Order, for any liability such person may have under CERCLA, other statutes, or the common law, including, but not limited to, any claims of the United States for costs, damages, and interest under Sections 106(a) and 107(a) of CERCLA, 42 U.S.C. §§ 9606(a) and 9607(a).

XI. MODIFICATIONS

42. Modifications to any plan or schedule may be made, in writing by the OSC, or at the OSC's oral direction. If the OSC makes an oral modification, it will be memorialized, in writing, within seven (7) days; provided, however, that the effective date of the modification shall be the date of the OSC's oral direction. The rest of the Order, or any other portion of the Order may only be modified, in writing, by signature of the Under Secretary, or the Under Secretary's designee.

43. If Hecla seeks permission to deviate from any approved plan or schedule, Hecla's

Project Coordinator shall submit a written request, outlining the proposed modification and its basis, to the Forest Service for approval.

44. No informal advice, guidance, suggestion, or comment by the Forest Service regarding reports, plans, specifications, schedules, or any other writing submitted by Hecla shall relieve Hecla of its obligation to obtain such formal approval as may be required by this Order, and to comply with all requirements of this Order unless it is formally modified.

XII. NOTICE OF COMPLETION

45. When the Forest Service determines, after the Forest Service's review of the Final Report, that all removal actions have been fully performed in accordance with this Order, with the exception of any continuing obligations required by this Order, including retention of records, the Forest Service will provide notice to Hecla. If the Forest Service determines that any removal actions have not been completed in accordance with this Order, the Forest Service will notify Hecla, provide a list of the deficiencies, and require that Hecla modify the Work Plan to correct such deficiencies. Hecla shall implement the modified and approved Work Plan and shall submit a modified Final Report in accordance with the Forest Service notice. Failure by Hecla to implement the approved modified Work Plan shall be a violation of this Order.

XIII. ACCESS TO ADMINISTRATIVE RECORD

46. The Administrative Record supporting these removal actions is available for review at USDA-Forest Service Yankee Fork Ranger District Office, Clayton, Idaho.

XIV. OPPORTUNITY TO CONFER

47. Within three (3) days after issuance of this Order, Hecla may request a conference with the Forest Service. Any such conference shall be held within seven (7) days after the Order

is signed by the Under Secretary, unless extended by agreement of the parties. At any conference held pursuant to the request, Hecla may appear in person or be represented by an attorney or other representative.

48. If a conference is held, Hecla may present any information, arguments, or comments regarding this Order. Regardless of whether a conference is held, Hecla may submit any information, arguments, or comments, in writing, to the Forest Service within seven (7) days following the conference, or within 14 days of issuance of the Order if no conference is requested. This conference is not an evidentiary hearing, does not constitute a proceeding to challenge this Order, and does not give Hecla a right to seek review of this Order. Requests for a conference, or any written submittal under this paragraph, shall be directed to Steven C. Silverman, USDA Office of the General Counsel, P.O. Box 25005, Denver, CO 80225; Phone (303) 275-5551; Fax (303) 275-5557.

XV. INSURANCE

49. At least three (3) days prior to commencing any on-Site work under this Order, Hecla shall secure, and shall maintain for the duration of this Order, comprehensive general liability insurance and automobile insurance with limits of no less than $3,000,000 dollars, combined single limit. Within the same time period, Hecla shall provide the Forest Service with certificates of such insurance and a copy of each insurance policy. If Hecla demonstrates by evidence satisfactory to the Forest Service that any contractor or subcontractor maintains insurance equivalent to that described above, or insurance covering the same risks but in a lesser amount, then Hecla need provide only that portion of the insurance described above which is not maintained by such contractor or subcontractor.

XVI. ADDITIONAL REMOVAL ACTIONS

50. If the Forest Service determines that additional removal actions not included in an approved plan are necessary to protect public health, welfare, or the environment, the Forest Service will notify Hecla of that determination. Unless otherwise stated by the Forest Service, within thirty (30) days of receipt of notice from the Forest Service that additional removal actions are necessary to protect public health, welfare, or the environment, Hecla shall submit for approval by the Forest Service a work plan for the additional removal actions. The plan shall conform to any and all applicable requirements of this Order. Upon the Forest Service's approval of the plan, Hecla shall implement the plan for additional removal actions in accordance with the provisions and schedule contained therein. This provision does not alter or diminish the OSC's authority to make oral modifications to any plan or schedule pursuant to this Order.

XVII. SEVERABILITY

51. If a court issues an order that invalidates any provision of this Order or finds that Hecla has sufficient cause not to comply with one or more provisions of this Order, Hecla shall remain bound to comply with all provisions of this Order not invalidated or not determined to be subject to a sufficient cause defense by the Court's order.

XIII. EFFECTIVE DATE

52. This Order shall be effective seven (7) days after the Order is signed by the Under Secretary, unless a conference is requested as provided herein. If a conference is requested, this Order shall be effective on the second (2nd) day following the day of the conference unless

modified, in writing, by the Forest Service.

IT IS SO ORDERED

By: _____ Date: _____

JAMES R. LYONS
Under Secretary for Natural Resources
and Environment
United States Department of Agriculture

SCOPE OF WORK
GROUSE CREEK MINE SITE
UNILATERAL ADMINISTRATIVE ORDER

OBJECTIVE:

The purpose of this Scope of Work (SOW) is to address all releases and threats of release of cyanide and other hazardous substances from the tailings impoundment at the Hecla Grouse Creek Mine (Site) to Jordan Creek and the Yankee Fork of the Salmon River associated surface and regional ground waters. The Site is located within the Salmon-Challis National Forest near Sunbeam, Custer County, Idaho. The objective is to reduce concentrations of cyanide and other hazardous substances to levels that do not result in exceedences of applicable water quality criteria for surface water or ground water. In order to achieve this objective, the main work elements will include dewatering of the tailings impoundment (removal of tailings impoundment supernatant), recovery of contaminated ground water and closure of the tailings impoundment.

WORK ELEMENTS:

1) **Project Work Plan**: Respondent shall submit a Project Work Plan within thirty (30) days of the effective date of this Unilateral Administrative Order (UAO). The Project Work Plan shall describe all major tasks from the effective date of the UAO through Notice of Completion and shall include a schedule for all tasks. The schedule shall indicate start and end dates of all tasks. In addition, the schedule shall include interim milestones for: 1) interim measures to ensure that water quality criteria in the receiving waters are achieved during all stream flow conditions and ensure that adequate measures are taken to de-water the impoundment; and 2) construction and operation of a treatment system for de-watering the tailings impoundment to achieve complete de-watering no later than November 1, 2002, in accordance with the terms of this UAO.

Upon completion of treatability studies utilizing best available demonstrated technologies for treatment of contaminants of concern, the Respondent may request that the Forest Service, review the requirements (effluent limits, including mixing zone, and schedule) imposed in this SOW for dewatering of the tailings impoundment, if Respondent believes that achieving those requirements are not practicable. If the Respondent submits such a request, the Forest Service, after consultation with EPA and the State, will consider the information provided and determine whether achievement of tailings impoundment dewatering as required by this SOW is practicable considering the exigencies of the situation. If, after consultation with EPA and the State, the Forest Service determines that the requirements in the SOW are not practicable, the Forest Service, in consultation with EPA and the State, will revise the schedule and/or effluent limits (including mixing zone as applicable) to reflect requirements that are practicable and that meet environmental objectives.

The Project Work Plan shall include the following:

a) **Interim Measures for reducing tailings impoundment water volume**: The Project Work Plan shall provide an analysis of alternatives and recommendation for implementation of interim measures to reduce the volume of water in the tailings impoundment pending start up of a new

treatment system. Interim measures that shall be evaluated include, but are not necessarily limited to, upgrades to the existing carbon columns, installation of a zinc circuit to the carbon adsorption system, and steps to maximize the forced evaporation system currently installed at the tailings impoundment.

The tailings impoundment evaporation system shall be operated to maximize dewatering of the tailings impoundment, and at a minimum shall be operated on a continuous basis each year from May 15 through October 15 unless otherwise approved in writing by the OSC. Critical equipment to maintaining operation of the evaporation system and spare parts shall be available at the Site to ensure that evaporation system shutdown is limited to no more than three days per month for the purpose of maintenance and operation. A daily operation log for the evaporation system shall be maintained and include hours of operation, system failures and causes, and environmental conditions which cause system shutdown.

b) **Interim Measures for Outfall 002**: In the Project Work Plan, the Respondent shall provide an evaluation of alternatives and identify a preferred alternative for modifying the existing wastewater management and treatment system for NPDES discharge 002 or adding additional treatment to ensure that State of Idaho water quality criteria (IDAPA 16.01.02200 and IDAPA 16.01.02250) in the receiving waters are achieved during all stream flow conditions, until the NPDES permit for outfall 002 is reissued. Implementation of an approved alternative shall begin within sixty (60) days of approval.

c) **De-water Tailings Impoundment**: The Project Work Plan shall provide for construction of a water treatment system designed specifically for treatment of water from the tailings impoundment. This treatment system must also be designed to treat tailings pore water as necessary to support tailings impoundment closure (item #6 below). The Project Work Plan shall include a schedule for necessary treatability studies and construction of a treatment system sufficient to treat and complete discharge of supernatant no later than November 1, 2002. Specifically, the schedule shall include, at a minimum, the following items: completion of treatability studies, completion of pilot testing, 30% design of the treatment system, 90% design of the treatment system, construction start, construction complete and full operation of the treatment system.

A Treatability Study Report, Pilot Study Work Plan, Pilot Study Report, 30% design of the treatment system, and 90% design of the treatment system shall each be deliverable items under this SOW (see Attachment A). The schedule shall include submittal dates for each of these deliverables.

The Project Work Plan shall provide detailed information about the treatability studies conducted to date and plans for any additional treatability studies to be conducted.

The Treatability Study Report shall include, but not be limited to: 1) a description and results of the treatability studies; 2) a detailed description and flow diagram of the proposed method by which the tailings impoundment will be dewatered; 3) tables that show estimated water balance on a monthly basis to achieve the dewatering deadline; 4) the predicted effluent quantity and

quality for any proposed discharge; and 5) a Monitoring Plan for the effluent and receiving water(s).

The Monitoring Plan shall include, at a minimum: 1) weekly monitoring of the effluent for hardness and for the parameters that have effluent limits; 2) quarterly monitoring of the effluent for arsenic, chromium, and nickel; 3) daily monitoring of the effluent and receiving water(s) for flow; and 4) monthly monitoring of the receiving water(s) upstream and downstream of the outfall for hardness and for the parameters with effluent limits.

The Pilot Study Report shall include, but not be limited to, a description and the results of the pilot studies and any refinement of items 2) through 5) reported in the Treatability Study Report.

Once the treatment system is operational, in addition to the other requirements of the UAO, the Respondent shall include in its monthly reports the results of effluent and receiving water monitoring, applicable quality assurance/quality control (QA/QC) measures, volume of wastewater treated and discharged, and revised water balance.

The effluent limitations that must be met by any discharge from the tailings impoundment to the Yankee Fork via the existing freshwater supply line are attached (Attachment B). These effluent limits allow for an acute zone of initial dilution within 25 feet of the diffuser and a chronic mixing zone of 25% of the volume and width of the receiving water. The Respondent shall ensure that a diffuser is designed to meet these requirements when discharging at the effluent limits under all flow and discharge conditions. There is uncertainty as to whether the mixing zones for mercury and selenium will impact endangered species in the Yankee Fork. The Respondent shall provide site-specific data and an evaluation that assesses the potential for mercury and selenium mixing zones and resulting effluent limits to adversely affect the threatened and endangered species and their habitat. This information shall be submitted by November 1, 2000, (the Mercury and Selenium Evaluation Report) and shall be a deliverable in accordance with the UAO. After reviewing the evaluation, the Forest Service, in consultation with EPA and the State, may modify the effluent limits and/or monitoring requirements.

The Respondent may consider alternatives, or additions to treatment and discharge to the Yankee Fork, including but not limited to temporary retention of tailings impoundment wastewater during low flow periods, accelerated evaporation and land application. Effluent limitations for any proposed discharge of wastewater from the tailings impoundment shall be approved by the Forest Service in consultation with EPA and the State prior to such discharge. Proposals for land application must address: 1) discharge water quality and quantity; 2) soil/site properties relevant to infiltration, percolation, retention and attenuation of cyanide and metals; 3) characterization of groundwater system and potential connection to surface waters; 4) assess potential risk to pathways and receptors for all contaminants in process water; 5) hydraulic, metals, nitrogen and TDS loading rates for soils; 6) design of all elements of land application system; and 7) monitoring programs for process water, physical pathways (soil/surface water/ groundwater/air) and potential receptors (plants, animals). For situations where mixing with groundwater is proposed to meet groundwater criteria, mixing zone analysis must be performed.

d) **Prevention and Control of Acid Drainage**: The Project Work Plan shall address the potential for formation and release of acid drainage from the tailings impoundment and embankment. The Project Work Plan shall include plans for preventing and controlling the formation and release of acid drainage from the impoundment and embankment concurrently and subsequent to de-watering of the impoundment.

2) **Collect and Pump Back Contaminated Groundwater**: Respondent shall collect and pump contaminated groundwater back to the tailings impoundment at the Site in accordance with the July 26, 1999 proposal for Jordan Creek Seeps and Pools Pump Back Project, as approved in the Forest Service letter of August 20, 1999. Additional groundwater collection measures, such as the installation of groundwater recovery wells or an interceptor trench, may be required under this UAO if determined necessary by the OSC in order to meet the objectives of the UAO/SOW and ensure that water quality criteria are achieved in Jordan Creek and the Yankee Fork during all stream flow conditions.

3) **Characterize Nature and Extent of Contamination**: Respondent shall implement the Site Characterization Work Plan, as requested in the letters from the Idaho Department of Environmental Quality (IDEQ) dated June 15, 1999 and July 30, 1999, and as modified herein. Respondent shall submit an Addendum to the Work Plan to Evaluate Sources of Cyanide (Site Characterization Work Plan) within ten (10) days after the effective date of this UAO. The addendum to the Site Characterization Work Plan shall address all items required in the letters from IDEQ dated June 15, 1999, and July 30, 1999, not already included in the Site Characterization Work Plan, and each of the items requested below (references are to the Site Characterization Work Plan):

i) Section 1.1, Page 1. Change "should" in the first line of this comment to read "must."

ii) Section 3.1.2. Change "should" in the first line of this comment to read "must."

iii) Section 3.1.3.2. Provide data on CN concentrations for all samples collected in Washout Creek.

iv) Section 3.3.3. Provide information on the CN levels in the effluent used and characterize the representativeness of effluent used.

v) Section 4.2. Provide information on the types of liners used and how they were constructed.

vi) Section 4.5.1. Change "should" in this comment to read "must."

vii) Section 5.4. Describe how geophysical survey information will be used for choosing additional monitoring well locations.

viii) Section 5.4. Describe additional pump-back wells that have been installed, including locations, well logs and well construction, well productivity, and cyanide concentrations.

ix) Section 6.0. Change "should" in this comment to read "must."

x) Section 6.1. Delete the sentence after "Monthly Reporting" and replace with: "Data will be submitted in Microsoft Office or compatible format, an electronic file of which will be transmitted monthly via hard copy and email."

xi) Data Reporting. Delete "It is requested that a statistical analysis be developed...." and replace with "Monthly reports must include a statistical analysis...."

xii) Analytical results must be provided at all monitoring locations with respect to both cyanide and all other hazardous substances that are detected at the Site.

xiii) Monitoring of surface water and ground water shall continue until the completion of work required by the UAO. Provide a schedule for continued monitoring of surface water and ground water.

Interim and final Site characterization reports shall be completed as described in the Site Characterization Work Plan and shall include a full response to the June 15, 1999 and July 30, 1999 letters from IDEQ (as modified herein).

4) **Quality Assurance and Sampling**: Sampling and analyses performed pursuant to this Order is referenced in the UAO under Section VI. Respondent shall submit a Sampling and Analysis Plan, including a Field Sampling Plan and a Quality Assurance Project Plan within ten (10) days of the effective date of this UAO that conforms with the requirements of Section VI.

5) **Health and Safety Plan**: Respondent shall submit a Site Health and Safety Plan at least ten (10) days prior to any on-Site construction activity conducted under this UAO. The Site Health and Safety Plan shall, at a minimum, ensure compliance with EPA and OSHA requirements for hazardous waste operations at uncontrolled hazardous waste sites (40 CFR Part 311 and 29 CFR Part 1910).

6) **Tailings Impoundment Closure Plan**: A work plan for final reclamation and closure of the tailings impoundment (Final Closure Plan) shall be submitted by no later than one (1) year prior to the scheduled completion of tailings impoundment de-watering. The Final Closure Plan shall specify removal and treatment of tailings pore water and measures to be taken to monitor and maintain the tailings in a de-watered condition and prevent formation of acid drainage over both the short- and long-term. These measures shall be designed to minimize long-term operation and maintenance responsibilities, and shall specifically describe such responsibilities. Respondent shall implement the Tailings Impoundment Closure Plan as approved by the Agencies.

7) **Final Report**: Within thirty (30) days after completion of all removal activities required under this UAO, the Respondent shall submit a final report summarizing all actions taken to comply with this UAO. The final report shall include the following certification signed by a person who

supervised or directed the preparation of that report:

> "Under penalty of law, I certify that to the best of my knowledge, after appropriate inquiries of all relevant persons, the information submitted is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

SOW ATTACHMENT A

SUMMARY OF DELIVERABLES:

Deliverables shall include:

1. The Project Work Plan within 30 days of the effective date of the UAO. The Project Work Plan shall include:

    a. Plan for implementation of interim measures to reduce the volume of water in the tailings impoundment.

    b. Plan for modification of existing wastewater management or treatment for discharge at outfall 002.

    c. Schedule for dewatering tailings pond, including:

        i. completion of treatability studies for treatment system.

        ii. completion of pilot studies.

        iii. 30% design of treatment system.

        iv. 90% design of treatment system.

        v. construction start.

        vi. construction complete.

        vii. full operation of treatment system.

        viii. completion of dewatering.

    d. Detailed information about the treatability studies conducted to date and plans for any additional treatability studies.

    e. Plan for preventing and controlling the formation and release of acid drainage from the impoundment and embankment.

2. Treatability Study Report. The Treatability Study Report shall include but not be limited to:

    a. Description and results of the treatability studies conducted.

    b. Description and flow diagram of tailings impoundment dewatering system.

c. Table with estimated water balance of tailings pond on monthly basis.

d. Describe prevention of formation and release of acid drainage from exposed tailings.

e. Predicted effluent quantity and quality for any discharge.

f. Monitoring Plan for effluent and receiving water.

3. Pilot Study Work Plan and Report. The Pilot Study Report shall include but not be limited to:

a. Description and results of the pilot studies conducted.

b. Any refinement of items b. through f. of the Treatability Study Report.

4. 30 % Design of the treatment system.

5. 90% Design of the treatment system.

6. An addendum to the Site Characterization Work Plan within ten (10) days of the effective date of the UAO to include modifications specified in 3) of the SOW.

7. Sampling and Analysis Plan within ten (10) days of the effective date of this UAO, including:

a. Field Sampling Plan.

b. Quality Assurance Project Plan.

8. Health and Safety Plan ten (10) days prior to any on-Site construction activity conducted under this UAO.

9. Mercury and Selenium Evaluation Report by November 1, 2000. This Evaluation Report shall assess the potential for mercury and selenium mixing zones and the resulting effluent limits to adversely affect the threatened and endangered species and their habitat.

10. Final Closure Plan one (1) year prior to the scheduled completion of tailings impoundment dewatering.

11. Final Report within thirty (30) days after completion of all removal activities required under the UAO.

12. Monthly reports in accordance with the UAO.

Effluent Limitations for Tailings Impoundment Discharge to Yankee Fork

Table 1: Effluent Limitations for Tailings Impoundment Discharge to Yankee Fork for Yankee Fork Flows of < 20 cfs
There will be no discharge at Yankee Fork flows of < 20 cfs.

Table 2: Effluent Limitations for Tailings Impoundment Discharge to Yankee Fork for Yankee Fork Flows of ≥ 20 cfs to < 75 cfs (see Table 5 for explanation of footnotes)

Parameter	units	Proposed Effluent Limitations					
		at Effluent Flows of ≤ 300 gpm		at Effluent Flows of ≤ 600 gpm		at Effluent Flows of > 600 gpm	
		maximum daily	monthly average	maximum daily	monthly average	maximum daily	monthly average
cadmium, total recoverable	µg/l	5.3	2.6	3.0	1.5	2.2	1.1
	lb/day	--	--	--	--	0.024	0.012
copper, total recoverable	µg/l	41	20	23	12	17	8.4
	lb/day	--	--	--	--	0.18	0.090
lead, total recoverable	µg/l	7.6	3.8[1]	4.3[1]	2.2[1]	3.1[1]	1.6[1]
	lb/day	--	--	--	--	0.033	0.017
mercury, total	µg/l	0.17	0.083	0.096	0.048	0.069	0.034
	lb/day	--	--	--	--	0.00074	0.00037
selenium, total recoverable	µg/l	70	35	40	20	29	14
	lb/day	--	--	--	--	0.31	0.15
silver, total recoverable	µg/l	3.2	1.6	1.8	0.90[2]	1.3	0.65[2]
	lb/day	--	--	--	--	0.014	0.0070
zinc, total recoverable	µg/l	260	130	150	76	110	56
	lb/day	--	--	--	--	1.2	0.60
cyanide, weak acid dissociable	µg/l	72	36	41	21	30	15
	lb/day	--	--	--	--	0.32	0.16
ammonia, total (as N)	mg/l	22	11	13	6.4	9.2	4.6
	lb/day	--	--	--	--	99	49
TSS	mg/l	30	20	30	20	30	20
pH	sµ	6.5 - 9.0		6.5 - 9.0		6.5 - 9.0	
effluent flow	gpm	not to exceed 300		not to exceed 600		--	

Table 3: Effluent Limitations for Tailings Impoundment Discharge to Yankee Fork for Yankee Fork Flows of ≥ 75 cfs to < 148 cfs (see Table 5 for explanation of footnote)

Parameter	units	Proposed Effluent Limitations					
		at Effluent Flows of ≤ 300 gpm		at Effluent Flows of ≤ 600 gpm		at Effluent Flows of > 600 gpm	
		maximum daily	monthly average	maximum daily	monthly average	maximum daily	monthly average
cadmium, total recoverable	µg/l	18	9.1	9.7	4.8	6.5	3.2
	lb/day	--	--	--	--	0.070	0.034
copper, total recoverable	µg/l	100	51	55	27	39	19
	lb/day	--	--	--	--	0.41	0.20
lead, total recoverable	µg/l	26	13	14	6.9	9.3	4.6[1]
	lb/day	--	--	--	--	0.10	0.049
mercury, total	µg/l	0.57	0.29	0.30	0.15	0.21	0.10
	lb/day	--	--	--	--	0.0023	0.0011
selenium, total recoverable	µg/l	240	120	130	63	85	43
	lb/day	--	--	--	--	0.91	0.46
silver, total recoverable	µg/l	7.1	3.5	3.8	1.9	2.8	1.4
	lb/day	--	--	--	--	0.030	0.015
zinc, total recoverable	µg/l	580	290	310	160	240	120
	lb/day	--	--	--	--	2.6	1.3
cyanide, weak acid dissociable	µg/l	250	120	130	66	89	44
	lb/day	--	--	--	--	0.95	0.47
ammonia, total (as N)	mg/l	76	38	41	20	27	14
	lb/day	--	--	--	--	290	150
TSS	mg/l	30	20	30	20	30	20
pH	sµ	6.5 - 9.0		6.5 - 9.0		6.5 - 9.0	
effluent flow	gpm	not to exceed 300		not to exceed 600		–	

Table 4: Effluent Limitations for Tailings Impoundment Discharge to Yankee Fork for Yankee Fork Flows of ≥ 148 cfs			
Parameter	units	maximum daily	monthly average
cadmium, total recoverable	μg/l	8.7	4.4
	lb/day	0.094	0.047
copper, total recoverable	μg/l	51	25
	lb/day	0.55	0.27
lead, total recoverable	μg/l	17	8.7
	lb/day	0.18	0.094
mercury, total	μg/l	0.38	0.19
	lb/day	0.0041	0.0020
selenium, total recoverable	μg/l	160	80
	lb/day	1.7	0.86
silver, total recoverable	μg/l	3.4	1.7
	lb/day	0.037	0.018
zinc, total recoverable	μg/l	370	190
	lb/day	4.0	2.0
cyanide, weak acid dissociable	μg/l	170	83
	lb/day	1.8	0.89
ammonia, total (as N)	mg/l	51	26
	lb/day	550	280
TSS	mg/l	30	20
pH	sμ	6.5 - 9.0	

Table 5 - Explanation of Footnotes for Tables 2 and 3

The footnoted limits are not quantifiable using EPA approved analytical methods. Therefore, the Forest Service will consider the Respondent to be in compliance with the effluent limits when the effluent concentration is less than the EPA approved Minimum Level (ML). The ML is defined as the concentration at which the entire analytical system gives recognizable signals and an acceptable calibration point.

1 - The ML for lead is 5 μg/l. Therefore the compliance evaluation level for the footnoted limits is 5 μg/l which corresponds to mass-based levels of 0.018 lb/day (at effluent flows of ≤ 300 gpm), 0.035 lb/day (at effluent flows of ≤ 600 gpm), and 0.054 lb/day (at effluent flows of > 600 gpm).

2- The ML for silver is 1 μg/l. Therefore the compliance evaluation level for the footnoted limits is 1 μg/l, which corresponds to mass-based levels of 0.0070 lb/day (at effluent flows of ≤ 600 gpm) and 0.011 lb/day (at effluent flows of > 600 gpm).

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DECISION:

Pursuant to the authority delegated to the Secretary of Agriculture in Executive Order 13016, which in turn has been re-delegated to the Under Secretary for Natural Resources and Environment, to be exercised only with the concurrence of the General Counsel, I have determined that USDA should request that the Environmental Protection Agency concur in an unilateral administrative order (UAO) under Section 106(a) of CERCLA requiring the Hecla Mining Company to perform a time critical removal action at the Grouse Creek Mine Site, located primarily on National Forest System land within the Salmon-Challis National Forest in Custer County, Idaho. The proposed UAO should be forwarded immediately to the Environmental Protection Agency with a request for concurrence.

	James R. Lyons Under Secretary for Natural Resources and Environment	Charles R. Rawls General Counsel
Approve:		
Disapprove:		
Discuss with me:		
Date:	6/14/00	6-14-00

3

Hecla
MINING COMPANY

February 28, 2000

Michael Gearheard
Director of Clean-up
U.S. Environmental Protection Agency
1200 Sixth Avenue
Box ECL 117
Seattle, WA 98101

Pat Trainor
USDA – Forest Service
P.O. Box 1026
800 W. Lakeside
McCall, ID 83638

Re: Scope of Work ("SOW") for Grouse Creek AOC

Dear Messrs. Gearheard and Trainor:

This letter is in response to the U.S. Forest Service's letter dated February 18, 2000 regarding the revised SOW dated February 17, 2000. In that letter, Mr. Trainor requested to know "if Hecla is willing to implement the SOW . . ."

Unfortunately, Hecla can not sign on to the current SOW pursuant to an Administrative Order on Consent. Our consultants advised us that because the proposed effluent limitations and mixing zone are much more stringent than necessary to protect aquatic resources, the schedule to dewater the tailing impoundment can not be achieved. A brief explanation of our decision follows.

To achieve EPA's November 1, 2002 deadline to dewater the tailing impoundment, Hecla will have to design and construct a plant, then discharge 900 gpm of treated effluent for 10 months and maximum of 1200 gpm for 2 months. Our water treatment consultant, Bob Helwick of U.S. Filter, has advised us that the effluent limitations for ammonia, silver, mercury and selenium will be problematic and perhaps unachievable for the 900 gpm discharge. For example, the monthly average effluent limit for silver is actually less than the analytical detection limit. Although the SOW provides a procedure to allow changes in these effluent limitations, this is discretionary and there is not enough certainty now, without the treatability studies in hand, for Hecla to feel comfortable with these limits. I would again point out that ongoing treatability studies will be completed

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within the next couple of months. We do not understand why we must commit to these effluent limitations now.

Compounding the problem is the fact that the Government has taken such an unnecessarily conservative approach to the mixing zone issue. EPA's proposed mixing zone based upon 25% of volume is much more stringent than proposed by the State of Idaho and much more stringent than necessary to protect the Yankee Fork fishery.

With regard to the schedule, we pointed out in our comments dated January 26, 2000 that EPA and its consultant, SAIC, have made several incorrect and significant assumptions in arriving at the dewatering schedule. In SAIC's memorandum dated February 8, 2000, there are several "new assumptions" that we have not been able to discuss with them for an explanation. Our concern over any hard deadline is best illustrated by the differences of opinions between engineers from Hecla and the government. This difference strongly suggests that the dewatering deadline should be a goal, not a firm deadline that subjects Hecla to penalties if it is not met.

It is Hecla's goal to safely dewater the Grouse Creek tailing impoundment as quickly as practicably possible. Unfortunately, the Government has proposed effluent limitations and mixing zone constraints that are so unnecessarily stringent that Hecla will not be able to meet the Government's timetable. In short, we have not seen the "flexibility" of using CERCLA here that was indicated by EPA at the outset of our discussions. We will be proceeding with treatability studies and other aspects of the work indicated at out meeting on January 14, 2000 in Boise.

I do remain hopeful that we can iron this out and will be contacting you soon to discuss the matter further.

Very truly yours,

William B. Booth
Vice President

WBB:tdh

c: Michael B. White, Esq.
Betsy Temkin, Esq.
John N. Galbavy, Esq.

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
1200 Sixth Avenue
Seattle, WA 98101

Reply To
Attn Of: OW-130

February 16, 2000

MEMORANDUM

SUBJECT: Grouse Creek Scope of Work
Response to Comments from Hecla Mining Company on Effluent Limits

FROM: Patty McGrath
Office of Water, Environmental Engineer

TO: Greg Weigel
Idaho Operations Office, On-Scene Coordinator

Following is a response to Hecla's comments on the effluent limits in the Scope of Work (SOW). These comments were presented by Hecla in a January 26, 2000 memorandum to yourself and Pat Trainor. Their specific comments can be found in Section 2, page 6 of that memo.

Comments 1, 2, and 3: Hecla suggested that effluent limits and monitoring requirements for arsenic, chromium, and nickel be removed from the SOW since these parameters have always been reported at less than the proposed effluent limits in the tailings impoundment water.

Response: After reviewing the available water quality data on the tailings impoundment and underdrains, I agree that effluent limits may not be needed for these parameters. The highest concentrations detected for these parameters were all well below the current SOW effluent limits. However, I suggest that monitoring be included on a quarterly basis at least for the first year to verify that concentrations are not increasing.

Comments 4 and 5: Hecla suggested that the effluent limits for cadmium and lead be removed if monitoring for six months indicates that all sampling results are 50% or less than the average monthly limits.

Response: Cadmium and lead concentrations in the tailings impoundment and underdrain waters have been reported at less than detection limits. However, the reported detection limits for the tailings impoundment were 3 ug/l for cadmium and 40 ug/l for lead. These detection limits are

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greater than the effluent limits proposed in the SOW, therefore it is unknown whether or not concentrations in the tailings impoundment water are lower than the effluent limits. Therefore, effluent limits for these parameters are necessary to ensure that the discharge is monitored and treated, if necessary, to the appropriate level. Even if the discharge is in compliance with the effluent limits for six months, the effluent limits and monitoring should not be removed. Six months may not be a representative time frame for determining compliance with effluent limits. At least a year would be necessary to take into account seasonal variations and more than a year would be necessary to take into account annual variations (e.g., due to changes in precipitation and evaporation). Effluent limits are also necessary to maintain long-term treatment goals. Also, in the NPDES program, compliance with an effluent limit is not a reason to remove an effluent limit under the term of the permit. However, the AOC does contain a clause that allows modification. If a year or more of monitoring indicates that concentrations of these parameters in the tailings impoundment (before treatment) are always less than the effluent limits, then monitoring frequency may be reduced under the terms the AOC.

Comment 6: Hecla requested that mixing zones be allowed for mercury and selenium and submitted a technical memorandum prepared by Chadwick Ecological Consultants in support of this.

Response: EPA reviewed the technical memorandum and consulted with the USFWS and NOAA/NMFS regarding this issue. The technical memorandum gave several reasons as to why mixing zones are appropriate. The reasons and EPA's responses are:

1) More appropriate mercury and selenium criteria could be higher than the current aquatic life criteria.

response: The technical memo focused more on criticizing the mercury and selenium water quality criteria than explaining why mixing zones may be appropriate. The memo made general statements that typical mountain streams would not conform to the conditions used to develop the criteria. However, the memo provides no evidence specific to the Yankee Fork to support this assertion. In the absence of a promulgated site-specific criteria, the water quality criteria are not subject to change.

2) The site-specific conditions necessary for significant methylation of mercury and biological transformation of selenium would not be expected in mountain streams like the Yankee Fork. response: The memo refers to studies of other mountain streams, but does not provide information specific to the Yankee Fork (e.g., concentrations of organic matter, fine sediments, dissolved oxygen, etc.) to substantiate this statement.

3) For selenium, the findings of other western stream-based studies indicate that the toxicity of selenium to aquatic life in mountain streams poses minimal risk.

response: Again, the memo refers to other studies but does not provide information

specific to the Yankee Fork. In addition, this relates more to the suitability of the criteria (see response to 1, above) rather than a mixing zone.

4) For mercury, the memo states that trout would not be expected to stay in a mixing zone long enough to have measurable bioaccumulation.

response: Again, no site-specific data (e.g., mixing zone size, percent of habitat, amount of time in the mixing zone, etc.) is provided to support this statement.

The USFWS also reviewed the memo and maintained its position that mercury and selenium mixing zones should not be allowed, particularly since EPA has determined that the mercury and selenium chronic aquatic life criteria are likely to adversely affect the endangered species and their habitat in Idaho (December 1999 Biological Assessment of the Idaho Water Quality Standards for Numeric Water Quality Criteria for Toxic Pollutants). Due to the uncertainty as to the protectiveness of these criteria as related to endangered species and the USFWS concern regarding the potential for bioaccumulation, mixing zones for mercury and selenium were not included in the original effluent limit calculations.

As discussed above, Hecla did not submit adequate site-specific information in support of their assertion that mixing zones are protective for mercury and selenium. However, we will allow mixing zones for these parameters should Hecla provide site-specific data and an evaluation that demonstrates that the mixing zones and resulting effluent limits will not adversely affect the endangered species or their habitat. EPA recalculated the effluent limits for mercury and selenium using the same procedures (and mixing zones) used to calculate the effluent limits for the other parameters. The new effluent limits are included in Attachment 4. Language has been added to the SOW requiring Hecla to prepare a biological evaluation to support the mixing zones for these parameters.

Comment 7: Hecla suggested that a 100% mixing zone by volume could be allowed by premixing effluent with Bonanza ground water or by Yankee Fork water drawn upstream of the discharge.

Response: The NPDES regulations (40 CFR 125.3(f)) allow for consideration of flow augmentation as a means to achieve water quality standards on a case-by-case basis, provided that the discharger "demonstrates that such a technique is the preferred environmental and economic method to achieve the standards after consideration of alternatives such as advanced waste treatment, recycle and reuse, land disposal, changes in operating methods, and other available methods." Hecla has not made such a demonstration, therefore diluting the effluent with groundwater or surface water should not be allowed.

Comment 8: This comment consisted of two parts.

First, Hecla suggested that if 100% mixing is not allowed under Comment 7, then limits should be based on the NOAA recommended safe fish passage criteria (acute criteria met within 25 feet of the diffuser and chronic or applicable avoidance criteria met within 25% of the stream width) using the CORMIX modeling, not EPA calculations based on a 25% by volume mixing zone.

Second, Hecla suggested that when CORMIX modeling results indicate that the maximum daily limit will exceed 2-times the monthly average limit then the daily maximum limit would be restricted to twice the monthly average. And, when the limits based on the 25-foot acute criteria is lower than the daily maximum, the monthly average would be the same as the daily maximum.

Response: In response to the first part of the comment, chronic mixing zones were based on meeting chronic criteria or avoidance threshold concentrations within 25% of the stream width or 25% of the stream volume, whichever was more stringent. The Federal Agencies used this approach for the following reasons:

- This was recommended by NOAA/NMFS at a meeting on November 3, 1999. At that meeting the USFWS concurred with this approach, except in regards to mercury and selenium. Attachment 1 includes a letter from NOAA/NMFS clarifying that they were concerned with mixing zone volume as well as width. This information was inadvertently left out of their January 12, 2000 letter that described their mixing zone recommendations.

- Mixing zone size (volume) is important as well as width to minimize the total area extent (and habitat alteration) of mixing zones. For example, Hecla's modeling indicated that at 25% width, the mixing zones for the > 75 cfs discharge scenarios extend more than 300 feet from the diffuser.

- This is consistent with the State of Idaho's mixing zone policy (IDAPA 16.01.02060) which limits mixing zones in flowing waters to 25% of the stream width and 25% of the stream volume. Where mixing zones are allowed in NPDES permits, the State of Idaho very rarely departs from this policy. For this discharge the State submitted initial recommendations that departed from these values, recommending 33 to 80% of the stream volume for mixing zones. The State departed from their policy considerations to encourage "expeditious dewatering of the tailings impoundment". EPA did not agree that the State's departure from its policy was appropriate for this discharge for the following reasons:

  - Expeditious dewatering of the tailings impoundment is desirable. However, until and unless treatability studies indicate otherwise, through proper design and operation of a wastewater treatment facility, Hecla can discharge in an expeditious manner and still meet effluent limits based on the 25% mixing zones.

  - There are no clear scientific studies which evaluate mixing zone sizes. The State's

analysis says "To avoid risk of interrupting migration of fishes through the outfall discharge plume, with consequences of effective loss of upstream habitat or interrupting their life cycles, a significant portion of the width of the stream must be below fish avoidance threshold concentrations." The State provided no rationale for allowing 50% of the stream width except the statement that this represents "a significant portion of the width of the stream". In the absence of information showing that something greater than the 25% volume and width currently envisioned in the state policy is protective, EPA felt that the state policy and recommendations of the Services (who are the experts in threatened and endangered species protection) should apply.

- The Yankee Fork is designated by the State of Idaho as a Special Resource Water (IDAPA 16.01.02130.01.c). Discharge into special resource waters are limited under IDAPA 16.01.02400.01.b, which states that no new point source can discharge pollutants to any water designated as a special resource water if pollutants significant to the designated beneficial uses can or will result in a reduction of the ambient water quality of the receiving special resource water as measured immediately below the applicable mixing zone. Note that this suggests that water quality should not be reduced below ambient water quality, not simply meeting water quality criteria. The special status of the Yankee Fork is an additional reason why EPA felt that it was not appropriate to depart from the States mixing zone policy.

The second part of this comment suggested an alternate way to develop effluent limits based on CORMIX modeling. In response to this, the effluent limits were developed consistent with how effluent limits are developed for NPDES permits. The effluent limits were developed based on EPA guidance in the Technical Support Document for Water Quality-based Toxics Control (the TSD, EPA March 1991). The regulatory basis for the development of the effluent limits and the procedures for how they were developed were provided in detail in EPA's January 11, 2000 memorandum. The TSD procedures were used since they are the standard procedures used to develop effluent limits. The TSD procedures take into account ambient concentrations, effluent variability, sampling frequency, and the difference in time frames between the monthly average and daily maximum limits. Hecla's proposal does not appear to take into account these factors and there is no basis for using alternate methods for developing effluent limits.

Comment 9: Since TSS is a technology-based standard, Hecla stated that there should be no mass loading requirements for TSS.

Response: Mass limits are used to control loadings to the receiving water and prevent the use of dilution as treatment. However, since the TSS limits are based on technology-based effluent guidelines expressed as concentration, mass limits are not required (40 CFR 122.45(f)) and therefore the mass-based TSS limits may be removed.

Comment 10: Hecla stated that mass loading limits are not necessary for most discharge scenarios since, for flow tiers of up to 600 gpm, the mass is restricted because higher flows result in the effluent limits of the next higher flow tier.

Response: Hecla is correct. So long as the SOW specifies restrictions on effluent flow, mass loading limits are not necessary for flows of less than 600 gpm. However, mass loading limits should be retained at the highest effluent flow tier for each receiving water flow tier to ensure that total loadings to the Yankee Fork are controlled within the flows used to develop the effluent limits. The final effluent limits are provided in Attachment 4.

Comment 11: Hecla suggested that the pH limitation should be 6 - 9 instead of 6.5 - 9, since 6.5-9.5 is an in-stream water quality standard and the Yankee Fork has been monitored as low as pH 6.1 and 6.4.

Response: EPA's January 11, 2000 memo explained the basis for the pH limitation. As with other parameters effluent limits were based on the most stringent of either the water quality-based effluent limits or the technology-based limits. For pH, the lower limit of 6.5 was based on Idaho water quality standards (since it is more stringent than the technology-based pH limit of 6). Therefore, 6.5 should be used as the lower limit of the effluent. This is regardless of actual water quality in the Yankee Fork.

Comment 12: Hecla commented that a 100% mixing zone should be allowed for ammonia since NOAA did not identify ammonia as a constituent of concern and EPA used worst case conditions for determining the criterion.

Response: Effluent limits for ammonia were developed consistent with how effluent limits for the other parameters were developed. For example, we used reasonable worst case conditions of receiving water pH and temperature (95th percentile) to calculate the ammonia criterion. This is analogous to using reasonable worst case hardness (5th percentile) for determining some of the metals criteria. This procedure is consistent with that used to develop criteria for NPDES permitting and ensures that the water quality-based effluent limits will be protective of water quality standards under virtually all stream conditions.

Ammonia was added as a parameter of concern because concentrations of ammonia in the tailings pond water exceed water quality criteria and the ammonia levels are increasing. In addition, some of the cyanide destruction technologies being evaluated by Hecla have the potential to increase the amount of ammonia in the discharge. Ammonia was identified by the Federal Agencies as a parameter of concern after the State and Services made their mixing zone recommendations. EPA consulted with the Services and they agreed that the mixing zone constraints for ammonia

should be the same as they are for the other parameters. In the absence of information justifying the need for larger mixing zones, the mixing zones used for ammonia should remain the same as for the other parameters.

Additional Concern #1: Although not specifically spelled out in the above comments, Hecla expressed concerns in its memo and at our January 14 meeting about why the modeled mixing zones appear to be smaller than those recommended by the Services. Specifically, Hecla questioned why the chronic mixing zones were less than 25% of the receiving water width and why the acute mixing zones were less than 25 feet from the diffuser.

Response: EPA's full response to this concern is included as Attachment 2. In summary, the chronic mixing zones were developed based on the more stringent of 25% of the receiving water width or 25% of the volume. Except for nickel, the volume constraint was more stringent than the width constraint. Therefore, the mixing zone widths for parameters other than nickel were all less than 25% of the stream width.

The acute mixing zones were based on achieving acute criteria within 25 feet of the diffuser. For parameters where effluent limits are based on the chronic criteria (the chronic long-term average concentration is more stringent than the acute), the acute mixing zones are less than 25 feet from the diffuser since the chronic mixing zone is the limiting factor. For parameters where effluent limits are based on the acute criteria, the acute mixing zones were developed as a group (expect for silver). Because of this grouping, the mixing zones for the individual parameters were not individually optimized. This is applicable to copper at the 75 - 148 cfs flow scenario and cadmium, copper, and zinc at the >148 cfs flow (it would also have been applicable to arsenic and chromium, but these should be removed as parameters of concern). Because of Hecla's concern, we recalculated the effluent limits for these parameters for these scenarios based on optimized mixing zones. The recalculated effluent limits for these parameters are provided in Attachment 2. The final effluent limits for all parameters are included in Attachment 4.

Additional Concern #2: Although not spelled out in the specific comments on the SOW effluent limits, above, Hecla suggested adding an additional flow tier of 901 - 1200 gpm. This will allow them greater flexibility to discharge greater volumes of water during peak flows.

Response: Increasing the effluent flow rate during Yankee Fork peak flows may be desirable to expedite dewatering of the tailings impoundment. However, modeling conducted by SAIC indicated that the higher effluent flow cannot be used with the current diffuser design (see Attachment 3). Therefore, effluent limits have not been developed for the higher flow tier. The SOW provides for Hecla to design an appropriate diffuser to meet the effluent limits and mixing zone constraints. Should the new diffuser design allow for effluent discharge at the higher flow

rates, it may be possible to modify the effluent limits to incorporate new limits for the higher flow tier.

List of Attachments:

Attachment 1: February 10, 2000 letter from NOAA/NMFS clarifying their mixing zone recommendations.

Attachment 2: February 16, 2000 memo from EPA in response to Hecla's concern about the modeled mixing zone sizes.

Attachment 3: February 4, 2000 memo from SAIC regarding the 1200 gpm effluent discharge scenario.

Attachment 4: Revised effluent limits.

U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Ocean Service
Office of Response and Restoration
Coastal Protection and Restoration Division
c/o EPA Region X (ECL-117)
1200 Sixth Avenue
Seattle, Washington 98101

February 10, 2000

Patricia McGrath
US EPA Region X (OW-130)
1200 Sixth Avenue
Seattle, WA 98101

Dear Ms. McGrath,

This letter clarifies information previously discussed with you last fall and summarized in NOAA correspondence dated January 12, 2000. Our January letter provided technical advice to EPA and the Forest Service regarding contaminant concentrations that would be protective of NOAA trust resources in the Yankee Fork of the Salmon River near the confluence with Jordan Creek. The information provided was based upon NOAA's understanding of the project and the best science available to date. Please refer to our January 12, 2000 letter for background.

As previously discussed, the Yankee Fork of the Salmon River provides spawning and rearing habitat for salmonid fishes under the trusteeship of NOAA. Snake River steelhead and Snake River spring/summer chinook, which occur at or near the proposed discharge are listed as threatened under the Endangered Species Act. These fish must have safe, continuous passage around any mixing zone. Any contaminant discharge poses a risk, and our preference would be to not allow a mixing zone. However, in the interest of dewatering the Grouse Creek Mine tailings impoundment and averting a catastrophic release of contaminants, NOAA has defined an approach to limit the impact of the discharge.

As you recall, avoidance thresholds and mixing zone sizes were discussed by EPA and NOAA staff in a November 3, 1999 meeting. During that meeting, NOAA staff stated that the mixing zone should be no more than 25% of the volume or width of the Yankee Fork, whichever was less.

If the stream bed were completely flat (the stream was the same depth from bank to bank) then there would be no meaningful difference between allowing a mixing zone of 25% width and, allowing a mixing zone of 25% volume. Like all natural streams, the Yankee fork is not flat-bottomed nor is it uniformly wide. Because the streambed is generally deeper in the middle than on the sides, allowing mixing over 25% of the width of the stream could result in the use of more than 25% of the volume, assuming the discharge occurs in the center of the stream as is currently planned for the dewatering project. This is of particular concern at lower flows and in wider portions of the steam, where several feet on either edge of the stream may be too shallow to allow passage of adult salmonids. Restricting the mixing zone to 25% of the width or volume, whichever is less, alleviates this concern.

The requirement that the mixing zone not use more than 25% of the volume of the stream is not an unusual requirement. In fact, the State of Idaho's water quality regulations specify that mixing zones in flowing receiving waters not exceed 25% of the stream width and not include more than 25% of the stream volume. In developing the technical recommendations in our January 12, 2000 letter, we focused on the question of avoidance behavior, and affirmed that

the standard 25% mixing zone, when applied with the recommended avoidance criteria, would protect NOAA trust resources.

NOAA believes that the effluent standards in EPA's December 16, 1999 memorandum should allow the dewatering of the tailings pond to occur while providing safe passage for salmonids migrating to spawning grounds above the site. If you have any questions about this letter or require any further clarification on NOAA's position, please do not hesitate to call me at 206/553-2101.

Sincerely,

Helen E. Hillman

Helen Hillman
Coastal Resource Coordinator

cc: Alyce Fritz, NOAA / NOS (file copy)
Jo Linse, NOAA / NOS Seattle
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Ted Meyers, NOAA / NMFS Boise
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Susan Burch, USFWS Boise
Catherine Reno, Idaho DEQ
Chris Mebane, Idaho DEQ

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
1200 Sixth Avenue
Seattle, WA 98101

Reply To
Attn Of: OW-130

February 16, 2000

MEMORANDUM

SUBJECT: Grouse Creek Mine Draft Scope of Work Effluent Limits
Response to Hecla's Concerns Regarding Mixing Zone Size

FROM: Patty McGrath
Office of Water, Environmental Engineer

TO: Greg Weigel
Idaho Operations Office, On-Scene Coordinator

This memorandum presents information requested at our January 14, 2000 meeting in Boise related to the development of the effluent limits for discharge from the Grouse Creek Mine tailings impoundment to the Yankee Fork. Specifically Hecla questioned the following:

1 - Why the chronic mixing zones were less than 25% of the receiving water width.
2- Why the acute mixing zones were less than 25 feet from the diffuser.

Before answering the above questions, it is important to understand that effluent limits are calculated based on either the acute or chronic criteria, whichever is more stringent. This concept is summarized below.

Effluent limits are developed to achieve both the acute and chronic water quality criteria. Effluent limits are developed for each parameter of concern by first calculating a wasteload allocation (WLA) based on the criteria, ambient concentration, effluent and receiving water flows, and mixing zones. A WLA is calculated for EACH the acute and chronic criterion. These WLAs are then translated into long-term average (LTA) concentrations. The most stringent LTA concentration is then used to develop both the average monthly limit and the maximum daily limit. For some parameters, such as copper, the acute LTA was more stringent than the chronic LTA, therefore effluent limits were based on the acute LTA. In other words, the acute criterion and mixing zones drove the calculation of effluent limits for copper. A discharge in compliance with the effluent limits for copper would be in compliance with both the acute and chronic criteria. If the effluent limits for copper were based on the chronic criterion, then the discharge would not be in compliance with the acute criterion and mixing zone. This is demonstrated in the following example:

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The copper limits for the 75 cfs - 148 cfs flow tier at an effluent flow of 900 gpm are:

average monthly limit (AML) = 19 ug/l
maximum daily limit (MDL) = 37 ug/l

These limits are based on the acute criterion and acute mixing zone since limits based on the chronic criterion and mixing zone are less stringent. The limits based on the chronic criteria are (see Table 1-11 of the January 11 EPA memorandum - chronic limits may be calculated from the chronic LTA as shown in the example calculation in Attachment 4 of the memo):

$AML_{chronic}$ = 31 ug/l
$MDL_{chronic}$ = 62 ug/l

If discharge was at the chronic effluent limits, CORMIX modeling indicates that the acute constraint would not be met:

the dilution at 25 feet from the diffuser for this flow scenario = 11.3%
therefore, the concentration at 25 feet based on the $MDL_{chronic}$ = 62 x 11.3 = 7 ug/l

7 ug/l exceeds the copper acute criteria of 4.6 ug/l

Where discharge is at the more stringent acute effluent limits, CORMIX modeling demonstrated that both the acute and chronic constraints would be met (see Table 2-6 of the EPA January 11 memo for this demonstration).

For other parameters, such as cyanide, the limits based on chronic criteria were more stringent. See the January 11, 2000 EPA memo for details of how the limits were calculated. For example, Tables 1-6 through 1-12 of the memo show, for each parameter, whether the limits were based on the acute criteria or chronic criteria.

Why the chronic mixing zones were less than 25% of the receiving water width.

The chronic mixing zones were based on 25% of the volume or 25% of the width of the Yankee Fork, whichever was less. The rationale for using these mixing zones was included in EPA's January 11 memo and in more detail in the February 16, 2000 memo in response to Hecla's specific comments on the effluent limits (the memo to which this is attached). Based on these mixing zone constraints, EPA used the following process to determine the appropriate chronic mixing zone for each parameter:

- Effluent limits were initially calculated based on a chronic mixing zone of 25% by volume (mixing zones used to calculate effluent limits must be in terms of volume).

- CORMIX modeling was conducted to determine how discharge at the average monthly limit would dilute with distance (see the January 21, 2000 memorandum from SAIC).

- If the modeling indicated that chronic criteria (or for copper, nickel and zinc, avoidance threshold concentrations) would be met within 25% of the stream width, then the 25% volume mixing zone was considered appropriate (i.e., consistent with the mixing zone constraint that the more stringent of 25% of the volume or 25% of the width be used). This was the case for all of the parameters except nickel.

- If the modeling indicated that chronic criteria or threshold concentrations would not be met within 25% of the stream width, then the mixing zone size was reduced. This was the case for nickel for several of the flow tiers (at receiving water flows of greater than 75 cfs and effluent flows of greater than 600 gpm). For these flow scenarios, the width constraint was more stringent than the volume constraint, therefore the chronic mixing zone volumes were reduced to 15% and the effluent limits recalculated and remodeled to confirm that the avoidance threshold concentrations would be achieved within approximately 25% of the stream width.

Based upon the above discussion, following are the two reasons why the chronic mixing zone widths were less than 25% of the stream width (except for nickel):

1 - <u>For arsenic (at the low receiving water flow tier only), cadmium (at all flow tiers except the 148 cfs tier), lead, cyanide, and ammonia:</u> The effluent limits for these parameters were driven by the chronic criteria. CORMIX modeling indicated that discharge at effluent limits based on mixing zones of 25% of the receiving water volume would result in achieving chronic criteria within 17% to 19% of the stream width. Because the mixing zone volume constraint was more stringent than the width constraint, chronic mixing zones were less than 25% of the stream width for these parameters. The chronic mixing zones for these parameters cannot be increased to 25% of the stream width without violating the 25% stream volume constraint.

<u>For mercury and selenium:</u> Initially mixing zones for mercury and selenium were not included in the effluent limit calculations. However, in response to Hecla's comments, EPA incorporated mixing zones for these parameters and recalculated the effluent limits. The effluent limits for these parameters were driven by the chronic criteria. Although CORMIX modeling was not conducted for these recalculated effluent limits, the mercury and selenium concentrations at 25% stream width can be estimated from model results of other parameters. For example, based on the modeling, the dilution at 25% stream width for the 75- 148 cfs receiving water flow and 900 gpm effluent flow scenario is approximately 9%. Multiplying this by the average monthly limits of 0.10 ug/l for mercury and 43 ug/l for selenium results in concentrations of 0.009 ug/l for mercury and 3.9 ug/l for selenium, which are less than the chronic criteria for these parameters. Similar calculations were performed for the other flow scenarios. The conclusion of this analysis is the same as for the parameters under #1, above. That is, the mixing zone volume constraint was more stringent than the width constraint, so chronic mixing zones were less than 25% of the stream width and cannot be increased without violating the 25% volume constraint.

2 - For arsenic (at the two high flow tiers); cadmium (at > 148 cfs), chromium, copper, silver, and zinc): The effluent limits for these parameters were driven by the acute criteria. That is, the AML_{acute} was less than the $AML_{chronic}$. CORMIX modeling showed that discharge at the AML_{acute} (the final effluent limit) would result in achieving chronic criteria and thresholds within 13% to 19% of the stream width. It makes sense that the chronic values would be met in something less than 25% of the width, since the chronic limits were not as stringent as the acute limits (see the copper example on the previous page). The chronic mixing zones for these parameters cannot be increased without violating the acute criteria and mixing zone constraint.

Why the acute mixing zones were less than 25 feet from the diffuser.

The acute mixing zone constraint was that acute criteria be met within 25 feet from the diffuser. However, mixing zones used to determine WLAs and calculate effluent limits must be based on volume (i.e., percent of receiving water flow). Therefore, the process for developing the acute mixing zones involved the following steps:

- Because mixing zones to calculate effluent limits must be based on receiving water volume, EPA initially assumed 25% of the stream volume for the acute mixing zones. This is the maximum acute mixing zone volume available (since the acute mixing zone, or zone of initial dilution, must be a smaller area and volume within the chronic mixing zone and the maximum chronic mixing zone allowed was 25% by volume).

- CORMIX modeling was conducted to determine how discharge at the maximum daily limit would dilute with distance.

- Where the modeling indicated that the effluent limits would result in meeting acute criteria within 25 feet, no change was made to the acute mixing zones. This is the case for all the parameters at the 20 - 75 cfs receiving water flow tier and for cadmium (at the two low flow tiers only), lead, mercury, nickel, selenium, cyanide, and ammonia.

- Where the modeling indicated that the acute criteria would not be met within 25 feet, the acute mixing zone volume was decreased. This was the case for cadmium at receiving water flows of >148 cfs, and arsenic, chromium, copper, silver, and zinc at receiving water flows of >75 cfs. Mixing zone volumes for these parameters were determined by iteratively calculating effluent limits and modeling to determine compliance with the acute constraint. In order to do this, the mixing zones were adjusted as a group, except for silver, (i.e., the mixing zone volumes for these parameters were all lowered to the same value until effluent limits met the 25 foot constraint for all of the parameters). It is common that parameters are grouped together with the same mixing zone volume determined for the group. For example, the state recommended separate mixing zones for zinc and copper, then grouped all the other parameters together rather than trying to

optimize mixing zones for each of the other parameters. Grouping conserves time and resources, particularly where there are a large number of effluent limits such as the numerous tiers requested for the Grouse Creek discharge. This is discussed in more detail under reason #2, below. Table 2-1 of EPA's January 11 memo provides the acute mixing zone volumes used.

Following are the two reasons why the acute mixing zones were less than 25 feet from the diffuser:

1 - For arsenic (at the low flow tier only), cadmium (at the two low flow tiers only), lead, mercury, nickel, selenium, cyanide, and ammonia: The chronic criteria and mixing zones resulted in effluent limits more stringent than the acute criteria and mixing zones for these parameters. This means that the MDL_{acute} was greater than the $MDL_{chronic}$. So, when discharge at the $MDL_{chronic}$ (the SOW effluent limit) was modeled, it makes sense that the acute criteria would be met in something less than 25 feet downstream from the diffuser. The acute mixing zones for these parameters cannot be increased without violating the chronic criteria and chronic mixing zone constraints.

2 - For arsenic (at the two highest receiving water flow tiers), cadmium (highest tier only), chromium, copper, silver, and zinc: The acute criteria and mixing zones controlled the development of effluent limits for these parameters. The reasons that acute mixing zones were less than 25 feet for these parameters is because:

- For the higher effluent flow scenarios, dilution was not very sensitive to near field downstream distance. For example, CORMIX modeling of effluent flow of 900 gpm for the 75 cfs - 148 cfs scenario, indicated that dilution at 4.6 feet from the diffuser was 12%, dilution at 18 feet from the diffuser was 11%, and dilution at 25 feet from the diffuser was 11%. Therefore, effluent limits do not increase much with distance from the diffuser. This is also discussed in SAIC's January 21 memo.

- Except for silver, the individual mixing zones were not optimized for these parameters. EPA did optimize the mixing zone for silver, since it was expected that effluent limits for silver would be the most challenging to achieve. To demonstrate differences between the current effluent limits and effluent limits based on optimized acute mixing zones, EPA recalculated the effluent limits for cadmium (highest flow tier only), copper and zinc. Effluent limits for arsenic and chromium were not recalculated since these parameters no longer have effluent limits (for the reasons discussed in the memo to which this is attached). Following is a discussion of the recalculated effluent limits for each flow scenario.

75 - 148 cfs scenario: Tables 1, 2, and 3 presents effluent limits based on various acute mixing zones for effluent flows of 300 gpm, 600 gpm, and 900 gpm, respectively. Only effluent limits for copper, silver, and zinc were considered since these are the parameters

whose effluent limits are driven by the acute criteria and mixing zone. These tables demonstrate that the effluent limits for copper can be increased by approximately 10%, and still meet both the acute and chronic mixing zone constraints. These tables demonstrate that the mixing zones for silver and zinc cannot be increased without violating the acute and chronic mixing zone constraints, respectively.

> 148 cfs and 900 gpm scenario: Table 4 presents effluent limits based on various acute mixing zones for this scenario. Only effluent limits for cadmium, copper, silver, and zinc were considered since these are the parameters whose effluent limits are driven by the acute criteria. This table demonstrates that the effluent limits for cadmium, copper, and zinc can be increased by approximately 8%, 5%, and 20%, respectively and still meet both the acute and chronic mixing zone constraints. The table demonstrates that the acute mixing zone for silver cannot be increased without violating the acute constraint.

20 cfs - 75 cfs scenarios: As discussed above (first bullet on page 4), the mixing zones for copper, silver, and zinc for all of the effluent flows in this flow tier are already maximized in terms of volume (25% is the maximum mixing zone volume). Therefore, the size of these mixing zones cannot be increased.

SUMMARY

Following summarizes the conclusions of this memo:

chronic mixing zones: The chronic mixing zones were developed based on the mixing zone constraints outlined in this memo, responses to Hecla's comments on the effluent limits (the memo to which this is attached) and in EPA's January 11 memo. This memo explains why the chronic mixing zones were less than 25% of the stream width for all parameters (except nickel). The chronic mixing zones cannot be increased in size for any of the parameters without violating the chronic volume constraint or the acute constraint.

acute mixing zones: The acute mixing zones were developed based on the mixing zone constraints outlined in this memo and in EPA's January 11 memo. This memo explains why the acute mixing zones for all parameters in the 20 - 75 cfs flow tier and most of the parameters in the higher flow tiers are less than 25 feet from the diffuser, but cannot be increased without violating the acute or chronic constraints. For the higher receiving water flow tiers, most of the parameters whose effluent limits were driven by the acute criteria were not individually optimized. This memo optimized the acute mixing zones for each of these parameters and demonstrated that the effluent limits for a few of the parameters can be increased slightly and still meet the acute and chronic constraints. The following table provides the new effluent limits for these parameters.

New Effluent Limits Based Upon Optimized Acute Mixing Zones

receiving water flow	effluent flow	parameter	optimized acute mixing zone (% volume)	New Effluent Limits (ug/l)	
				MDL	AML
75 - 148 cfs	300 gpm	copper	18	100	51
	600 gpm	copper	18	55	27
	900 gpm	copper	19	39	19
> 148 cfs	300 gpm	cadmium	13	8.7	4.4
		copper	13	51	25
		zinc	15	370	190

Table 1: Effluent Limits for Various Mixing Zone Sizes and Compliance with Acute Mixing Zone Constraints (note: effluent limits in bold represent the current effluent limits)

flow scenario: effluent flow = 300 gpm, receiving water flow = 75 - 148 cfs
dilution at 25 feet from the diffuser = 4.4%

acute mixing zone size (% volume)	copper (acute criterion = 4.6 ug/l)			silver (acute criterion = 0.32 ug/l)			zinc (acute criterion = 35)		
	MDL	AML	acute criterion met within 25 feet[1]	MDL	AML	acute criterion met within 25 feet[1]	MDL	AML	acute criterion met within 25 feet[1]
16	**91**	**45**	yes	**7.1**	**3.5**	yes	**580**	**290**	yes
17	96	48	yes	7.5	3.7	no	610	300	yes
18	100	51	yes	–	–	–	640	320	yes
19	110	53	no	–	–	–	680	340	yes
20	–	–	–	–	–	–	710	350	yes
22	–	–	–	–	–	–	780	390	yes
23	–	–	–	–	–	–	810	410	no
comments	Modeling was not completed for this scenario since dilution was expected to be similar to the 600 gpm scenario. Based on the conclusions of that scenario (see Table 2), copper limits could be increased to those representative of a 18% acute mixing zone without adversely impacting the chronic analysis			silver limits cannot be increased with adversely impacting the acute analysis			Modeling was not completed for this scenario since dilution was expected to be similar to the 600 gpm scenario. Based on the conclusions of that scenario (see Table 2), zinc limits cannot be increased without violating the chronic mixing zone constraint.		

Footnote:
1 - The acute criteria is met if the concentration at 25 feet from the diffuser is less than the acute criteria. The concentration at 25 feet from the diffuser is the MDL multiplied by the dilution at 25 feet. For this flow scenario the dilution at 25 feet is 4.4%. For example, for silver the acute mixing zone cannot be increased, since $MDL_{17\%}$ (7.5) x .044 = 0.33 ug/l which exceeds the acute criterion of 0.32 ug/l.

Table 2: Effluent Limits for Various Mixing Zone Sizes and Compliance with Acute Mixing Zone Constraints (note: effluent limits in bold represent the current effluent limits)

flow scenario: effluent flow = 600 gpm, receiving water flow = 75 - 148 cfs
dilution at 25 feet from the diffuser = 8.2%

acute mixing zone size (% volume)	copper (acute criterion = 4.6 ug/l)			silver (acute criterion = 0.32 ug/l)			zinc (acute criterion = 35)		
	MDL	AML	acute criterion met within 25 feet[1]	MDL	AML	acute criterion met within 25 feet[1]	MDL	AML	acute criterion met within 25 feet[1]
16	**49**	**24**	yes	**3.8**	**1.9**	yes	**310**	**160**	yes
17	52	26	yes	4.0	2.0	no	330	170	yes
18	55	27	yes	–	–	–	350	170	yes
19	57	29	no	–	–	–	370	180	yes
20	–	–	–	–	–	–	380	190	yes
22	–	–	–	–	–	–	410	210	yes
23	–	–	–	–	–	–	440	220	no
comments	copper limits could be increased to those representative of a 18% acute mixing zone without adversely impacting the chronic analysis			silver limits cannot be increased with adversely impacting the acute analysis			Zinc limits cannot be increased without adversely impacting the chronic analysis. The dilution at 25% of the stream width is approx. 6%, if the zinc mixing zone is increased by 1%, the AML becomes 170 ug/l and the concentration at 25% of the stream width is 10.2 ug/l (0.06 x 170) which exceeds the recommended avoidance threshold.		

Footnote:
1 - The acute criteria is met if the concentration at 25 feet from the diffuser is less than the acute criteria. The concentration at 25 feet from the diffuser is the MDL multiplied by the dilution at 25 feet. For this flow scenario the dilution at 25 feet is 8.2%. For example, for silver the acute mixing zone cannot be increased, since $MDL_{17\%}$ (4.0) x .082 = 0.33 ug/l which exceeds the acute criterion of 0.32 ug/l.

Table 3: Effluent Limits for Various Mixing Zone Sizes and Compliance with Acute Mixing Zone Constraints (note: effluent limits in bold represent the current effluent limits)

flow scenario: effluent flow = 900 gpm, receiving water flow = 75 - 148 cfs
dilution at 25 feet from the diffuser = 11.3%

acute mixing zone size (% volume)	copper (acute criterion = 4.6 ug/l)			silver (acute criterion = 0.32 ug/l)			zinc (acute criterion = 35)		
	MDL	AML	acute criterion met within 25 feet[1]	MDL	AML	acute criterion met within 25 feet[1]	MDL	AML	acute criterion met within 25 feet[1]
17	35	18	yes	**2.8**	**1.4**	yes	230	110	yes
18	**37**	**19**	yes	2.9	1.4	no	**240**	**120**	yes
19	39	19	yes	–	–	–	250	130	yes
20	41	20	no	–	–	–	260	130	yes
21	–	–	–	–	–	–	270	140	yes
22	–	–	–	–	–	–	290	140	yes
24	–	–	–	–	–	–	310	150	no
comments	copper limits could be increased to those representative of a 19% acute mixing zone without adversely impacting the chronic analysis			silver limits cannot be increased with adversely impacting the acute analysis			Zinc limits cannot be increased without adversely impacting the chronic analysis. The dilution at 25% of the stream width is approx. 9%, if the zinc mixing zone is increased by 1%, the AML becomes 130 ug/l and the concentration at 25% of the stream width is 11.7 ug/l (0.09 x 130) which exceeds the recommended avoidance threshold.		

Footnote:
1 - The acute criteria is met if the concentration at 25 feet from the diffuser is less than the acute criteria. The concentration at 25 feet from the diffuser is the MDL multiplied by the dilution at 25 feet. For this flow scenario the dilution at 25 feet is 11.3%. For example, for silver the acute mixing zone cannot be increased, since $MDL_{18\%}$ (2.9) x .113 = 0.33 ug/l which exceeds the acute criterion of 0.32 ug/l.

An Employee-Owned Company

February 4, 2000

To: Pat Trainor; USFS Payette
Patricia McGrath, EPA Region X
Greg Weigel, EPA Region X

cc: Steve Silverman, USDA
Gerald Zimpfer, SAIC
Jack Templeton, SAIC

From: Tim Reeves
SAIC
Denver, Colorado

Re: Grouse Creek Mine, **Results of 1,200 gpm effluent discharge scenario.**

As requested by the agencies per our phone conference of January 28th, SAIC conducted initial modeling to perform a mixing zone analysis to evaluate dilution characteristics and plume behavior of a 1,200 gallons per minute (gpm) effluent discharge into the Yankee Fork at a river flow rate of 148 cubic feet per second (cfs). The modeling was performed using the CORMIX (Cornell Mixing Zone Expert System, Version 3.2) and assumed the specified diffuser design specified by Hecla[1].

At an effluent discharge rate of 1,200 gpm the CORMIX program identified several problems that suggest that unstable mixing conditions would result at this flow rate using the current diffuser design. These problems or warnings that were issued by the program indicate that the effluent rate of discharge (1,200 gpm) coming out of the ports of the diffuser is too high compared to the river flow rate and volume to provide stable initial mixing and dilution. To be specific, the program indicated that the discharge produced hydraulically unstable conditions in the "near-field " (i.e., the zone of initial mixing). This causes the following problems:

- Uncertain prediction results for mixing, dilution and plume behavior because of <u>unstable hydraulic conditions</u>. This is because the effluent velocity out of the diffuser ports is relatively high with compared to the river ambient velocity. For this reason results of predicted dilutions have not been reported herein.
- Potential areas of localized recirculation and internal hydraulic jumps near the diffuser producing, unstable flow and mixing of the effluent.

[1] Mixing Zone Study for Proposed Yankee Fork Discharge Point; Hecla Mining Company, Grouse Creek Unit, May 1999.

Table 4: Effluent Limits for Various Mixing Zone Sizes and Compliance with Acute Mixing Zone Constraints (note: effluent limits in bold represent the current effluent limits)

flow scenario: effluent flow = 900 gpm, receiving water flow = > 148 cfs
dilution at 25 feet from the diffuser = 9.0 %

acute mixing zone size (% volume)	cadmium (acute criterion = 0.82 ug/l)			copper (acute criterion = 4.6 ug/l)			silver (acute criterion = 0.32 ug/l)			zinc (acute criterion = 35 ug/l)		
	MDL	AML	acute criterion met within 25 feet	MDL	AML	acute criterion met within 25 feet	MDL	AML	acute criterion met within 25 feet	MDL	AML	acute criterion met within 25 feet
11	7.5	3.7	yes	44	22	yes	**3.4**	**1.7**	yes	280	140	yes
12	**8.1**	**4.0**	yes	**47**	**24**	yes	3.7	1.8	no	**300**	**150**	yes
13	8.7	4.4	yes	51	25	yes	–	–	–	330	160	yes
14	9.3	4.7	no	55	27	no	–	–	–	350	170	yes
15	–	–	–	–	–	–	–	–	–	370	190	yes
16	–	–	–	–	–	–	–	–	–	390	200	no
comments	cadmium limits could be increased to those representative of a 13% acute mixing zone without adversely impacting the chronic analysis			copper limits could be increased to those representative of a 13% acute mixing zone without adversely impacting the chronic analysis			silver limits cannot be increased with adversely impacting the acute analysis			zinc limits could be increased to those representative of a 15% acute mixing zone without adversely impacting the chronic analysis		

Footnote:
1 - The acute criteria is met if the concentration at 25 feet from the diffuser is less than the acute criteria. The concentration at 25 feet from the diffuser is the MDL multiplied by the dilution at 25 feet. For this flow scenario the dilution at 25 feet is 9.0%.

- The discharge could result in impacting the benthic environment of the river near the diffuser causing high pollutant concentrations to build up in the gravels and substrate.

These data suggest that part of the problem is the diffuser design (i.e., the number of ports, port diameter, spacing of ports, etc.) with respect to the 1,200 gpm effluent discharge rate which was modeled. A modified diffuser design would be required to potentially accommodate higher effluent discharge rates (up to 1,200 gpm) and provide stable mixing of effluent within the outlined mixing zone criteria. We have already identified that the currently proposed diffuser design would need to be modified by Hecla to accommodate even the lower flow rates that were evaluated in our previous report dated January 11th 2000. Hecla confirmed this in our meeting on January 14th and indicated that an additional diffuser design has been evaluated. This new design was not used for this test because the specific diffuser design information required to run CORMIX was not available.

ATTACHMENT 4
REVISED EFFLUENT LIMITS

The following tables present the effluent limits for the tailings impoundment discharge. Some of the limits have been revised based on the Federal Agencies response to Hecla's concerns. The changes to the effluent limits include:

- effluent limits for arsenic, chromium, and nickel were removed

- effluent limits for mercury and selenium were increased since mixing zones were incorporated

- mass limits for flow tiers of < 600 gpm were removed

- mass limits for TSS were removed

- limits for effluent flow were added for the < 600 gpm tiers

- acute mixing zones for the following parameters were increased which resulted in an increase to the effluent limits:
  - copper (75 - 148 cfs tier and > 148 cfs tier)
  - cadmium (> 148 cfs tier only)
  - zinc (> 148 cfs only)

Table 1: Effluent Limitations for Tailings Impoundment Discharge to Yankee Fork for Yankee Fork Flows of < 20 cfs

There will be no discharge at Yankee Fork flows of < 20 cfs.

Table 2: Effluent Limitations for Tailings Impoundment Discharge to Yankee Fork for Yankee Fork Flows of ≥ 20 cfs to < 75 cfs (see Table 5 for explanation of footnotes)

Parameter	units	Proposed Effluent Limitations					
		at Effluent Flows of ≤ 300 gpm		at Effluent Flows of ≤ 600 gpm		at Effluent Flows of > 600 gpm	
		maximum daily	monthly average	maximum daily	monthly average	maximum daily	monthly average
cadmium, total recoverable	ug/l	5.3	2.6	3.0	1.5	2.2	1.1
	lb/day	–	–	–	–	0.024	0.012
copper, total recoverable	ug/l	41	20	23	12	17	8.4
	lb/day	–	–	–	–	0.18	0.090
lead, total recoverable	ug/l	7.6	3.8[1]	4.3[1]	2.2[1]	3.1[1]	1.6[1]
	lb/day	–	–	–	–	0.033	0.017
mercury, total	ug/l	0.17	0.083	0.096	0.048	0.069	0.034
	lb/day	–	–	–	–	0.00074	0.00037
selenium, total recoverable	ug/l	70	35	40	20	29	14
	lb/day	–	–	–	–	0.31	0.15
silver, total recoverable	ug/l	3.2	1.6	1.8	0.90[2]	1.3	0.65[2]
	lb/day	–	–	–	–	0.014	0.0070
zinc, total recoverable	ug/l	260	130	150	76	110	56
	lb/day	–	–	–	–	1.2	0.60
cyanide, weak acid dissociable	ug/l	72	36	41	21	30	15
	lb/day	–	–	–	–	0.32	0.16
ammonia, total (as N)	mg/l	22	11	13	6.4	9.2	4.6
	lb/day	–	–	–	–	99	49

Table 2: Effluent Limitations for Tailings Impoundment Discharge to Yankee Fork for Yankee Fork Flows of ≥ 20 cfs to < 75 cfs (see Table 5 for explanation of footnotes)

Parameter	units	Proposed Effluent Limitations					
		at Effluent Flows of ≤ 300 gpm		at Effluent Flows of ≤ 600 gpm		at Effluent Flows of > 600 gpm	
		maximum daily	monthly average	maximum daily	monthly average	maximum daily	monthly average
TSS	mg/l	30	20	30	20	30	20
pH	su	6.5 - 9.0		6.5 - 9.0		6.5 - 9.0	
effluent flow	gpm	not to exceed 300		not to exceed 600		–	

Table 3: Effluent Limitations for Tailings Impoundment Discharge to Yankee Fork for Yankee Fork Flows of ≥ 75 cfs to < 148 cfs (see Table 5 for explanation of footnotes)

Parameter	units	Proposed Effluent Limitations					
		at Effluent Flows of ≤ 300 gpm		at Effluent Flows of ≤ 600 gpm		at Effluent Flows of > 600 gpm	
		maximum daily	monthly average	maximum daily	monthly average	maximum daily	monthly average
cadmium, total recoverable	ug/l	18	9.1	9.7	4.8	6.5	3.2
	lb/day	–	–	–	–	0.070	0.034
copper, total recoverable	ug/l	100	51	55	27	39	19
	lb/day	–	–	–	–	0.41	0.20
lead, total recoverable	ug/l	26	13	14	6.9	9.3	4.6[1]
	lb/day	–	–	–	–	0.10	0.049
mercury, total	ug/l	0.57	0.29	0.30	0.15	0.21	0.10
	lb/day	–	–	–	–	0.0023	0.0011
selenium, total recoverable.	ug/l	240	120	130	63	85	43
	lb/day	–	–	–	–	0.91	0.46
silver, total recoverable	ug/l	7.1	3.5	3.8	1.9	2.8	1.4
	lb/day	–	–	–	–	0.030	0.015
zinc,	ug/l	580	290	310	160	240	120

Table 3: Effluent Limitations for Tailings Impoundment Discharge to Yankee Fork for Yankee Fork Flows of ≥ 75 cfs to < 148 cfs (see Table 5 for explanation of footnotes)

Parameter	units	Proposed Effluent Limitations					
		at Effluent Flows of ≤ 300 gpm		at Effluent Flows of ≤ 600 gpm		at Effluent Flows of > 600 gpm	
		maximum daily	monthly average	maximum daily	monthly average	maximum daily	monthly average
total recoverable	lb/day	–	–	–	–	2.6	1.3
cyanide, weak acid dissociable	ug/l	250	120	130	66	89	44
	lb/day	–	–	–	–	0.95	0.47
ammonia, total (as N)	mg/l	76	38	41	20	27	14
	lb/day	–	–	–	–	290	150
TSS	mg/l	30	20	30	20	30	20
pH	su	6.5 - 9.0		6.5 - 9.0		6.5 - 9.0	
effluent flow	gpm	not to exceed 300		not to exceed 600		–	

Table 4: Effluent Limitations for Tailings Impoundment Discharge to Yankee Fork for Yankee Fork Flows of ≥ 148 cfs (see Table 5 for explanation of footnotes)

Parameter	units	maximum daily	monthly average
cadmium, total recoverable	ug/l	8.7	4.4
	lb/day	0.094	0.047
copper, total recoverable	ug/l	51	25
	lb/day	0.55	0.27
lead, total recoverable	ug/l	17	8.7
	lb/day	0.18	0.094
mercury, total	ug/l	0.38	0.19
	lb/day	0.0041	0.0020
selenium, total recoverable	ug/l	160	80
	lb/day	1.7	0.86

Table 4: Effluent Limitations for Tailings Impoundment Discharge to Yankee Fork for Yankee Fork Flows of ≥ 148 cfs (see Table 5 for explanation of footnotes)			
silver, total recoverable	ug/l	3.4	1.7
	lb/day	0.037	0.018
zinc, total recoverable	ug/l	370	190
	lb/day	4.0	2.0
cyanide, weak acid dissociable	ug/l	170	83
	lb/day	1.8	0.89
ammonia, total (as N)	mg/l	51	26
	lb/day	550	280
TSS	mg/l	30	20
pH	su	6.5 - 9.0	

Table 5 - Explanation of Footnotes for Tables 2 through 4

The footnoted limits are not quantifiable using EPA approved analytical methods. Therefore, EPA will consider the Respondent to be in compliance with the effluent limits when the effluent concentration is less than the EPA approved Minimum Level (ML). The ML is defined as the concentration at which the entire analytical system gives recognizable signals and an acceptable calibration point.

1 - The ML for lead is 5 ug/l. Therefore the compliance evaluation level for the footnoted limits is 5 ug/l which corresponds to mass-based levels of 0.018 lb/day (at effluent flows of ≤ 300 gpm), 0.035 lb/day (at effluent flows of ≤ 600 gpm), and 0.054 lb/day (at effluent flows of ≤ 900 gpm).

2- The ML for silver is 1 ug/l. Therefore the compliance evaluation level for the footnoted limits is 1 ug/l, which corresponds to mass-based levels of 0.0070 lb/day (at effluent flows of ≤ 600 gpm) and 0.011 lb/day (at effluent flows of ≤ 900 gpm).

Memorandum

Date: February 8, 1999

To: **Pat Trainor, US Forest Service**

From: J.H. (Jack) Templeton PE, SAIC

Subject: Hecla Grouse Creek Project
Scope of Work
Review of Hecla Proposed Schedule

In reviewing Hecla Mining Companies memorandum dated January 26, 2000, "Grouse Creek AOC – Hecla's Response to Agency Concern," specifically the supporting information under Tab 1, I submit the following comments and observations.

1. Precipitation and evaporation – The original precipitation and evaporation values were based on pond elevations over several years as obtained from the monthly reports. Hecla's values reflect actual measurements, which closely match the sum of the values generated from the pond level data. The new values from Hecla were used in the revised model.

2. Tailings Pond Consolidation – Due to insufficient data, the original model did not include tailings consolidation in the water balance. Though the equation Hecla used appears suspect in the early years (yielding a tailings density less than water), the new values calculated for 2000 through 2004 appear reasonable for tailings consolidation and were used in the model.

3. Pump Back Wells and sump volume – In review of the Hecla monthly reports I did not see flow rates for wells MW-18, MW-51 and MW-52. Without these values, I cannot validate the Hecla annual volume of 48 million gallons, and ran the model at a pump back well and seep volume of 20.2 million gallons/year. However, In order to evaluate the additional time required should Hecla be able to demonstrate the higher pump back well and sump volume, the model was also run at 48 million gallons/year.

4. Desilting – While this task is required and Hecla does have an actual value for the last time the operation was performed, the volume stated reflects poor water management practice. If fresh water must be used to desilt the ponds, a hydrocyclone could be placed near the outlet to dewater the silt prior to discharge to the pond, and the bulk of the water returned to the desilting operation. Also, tailings impoundment water could be used to remove the silt from the ponds, and then fresh water used only for rinsing the settling ponds. Therefore, I used 20% of Heclas's value, or 3,254,800 gallons of fresh water added to the pond each time desilting is performed.

5. Volume of underdrains – Hecla's values match the values I obtained from their monthly reports, therefore, the original values were used in the model.

6. Water Treatment Plant upset conditions and Plant availability –The limiting flow is the discharge to the pipeline, not the flow to the treatment plant. Therefore, the treatment plant should be designed to accommodate both upset conditions and plant availability in order to deliver a constant maximum flow to the Yankee Fork. Therefore, neither of these factors were applied to the revised model.

7. Flow Rate – Hecla has tentatively agreed to an upper flow tier of 900 to 1200 gpm. Though this may require diffuser redesign, 1200 gallons was used as the upper flowrate only during high flow conditions on the Yankee Fork (>148 cfs) in the revised model.

8. Schedule – Hecla has included a treatment plant start date of 2/12/2001. However, they do not consider treating any of the impoundment water though the existing treatment plant. This effectively costs one year of schedule and results in a pond volume start of 620 million gallons in 2/2001. By making the improvements to the existing system (as discussed in the previous memorandum), and moving the discharge to Outfall 3, Hecla could have only 400 to 420 million gallons of water in the impoundment to treat.

Assumptions – (from previous schedule estimate)

- Hecla can meet 0.015 mg/l WAD CN Average for all cyanide-bearing water.
- Yankee Fork seasonal flow is at Low flow (20 to 75 cfs) 8 months of the year from August through March; Mid flow (75 to 148 cfs) 2 months of the year in April and July; and at High flow (>148 cfs) 2 months of the year in May and June.
- At Yankee Fork low-flow and mid-flow Hecla can discharge at 900 gpm and meet 0.015 mg/l WAD CN
- At Yankee Fork high-flow Hecla can discharge at 1200 gpm and meet 0.015 mg/l WAD CN
- Hecla will complete upgrades to existing carbon columns by February 1, 2000 (Based on 3 months to make modifications - previously recommended in November).
- If modifications to the neutralization system are required they will be completed by the time the pipeline to Outfall #3 is ready – January 10, 2000 (Hecla estimated date).
- Hecla will implement zinc addition (or suitable substitute) to existing carbon columns by May 1, 2000 (Assumes implementation is performed in conjunction with completing pilot tests).

New Assumptions based on Recent Hecla Data

- The February 2000 starting volume for Pond #1 is **501.2 million gallons**, based on 50 million gallons of increase since September 21, 1999.
- At Yankee Fork high-flow (>148 cfs in June and July) Hecla can discharge at **1200 gpm** and meet 0.015 mg/l WAD CN
- The increase in pond volume from annual precipitation will be added monthly at the Hecla-provided 32.2 inches per year.
- The decrease in pond volume from forced evaporation will be subtracted in August, and the Hecla-provided 60.37 million gallons per year will be used.

- The Hecla-provided tailings consolidation numbers will be used
  - Through 2/2000 24,247,000 gallons
  - 2001 19,867,000 gallons
  - 2002 18,342,000 gallons
  - 2003 15,497,000 gallons
- Pond desilting will occur in June 2000 and June 2002 and will add 3,254,800 gallons of new water to the impoundment.
- A new treatment system operational by February 12, 2001 (Based on Hecla estimate).

Description of Alternatives

Based upon this new data 4 new alternatives are available: 900 versus 1200 gpm maximum flow to the Yankee Fork, and 20.4 million gallons versus 48 million gallons from the pump back wells.

Alternative	Dewatering Complete
1. 900 gpm 20.2 mgal/yr Pumpback	Mid-October 2002
2. 1200 gpm – 20.2 mgal/yr Pumpback	**September 1, 2002**
3. 900 gpm – 48 mgal/yr Pumpback	Mid-November 2002
4. 1200 gpm – 48 mgal/yr Pumpback	October 1, 2002

Using a maximum flowrate to the Yankee Fork of **1200 gpm** during only the high–flow months of June and July, and Pump back well flows from the seeps of **20.4 million gallons** per year yields completion of the pond dewatering by the beginning of September 2002. As there are many unforeseen difficulties, which could encountered, a buffer of 2 months is suggested, placing **completion of pond dewatering by the beginning of November 2002**. This buffer also allows the other alternatives to nearly fit within the scheduled completion date.

Hecla is correct in stating that many unknowns still exist which could impact this schedule, however, language within the AOC allows for schedule variance request based upon documented changes.

5

U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Ocean Service
Office of Response and Restoration
Coastal Protection and Restoration Division
c/o EPA Region X (ECL-117)
1200 Sixth Avenue
Seattle, Washington 98101

February 10, 2000

Patricia McGrath
US EPA Region X (OW-130)
1200 Sixth Avenue
Seattle, WA 98101

Dear Ms. McGrath,

This letter clarifies information previously discussed with you last fall and summarized in NOAA correspondence dated January 12, 2000. Our January letter provided technical advice to EPA and the Forest Service regarding contaminant concentrations that would be protective of NOAA trust resources in the Yankee Fork of the Salmon River near the confluence with Jordan Creek. The information provided was based upon NOAA's understanding of the project and the best science available to date. Please refer to our January 12, 2000 letter for background.

As previously discussed, the Yankee Fork of the Salmon River provides spawning and rearing habitat for salmonid fishes under the trusteeship of NOAA. Snake River steelhead and Snake River spring/summer chinook, which occur at or near the proposed discharge are listed as threatened under the Endangered Species Act. These fish must have safe, continuous passage around any mixing zone. Any contaminant discharge poses a risk, and our preference would be to not allow a mixing zone. However, in the interest of dewatering the Grouse Creek Mine tailings impoundment and averting a catastrophic release of contaminants, NOAA has defined an approach to limit the impact of the discharge.

As you recall, avoidance thresholds and mixing zone sizes were discussed by EPA and NOAA staff in a November 3, 1999 meeting. During that meeting, NOAA staff stated that the mixing zone should be no more than 25% of the volume or width of the Yankee Fork, whichever was less.

If the stream bed were completely flat (the stream was the same depth from bank to bank) then there would be no meaningful difference between allowing a mixing zone of 25% width and, allowing a mixing zone of 25% volume. Like all natural streams, the Yankee fork is not flat-bottomed nor is it uniformly wide. Because the streambed is generally deeper in the middle than on the sides, allowing mixing over 25% of the width of the stream could result in the use of more than 25% of the volume, assuming the discharge occurs in the center of the stream as is currently planned for the dewatering project. This is of particular concern at lower flows and in wider portions of the steam, where several feet on either edge of the stream may be too shallow to allow passage of adult salmonids. Restricting the mixing zone to 25% of the width or volume, whichever is less, alleviates this concern.

The requirement that the mixing zone not use more than 25% of the volume of the stream is not an unusual requirement. In fact, the State of Idaho's water quality regulations specify that mixing zones in flowing receiving waters not exceed 25% of the stream width and not include more than 25% of the stream volume. In developing the technical recommendations in our January 12, 2000 letter, we focused on the question of avoidance behavior, and affirmed that

the standard 25% mixing zone, when applied with the recommended avoidance criteria, would protect NOAA trust resources.

NOAA believes that the effluent standards in EPA's December 16, 1999 memorandum should allow the dewatering of the tailings pond to occur while providing safe passage for salmonids migrating to spawning grounds above the site. If you have any questions about this letter or require any further clarification on NOAA's position, please do not hesitate to call me at 206/553-2101.

Sincerely,

Helen E. Hillman

Helen Hillman
Coastal Resource Coordinator

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6

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SUMMARY OF WATER QUALITY
AUGUST 1999
HECLA MINING COMPANY GROUSE CREEK UNIT

Prepared for:

Hecla Mining Company
Grouse Creek Unit

Copies to:

Idaho Division of Environmental Quality (IDEQ)
Environmental Protection Agency (EPA)
United States Forest Service (USFS)

Submitted by:

Golder Associates Inc.
Redmond, Washington

September 10, 1999

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1. INTRODUCTION

This water quality summary is pursuant to NPDES Permit No. ID-002646-8 Sections I.A.4, I.A.5, I.C.3, I.C.4, IDHW-DEQ Ore Processing by Cyanidation Permit No. CN-000022 Section E, and U.S. Forest Service Plan of Operations Section 6.1.7.

This report follows *'Summary of Water Quality, July 1999 – Hecla Mining Company Grouse Creek Unit'* submitted by Hecla Mining Company on August 10, 1999. The purpose of this report is to summarize and evaluate water quality data collected from the Grouse Creek mine site from the end of July through August 1999. Monitoring results for site groundwater and Jordan Creek are presented and water quality anomalies and trends identified. The evaluation of the whether the recent data meet the overall QA/QC objectives is included. A complete tabulation of water quality data collected since the last monthly report was submitted to IDEQ by Hecla on September 9 1999.

2. POND 1 AND UNDERDRAINS

Figure 2-1 is a site map showing the location of the tailings impoundment (Pond 1) and the South Embankment collection ponds.

2.1 Pond 1

Pond 1 sampling on July 26, 1999 indicated an improvement in water quality over the previous month. Total, WAD, and free cyanide and thiocyanate concentrations all decreased as is illustrated in Figure 2-2. Cyanide loss is likely largely attributable to volatilization of hydrogen cyanide (HCN). Ammonia concentrations rose to a peak concentration of 47 mg/L. This concentration exceeds one standard deviation of the mean concentration. Ammonia is a degradation product of cyanide.

2.2 Floor Drain

Floor Drain water is water that is pumped to Pond 1 from the gravel layer situated between the tailings and liner. Floor Drain water quality is representative of pond water following interaction with the tailings. Floor drain total cyanide (69.8 mg/L) and WAD cyanide (0.84 mg/L) concentrations decreased over this reporting period, coincident with the decreasing trend in cyanide concentrations within Pond 1 (Figure 2-1).

2.3 Pond 6 – Underdrains

Pond 6 underdrain water quality is a composite of water qualities from the fifteen underdrains. Pond 6 was sampled on July 8th, 22nd, and 30th and August 3rd.

Figure 2-3 plots total and WAD cyanide concentrations within Pond 6 from December 1994 through August 1999. Both total and WAD cyanide concentrations increased over this sampling period in comparison to the July 7, 1999 sampling.

Trace metal analysis on June 7, 1999 indicated detectable cadmium (0.0028 mg/L) within the Pond 6 underdrain. As the July 1999 report indicated, this was the first time cadmium had been detected in Pond 6; however, this concentration was just above the method detection limit. Cadmium analyses from July 22nd and July 30th, 1999, indicate that cadmium levels have returned to below detectable concentrations (<0.0024 mg/L).

A lead concentration of 1.37 mg/L was measured in Pond 6 on July 22, 1999. Lead concentrations within Pond 1 are consistently below detectable limits. Future analysis will indicate if this concentration represents a significant change in Pond 6 water quality.

Mercury concentrations increased during this sampling period. Mercury concentrations measured on July 22nd and 30th were 0.0058 mg/L and 0.0061 mg/L respectively. These concentrations are higher than mercury concentrations recorded in Pond 1.

A notable increase in Pond 6 pH was noted in the July 1999 monthly report. Pond 6 pH returned to typical levels during this reporting period as illustrated in Figure 2-4.

3. GROUNDWATER QUALITY

Groundwater monitoring wells in the areas of the North and South Embankment are sampled monthly to monitor groundwater quality. A number of new wells have recently been drilled at the Hecla site. Figures 3-1 and 3-2 show the locations and depths of monitoring wells in the area of the North and South Embankments.

Table 3-1 summarizes the results of the August groundwater sampling. Groundwater sampling was conducted on August 3rd and 4th unless otherwise indicated in Table 3-1. Groundwater wells are grouped according to their location: the South Embankment, North Embankment, and Adit.

The water-quality monitoring plan identifies anomalous groundwater concentrations as those that fall outside one standard deviation of the mean. Based on this criterion, anomalous values are highlighted within Table 3-1. Groundwater temperatures measured in August occasionally exceeded one standard deviation of the mean. Because the mean groundwater temperature is not calculated from sampling events distributed evenly throughout the year, it is not unexpected that groundwater temperatures measured in the summer are occasionally anomalous. Groundwater temperature anomalies will therefore not be highlighted in this report.

Table 3-1 demonstrates that groundwater results were generally consistent with previous sampling events. Total cyanide concentrations exceeded one standard deviation of the mean at MW-30 and MW-20. Weak acid dissociable (WAD) cyanide also exceeded one standard deviation of the mean at MW-20.

3.1 Groundwater Monitoring Wells – South Embankment Area

3.1.1 MW-11

Groundwater monitoring well MW-11 is the keytrench discharge and is located below the South Embankment of the tailing impoundment. This monitoring well is associated with the underdrain system. Total and WAD cyanide concentrations increased slightly within MW-11 during August 1999. Turbidity exceeded one standard deviation of the mean on August 12, 1999 (9.7 NTU). Measurements of pH on August 4 (6.81), August 5 (6.92) and August 8 (6.96) dropped below one standard deviation of the mean pH.

3.1.2 MW-14

Temperature, pH and conductivity were measured at this well on August 17, 1999. Conductivity and pH are consistent with previous sampling results.

3.1.3 MW-25 and MW-26

Groundwater monitoring wells MW-25 and MW-26 are nested wells screened at depths of 50 to 60 feet (MW-25) and 77 to 87 feet (MW-26). Pumping of monitoring well MW-26

began in May 1999 at a rate of about 10 gpm in an effort to capture the tailings-derived plume. Pumping has lowered the water table to below the screen depth of MW-25.

MW-26 was dry on August 9, 1999 and therefore was not sampled for cyanide. Temperature, pH and conductivity measurements taken on August 17, 1999 are consistent with previous sampling results.

3.1.4 MW-23 and MW-24

Groundwater monitoring wells MW-23 and MW-24 are nested wells screened at depths of 40 to 50 feet (MW-23) and 70 to 80 feet (MW-24). Monitoring well MW-23 remained dry for the August sampling event. General water quality at MW-24 continued to improve during this sampling event exhibiting decreases in both total and WAD cyanide. Improvements in water quality noted in both July and August 1999 may indicate that MW-26, located upgradient of MW-24, is effectively capturing the tailings-derived plume; however, continued monitoring is required to evaluate the long term effectiveness of pumping at MW-26.

During the July sampling event, MW-24 recorded a pH of 10.3, a value at least 2 pH units higher than any other groundwater pH. August measurements of pH at this well are similar to other groundwater pHs. A pH of 8.12 was measured on August 3, 1999 and a pH of 8.06 was measured on August 17, 1999.

3.1.5 MW-32

Groundwater monitoring well MW-32 is located adjacent to MW-23 and MW-24 and is screened at a depth of 174.7 feet below ground surface. Total and WAD cyanide were sampled for the first time at this well on August 3, 1999. Both total and WAD cyanide were below detectable limits (<0.005 mg/L) indicating the tailings derived plume is not present at depth at this location.

3.1.6 MW-30

Groundwater monitoring well MW-30 is located south east of the Water Treatment Plant and is screened at a depth of 60.8 feet. Total (4.88 mg/L) and WAD (0.394 mg/L) concentrations at this well both increased during the August sampling event as did conductivity.

3.2 Groundwater Monitoring Wells – North Embankment Area

3.2.1 MW-16

Groundwater monitoring results for MW-16 are consistent with previous sampling events. Both total and WAD cyanide remained below detectable limits during the August 4, 1999 sampling event.

3.2.2 MW-19 and MW-20

Groundwater monitoring wells MW-19 and MW-20 are nested wells screened at depths of 36.5 to 46.5 (MW-19) and 60 to 70 (MW-20) feet below ground surface. MW-19 was dry for the August 4, 1999 sampling event. Monitoring well MW-20 recorded peak total (1.46 mg/L) and WAD (0.309 mg/L) cyanide concentrations to date.

3.2.3 MW-17

Groundwater monitoring well MW-17 is screened from 60 to 70 feet below ground surface. This well was dry during the August sampling event.

3.2.4 MW-27 and MW-28

Groundwater monitoring wells MW-27 and MW-28 are nested wells screened at depths of 58 to 78 (MW-27) and 145 to 175 (MW-28) feet below ground surface.

Water quality results for these wells indicate an improvement in water quality over the previous sampling event. Both wells exhibited decreases in total and WAD cyanide concentrations. Cyanide concentrations are consistently higher within the shallow well (MW-27).

3.3 Groundwater Monitoring Wells – Sunbeam Adit

3.3.1 MW-1, MW-3, and MW-12

Monitoring wells MW-1, 3 and 12 are located north east of the mine site adjacent to the Sunbeam open cut. These wells all experienced a deterioration in water quality during the June 1999 sampling event. Water quality improvements were noted during the July sampling event, however overall water quality was still poor with respect to historic water quality.

Both total and WAD cyanide remained below detectable concentrations (<0.005 mg/L) at MW-12 and MW-3. Cyanide analyses for this reporting period for MW-1 have not yet been received from SVL Laboratory.

Conductivity and pH measurements taken at MW-12 throughout August 1999 (Figure 3-3) show a gradual improvement in water quality since June 1999. Conductivity measurements however at MW-3 increased during August 1999. A conductivity of 280 micromho measured on August 18, 1999 exceeds one standard deviation of the mean conductivity. Conductivity at MW-1 decreased slightly from the previous month (570 to 500 micromho).

4. STREAMFLOW

The locations of surface water stations along Jordan Creek and its tributaries are shown in Figure 4-1.

Streamflow measurements along Jordan Creek from July 28, 1999 to August 19, 1999 are listed in Table 4-1. Streamflow stations are listed from upstream to downstream location. Streamflow generally increases along Jordan Creek indicating that Jordan Creek is a gaining stream. Some uncertainty exists in the accuracy of streamflow measurements, due to inconsistent trends in gauge height versus streamflow. Procedures for streamflow measurement will be reviewed to ensure the validity of future data sets.

5. SURFACE WATER QUALITY

5.1 Surface Water Sampling Stations

Surface water samples were collected weekly throughout August 1999 and analyzed for nitrate/nitrite, ammonia, total and WAD cyanide, temperature, conductivity, pH and dissolved oxygen. Weekly surface water quality results are tabulated in Tables 5-1 through 5-5. In all tables, surface water sites are presented from upstream (S-2) to downstream (S-10) location.

Weekly monitoring of Jordan Creek allows water quality to be compared to baseline standards on an ongoing basis permitting identification and interpretation of anomalous values and trends. For surface water parameters, a significant increase or decrease in reportable water quality is defined as a change equal to two standard deviations from the mean. Surface water parameters that fall outside two standard deviations of the mean are highlighted in Tables 5-1 through 5-5.

5.1.1 July 28, 1999

Surface water sampling results from July 28, 1999 are consistent with previous sampling events (Table 5-1), with the exception of total cyanide at Stations S-3 and S-4. Cyanide continues to be detected along Jordan Creek at low concentrations.

5.1.2 August 3, 1999

Surface water sampling results from August 3, 1999 are generally consistent with previous sampling events (Table 5-2). An anomalously high pH was recorded at Station S-9 (9.03). This pH returned to within the normal range for this site during the subsequent week.

5.1.3 August 9, 1999

Surface water quality results for this date are consistent with previous sampling results (Table 5-3).

5.1.4 August 16, 1999

An increase in dissolved oxygen was noted at all surface water stations on August 16, 1999 (Table 5-4). Dissolved oxygen in all cases exceeded two standard deviations of the mean concentration. Increases in dissolved oxygen may be partially attributed to a slight drop in temperature. Dissolved oxygen concentrations returned to typical levels during the subsequent week.

5.1.5 August 23, 1999

Surface water quality results for this date are consistent with previous sampling results (Table 5-5).

5.2 Jordan Creek Water Quality

Surface water monitoring through August 1999 has continued to indicate detectable cyanide concentrations within Jordan Creek downstream of Station S-2. Figure 5-1 plots total cyanide concentrations along Jordan Creek from July 28, 1999 to August 9, 1999. Detectable cyanide at S-13 on August 3, 1999 and August 9, 1999 indicate a cyanide source along Washout Creek.

5.3 Seep/Spring Water Quality

Detectable cyanide in Jordan Creek has resulted in efforts to determine the source(s) of this cyanide and to quantify their individual cyanide inputs. A number of seeps and springs discharging to Jordan Creek have been identified. Their locations are shown in Figure 3-1.

These seeps and springs were sampled on August 5, 1999 and August 19, 1999. Field measurement of pH, conductivity and temperature were recorded. Water samples were collected and submitted for nitrate/nitrite, ammonia, total and WAD cyanide analysis

Seep and spring cyanide concentrations are summarized in Table 5-6. Results from previous sampling events are included for comparison. Most of the seeps and springs were dry in August 1999. Those seeps and springs that were sampled yielded water qualities similar to previous sampling events; however, a significant increase in total cyanide was noted at JC-43. Cyanide concentrations at both JC28 and JC26 decreased from July 1999.

5.4 Turbidity

To evaluate the effectiveness of mine site and access road Best Management Practices (BMPs) for sediment control, Hecla monitors turbidity at surface water sites along Jordan Creek.

Stream turbidity measurements taken between August 3, 1999 and August 23, 1999 are shown in Table 5-7. Stream stations are listed from upstream to downstream location. Turbidity levels within the stream for these sampling events were low (< 4 NTU) and consistent with historical measurements. Stream turbidity for mine affected areas should not exceed background turbidity by greater than 5 NTU for streams with a turbidity of less than 50 NTU. All surface water stations meet this criterion for this reporting period

6. QUALITY ASSURANCE/QUALITY CONTROL

Duplicate analyses for surface water sites in August 1999 are shown in Table 6-1. The relative percent difference (RPD) for field and lab duplicates are calculated and included in this table. Relative percent difference for water samples should not exceed 20% (EPA, 1994). This criterion applies to those samples whose concentrations are greater than or equal to 5 times the method detection limit (MDL). For samples whose concentrations are less than 5 times the MDL, duplicate analysis should fall within +/- the MDL. This criterion applies to lab duplicates; however, it is often used to assess the accuracy of field duplicates as well. Samples for which these criteria have not been met are highlighted.

One field duplicate was submitted for S-3 on August 8, 1999. QA/QC criteria were met for nitrate/nitrite, ammonia, total and WAD cyanide for this sample. A number of lab duplicates were run on the August 3, 1999 total and WAD cyanide analyses. Two total and WAD analyses failed to meet the QA/QC criteria outlined above.

Failure for cyanide analysis by SVL to consistently meet QA/QC criteria has resulted in a decision by Hecla to submit samples for cyanide analysis to an alternate laboratory. Beginning August 17, 1999, Hecla will contract ACZ Laboratories in Steamboat Springs, Colorado to perform all cyanide analyses on all samples. These samples will include those from Outfall 002, surface water monitoring sites along Jordan Creek, groundwater monitoring wells and Pond 1.

7. REFERENCES

EPA, 1994. USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review. EPA-540/R-54-013.

TABLES

TABLE 3-1

Groundwater Monitoring Well Water Quality Data

	Nitrate + Nitrite, T	Ammonia	Total CN	CN increase or decrease	WAD CN	WAD increase or decrease	Mercury, T	Temperature	Conductivity, Field	pH
	mg/L	mg/L	mg/L		mg/L		mg/L	°C	micromho	s.u.
SOUTH EMBANKMENT										
MW-10	not sampled on this date									
MW-11	0.66	<0.1	0.622	increase	0.138	increase			130	7.37
MW-13	not sampled on this date									
MW-14	not sampled on this date									
MW-23 (8/9/99)	dry									
MW-24	0.66	<0.1	0.175	decrease	0.049	decrease		7.9	250	8.12
MW-25	dry									
MW-26 (8/9/99)	dry									
MW-29	not sampled on this date									
MW-30	2.15	<0.1	4.88	increase	0.394	increase		9.3	340	7.42
MW-31	not sampled on this date									
MW-32	<0.02	0.1	<0.005		<0.005			10.1		8.23
NORTH EMBANKMENT										
MW-15 (8/9/99)	dry									
MW-16	0.04	<0.1	<0.005	no change	<0.005	no change		13.4	300	7.62
MW-17	dry									
MW-19	dry									
MW-20	0.71	<0.1	1.46	increase	0.309	increase		10.3	440	7.6
MW-27 (7/22/99)			5.04	decrease	0.94	decrease	<0.0002			
MW-28	0.03	<0.1	0.053	decrease	0.006	decrease		14.1	270	7.43
MW-33	not sampled on this date									
MW-34	not sampled on this date									
MW-35	not sampled on this date									
ADIT										
MW-1	not sampled on this date									
MW-3	0.19	<0.1	<0.005	no change	<0.005	no change		12.5	210	7.65
MW-12	0.2	<0.1	<0.005	no change	<0.005	no change				
BACKGROUND										
MW-7	0.05	<0.1	<0.005		<0.005			6.2	220	8.84

Shaded values exceed one standard deviation of the mean concentration.

Jordan Creek Streamflow

	14-Jul	20-Jul	28-Jul	5-Aug	10-Aug	19-Aug
Surface Water Site	Flow	Flow	Flow	Flow	Flow	Flow
	cfs	cfs	cfs	cfs	cfs	cfs
S-1	18.39	9.33	5.68	44.72	5.42	9.48
S-8	---	---	---	---	---	---
S-7	---	---	---	---	---	---
S-6	17.48	12.39	6.97	6.02	5.99	12.13
S-2	20.76	12.07	6.80	5.06	6.02	7.41
S-3	23.56	17.18	10.60	9.48	8.00	13.92
S-13	---	---	---	---	---	---
S-4	29.33	17.94	10.81	11.65	9.31	13.09
S-12	32.86	22.77	13.64	11.03	8.48	12.76
S-5	37.08	25.24	17.11	18.12	14.19	33.25
S-11	30.32	22.37	14.04	11.12	9.42	15.83
S-9	165.10	123.21	92.10	77.37	67.39	149.40
S-10	182.36	142.16	108.92	96.91	82.10	175.63

0910cr1.xls/Table 4-1 streamflows

TABLE 5-1

Surface Water Quality

July 28, 1999

	Total Nitrate/Nitrite	Ammonia	Total CN	WAD CN	Temperature	Conductivity	pH	Dissolved Oxygen
	mg/L	mg/L	mg/L	mg/L	°C	micromho/cm	s.u.	mg/L
S-2	<0.02	<0.1	0.014	0.006	7.7	60	7.38	14.9
S-3	<0.02	<0.1	0.066	0.022	7.3	70	7.39	15.6
S-13	<0.02	<0.1	<0.005	<0.005	6.9	30	7.32	14.7
S-4	0.16	<0.1	0.08	0.023	8	70	7.44	15.2
S-12	0.07	<0.1	0.06	0.021	7.8	110	7.3	15.1
S-5	<0.02	<0.1	0.042	0.016	7.9	20	7.31	15.6
S-11	0.04	<0.1	0.037	0.009	8.1	90	7.25	15.8
S-10	<0.02	<0.1	<0.005	<0.005	10	80	6.05	13

Shaded values exceed two standard deviations of the mean value.

TABLE 5-2

Surface Water Quality

August 3, 1999

	Total Nitrate/Nitrite	Ammonia	Total CN	WAD CN	Temperature	Conductivity	pH	Dissolved Oxygen
	mg/L	mg/L	mg/L	mg/L	°C	micromho/cm	s.u.	mg/L
S-2	<0.02	<0.1	0.027	0.015	9.8	60	7.33	15.8
S-3	<0.02	<0.1	0.04	0.024	9.3	70	7.68	17.3
S-13	<0.02	<0.1	0.031	0.009	8.5	20	7.24	18.2
S-4	0.2	<0.1	0.035	0.019	9.6	110	7.87	18
S-12	0.18	<0.1	0.036	0.023	9.4	110	7.9	17.7
S-5	0.08	<0.1	0.029	0.016	9.5	110	7.9	17.9
S-11	0.04	<0.1	0.022	0.016	9.6	110	9.03	18.3
S-10	0.04	<0.1	0.005	<0.005	9.5	60	7.44	16.2

Shaded values exceed two standard deviations of the mean value.

TABLE 5-3

Surface Water Quality

August 9, 1999

	Total Nitrate/Nitrite	Ammonia	Total CN	WAD CN	Temperature	Conductivity	pH	Dissolved Oxygen
	mg/L	mg/L	mg/L	mg/L	°C	micromho/cm	s.u.	mg/L
S-2	<0.02	<0.1	0.012	0.007	9.3	60	7.46	19.8
S-3	<0.02	<0.1	0.04	0.021	9.1	70	7.7	21.2
S-13	<0.02	<0.1	0.009	<0.005	9.2	20	7.3	21.5
S-4	0.19	<0.1	0.033	0.021	8.9	120	7.76	20
S-12	0.17	<0.1	0.033	0.02	8.4	120	7.58	21.7
S-5	0.08	<0.1	0.026	0.014	8.6	110	7.77	21.2
S-11	0.05	<0.1	0.022	0.012	8.7	120	7.84	22.7
S-10	<0.02	<0.1	0.007	<0.005	9.0	60	7.62	19.8

Shaded values exceed two standard deviations of the mean value.

TABLE 5-4

Surface Water Quality

August 16, 1999

	Temperature	Conductivity	pH	Dissolved Oxygen
	°C	micromho/cm	s.u.	mg/L
S-2	7.3	80	7.54	28.8
S-3	6.9	80	7.66	31.6
S-13	6.9	30	7.58	32.2
S-4	7.0	140	7.73	29.7
S-12	6.6	130	7.74	30
S-5	6.7	120	7.9	30.9
S-11	6.5	140	7.68	33.4
S-10	7.7	70	7.68	28.9

Shaded values exceed two standard deviations of the mean value.

EFERENCES

94. USEPA Contract Laboratory Program National Functional Guidelines for Data Review. EPA-540/R-54-013.

Golder Associates

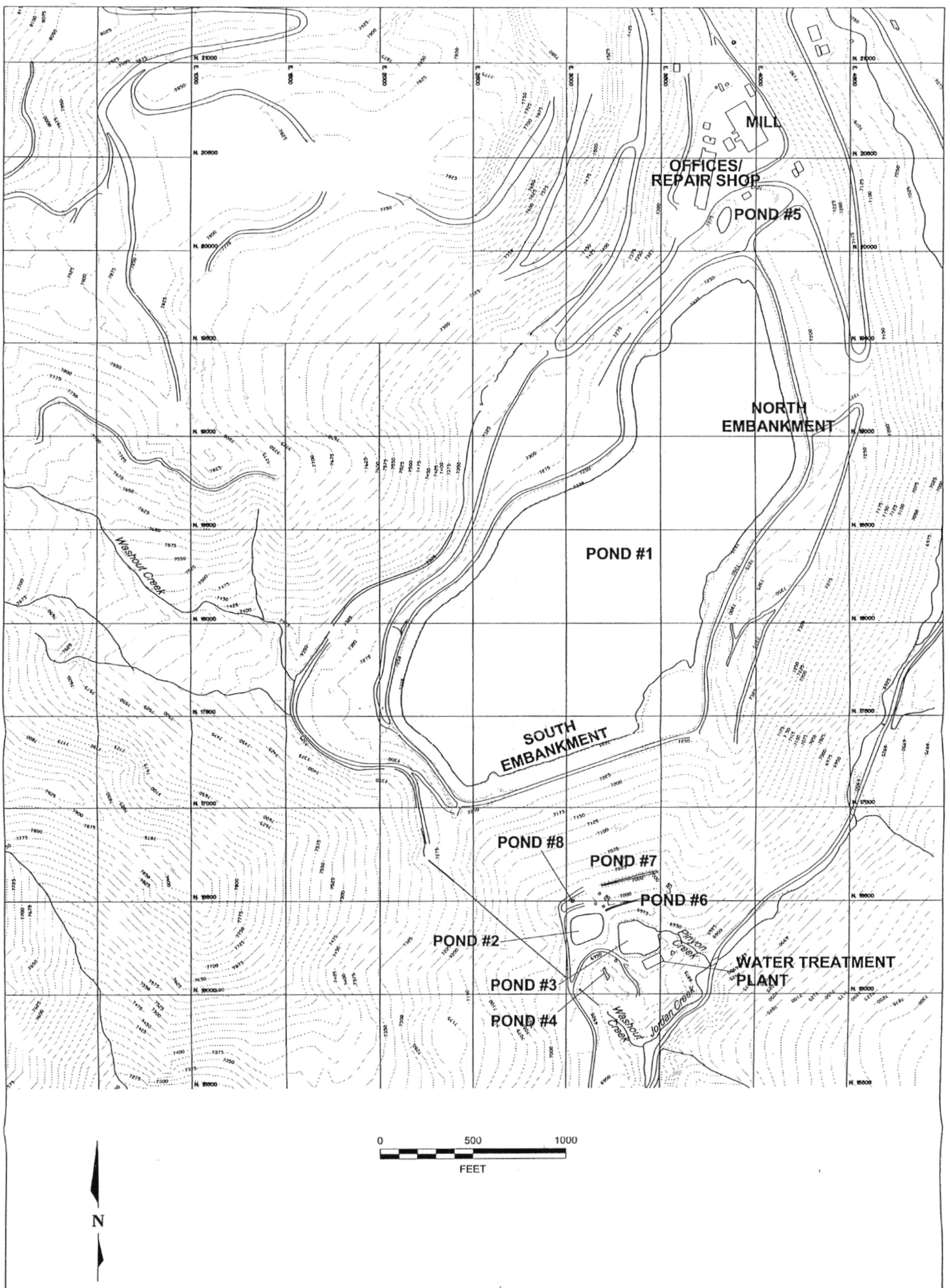


FIGURE **2-1**

MINE SITE MAP

HECLA/WORK PLAN/ID

FIGURE 2-2
Pond 1 Cyanide Concentrations

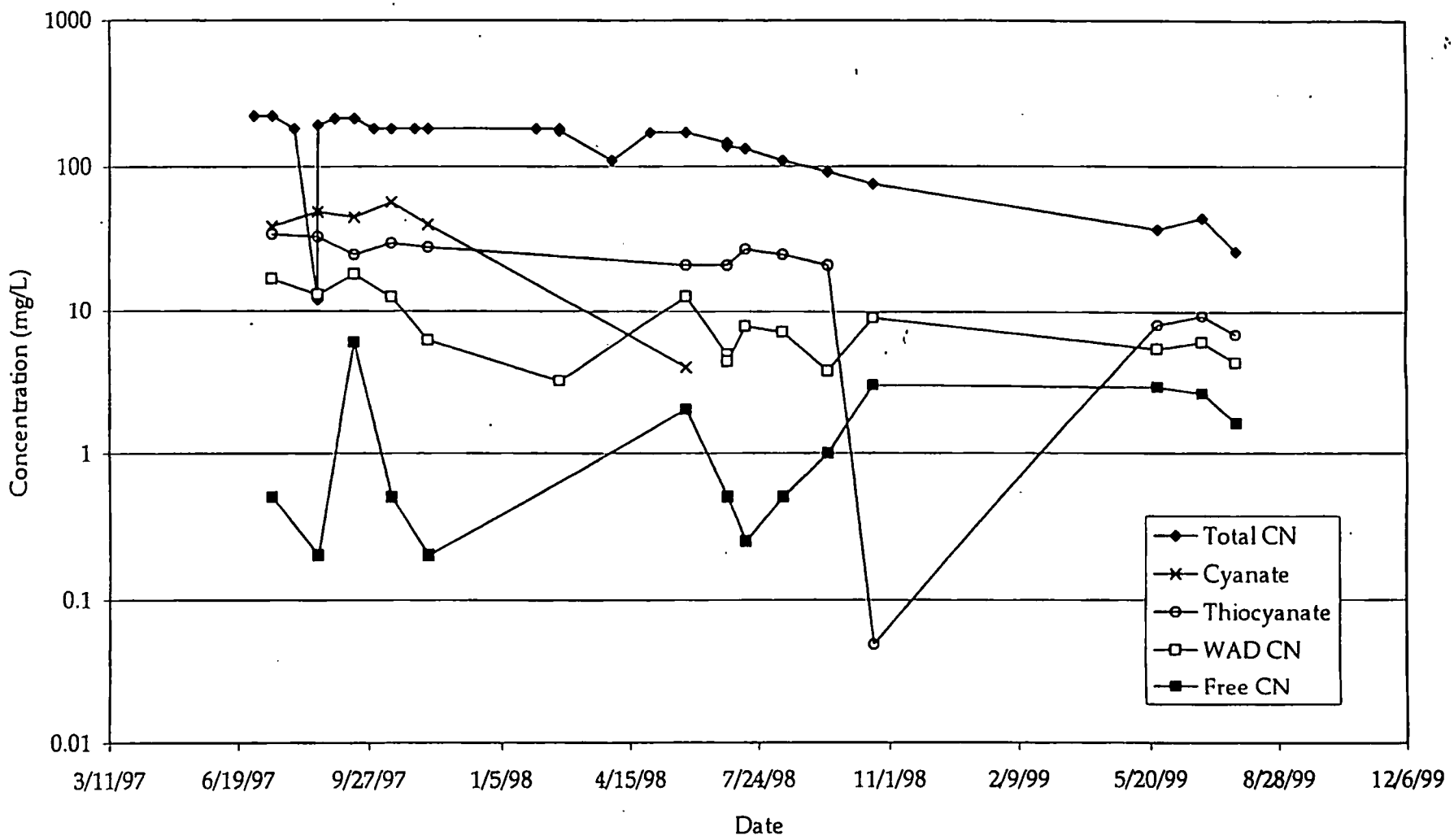


FIGURE 2-3
Pond 6 - Underdrain Cyanide Concentrations

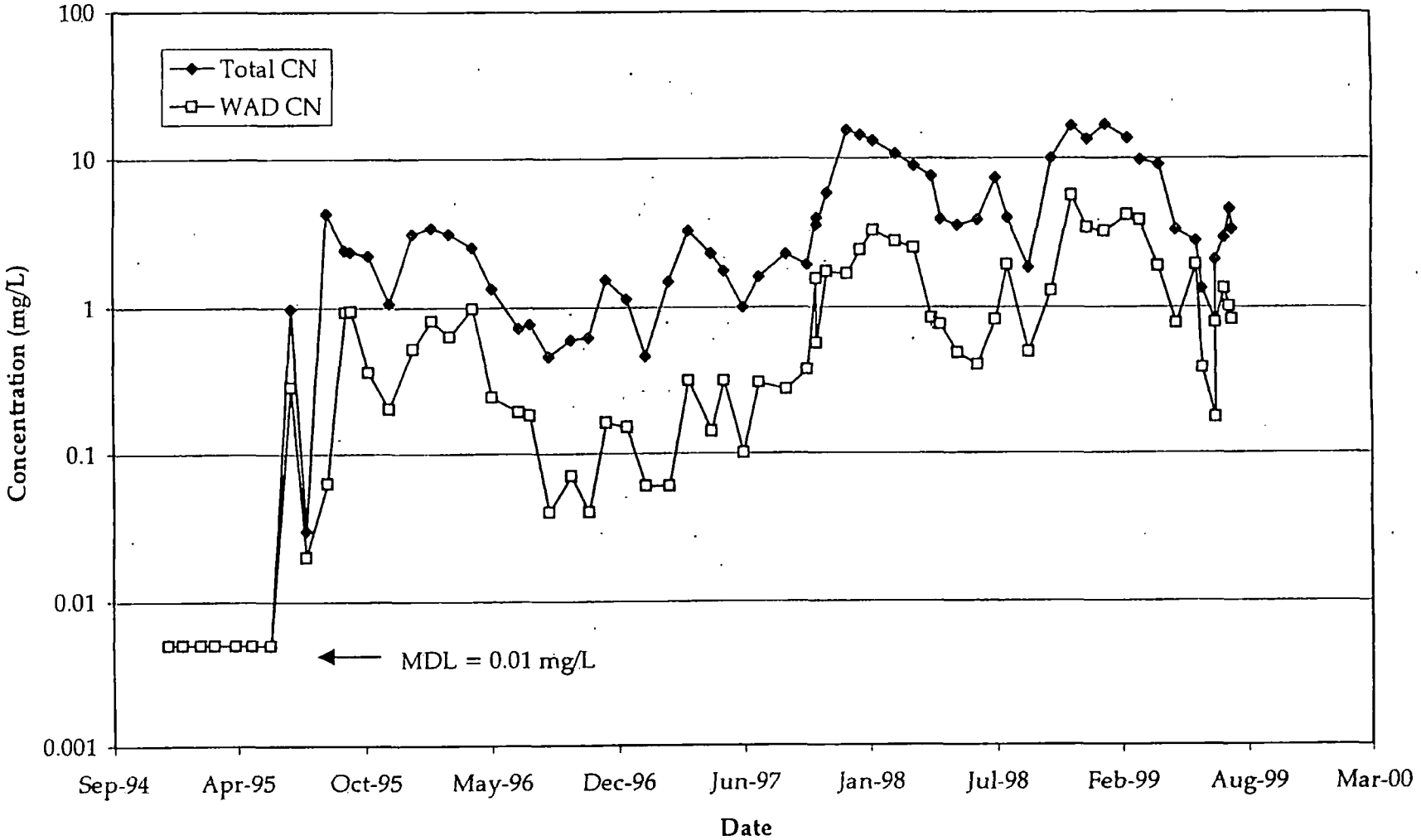
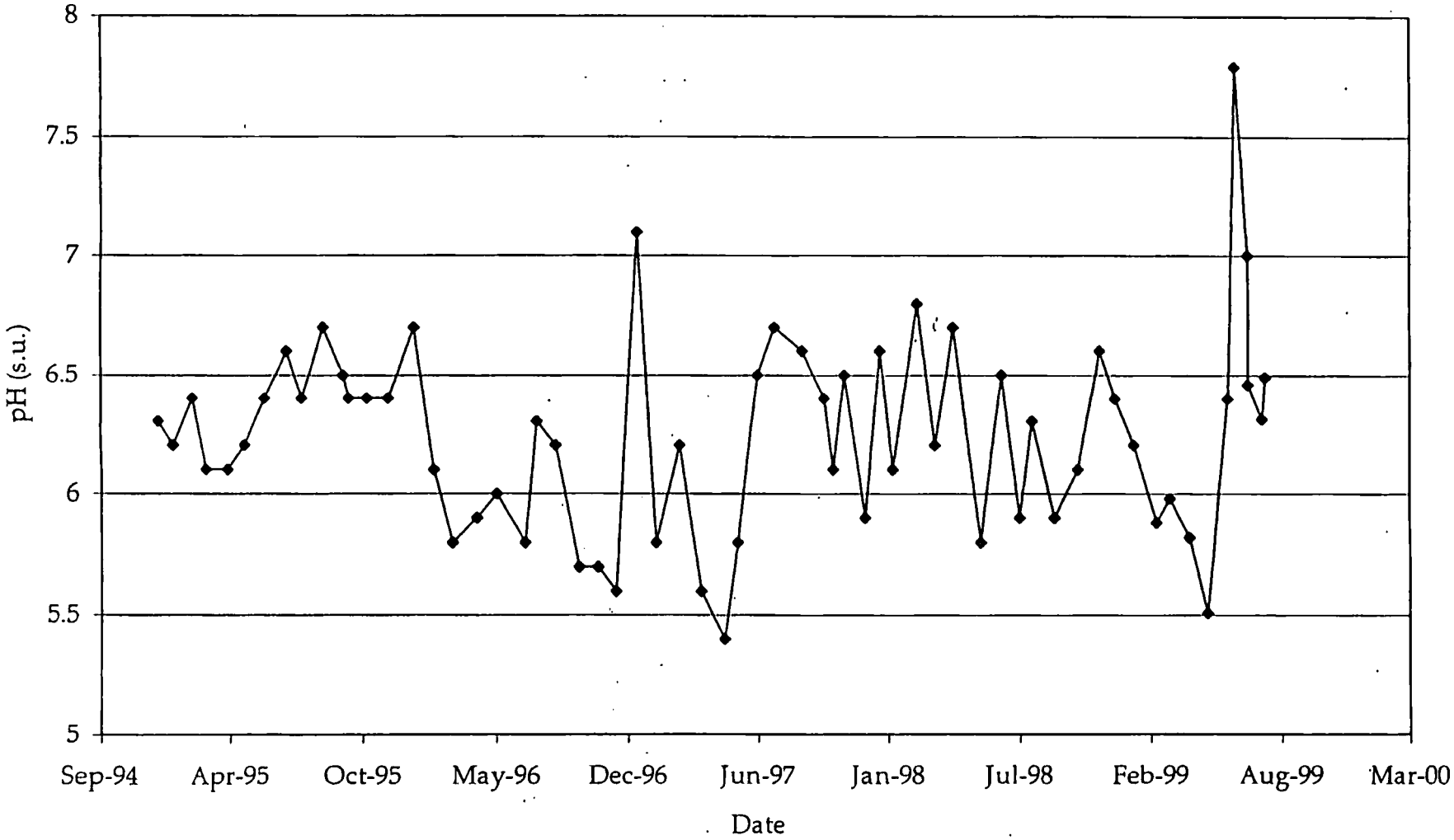
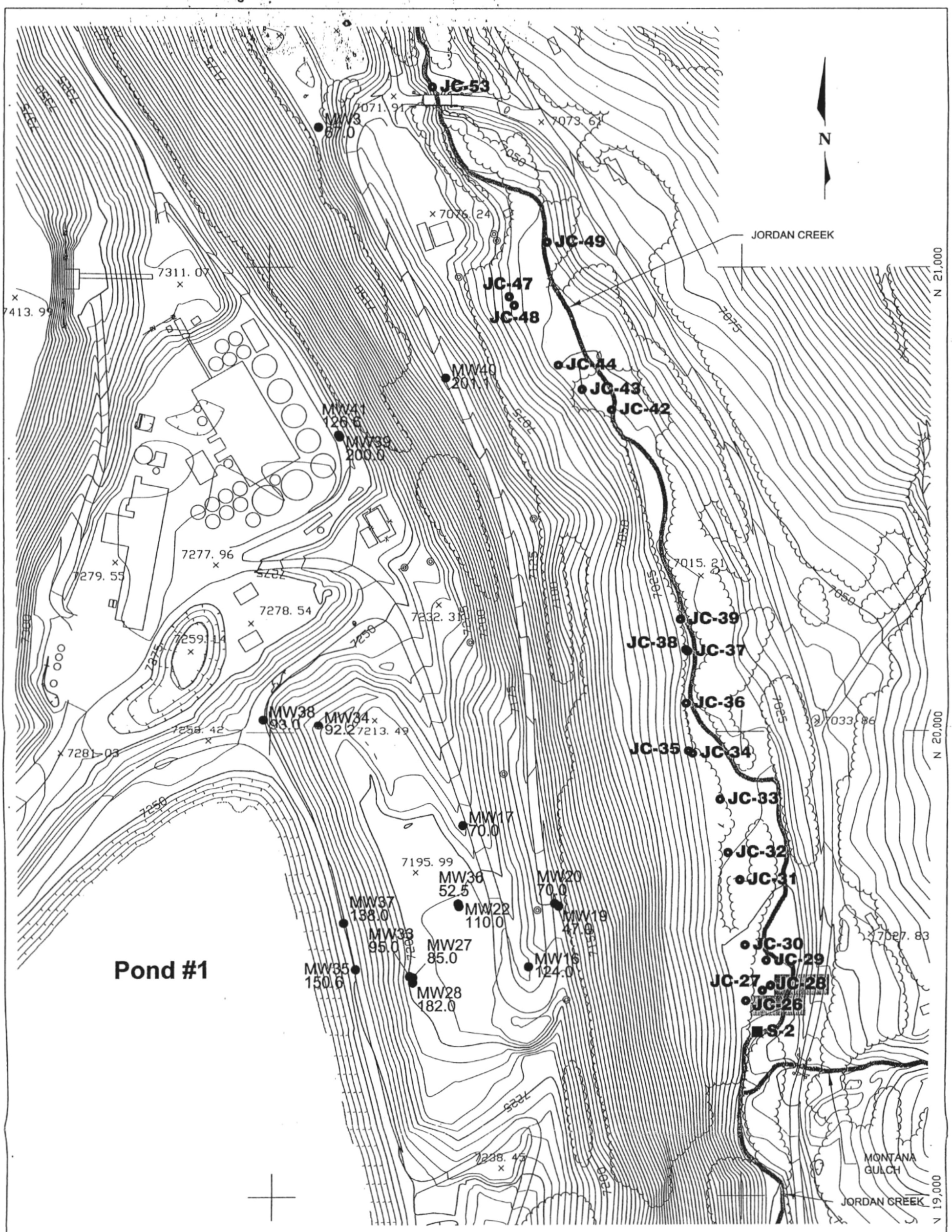


FIGURE 2-4
Pond 6 Underdrain pH





SOURCE: HECLA MINING CO., "JORDAN CREEK SAMPLING SITES MAY 13, 1999," DWG. # CN99TRAV.DWG

EXPLANATION

- JC-27 — SEEP OR SPRING SAMPLE SITE
- S-2 — SURFACE WATER SAMPLING SITE
- MW37 138.0 — MONITOR WELL (W/ BOTTOM OF HOLE DEPTH) (IN FEET)
- SEEPS/SPRINGS SHOWING ELEVATED TOTAL CYANIDE (>0.1 mg/L) (AUGUST 1999)

0 200 400
FEET

FIGURE 3-1
NORTH EMBANKMENT MONITORING WELL, SPRING, AND SEEP SAMPLING LOCATIONS AUGUST 1999
HECLA/WORK PLAN/ID

J_SNOW|K:\CAD\SDSKPROJ\9831252\302\84240.dwg|9-7-99 12:33|x:-|l:-

Golder Associates

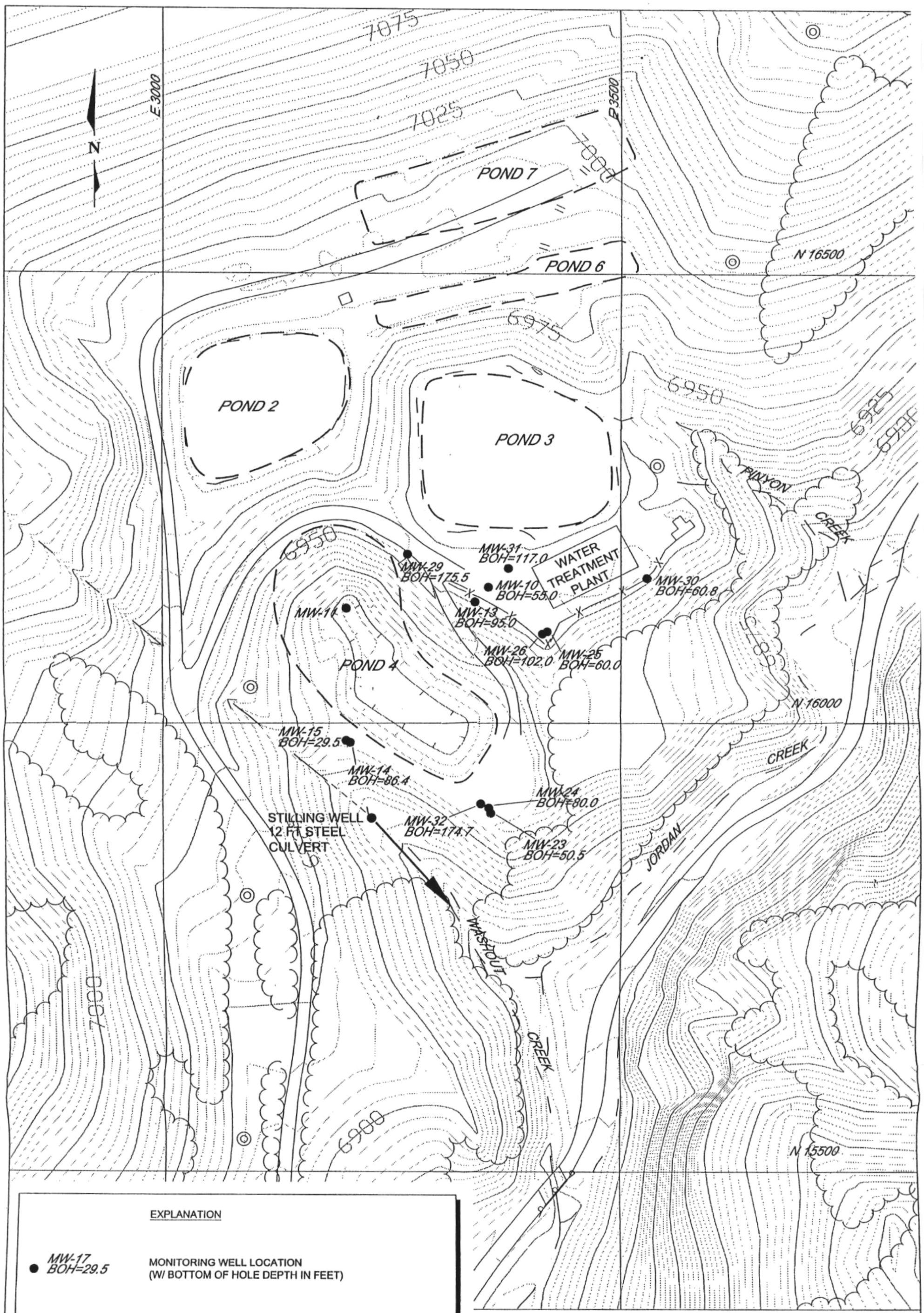


FIGURE **3-2**

SOUTH EMBANKMENT MONITORING WELL LOCATIONS

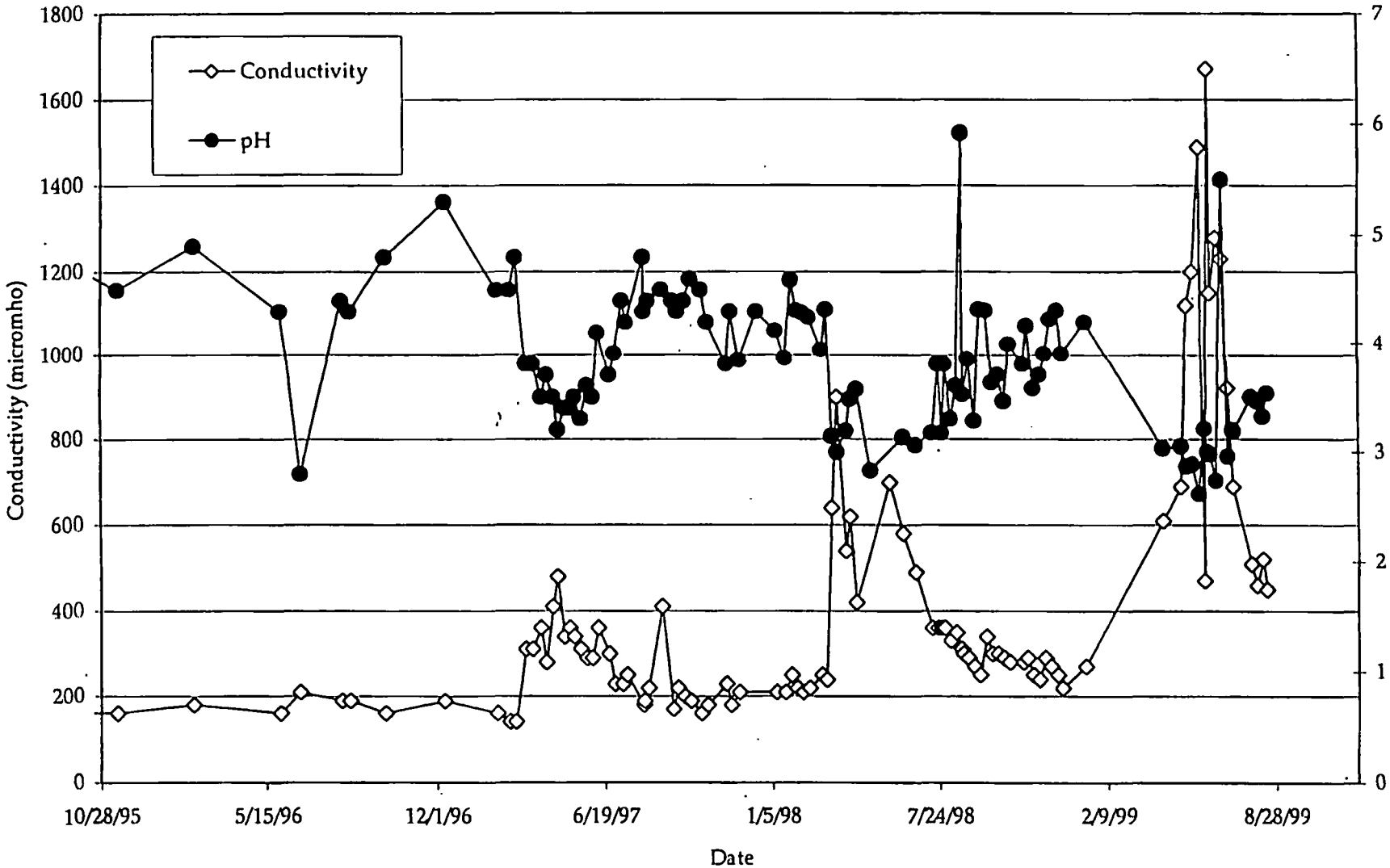
HECLA/WORK PLAN/ID

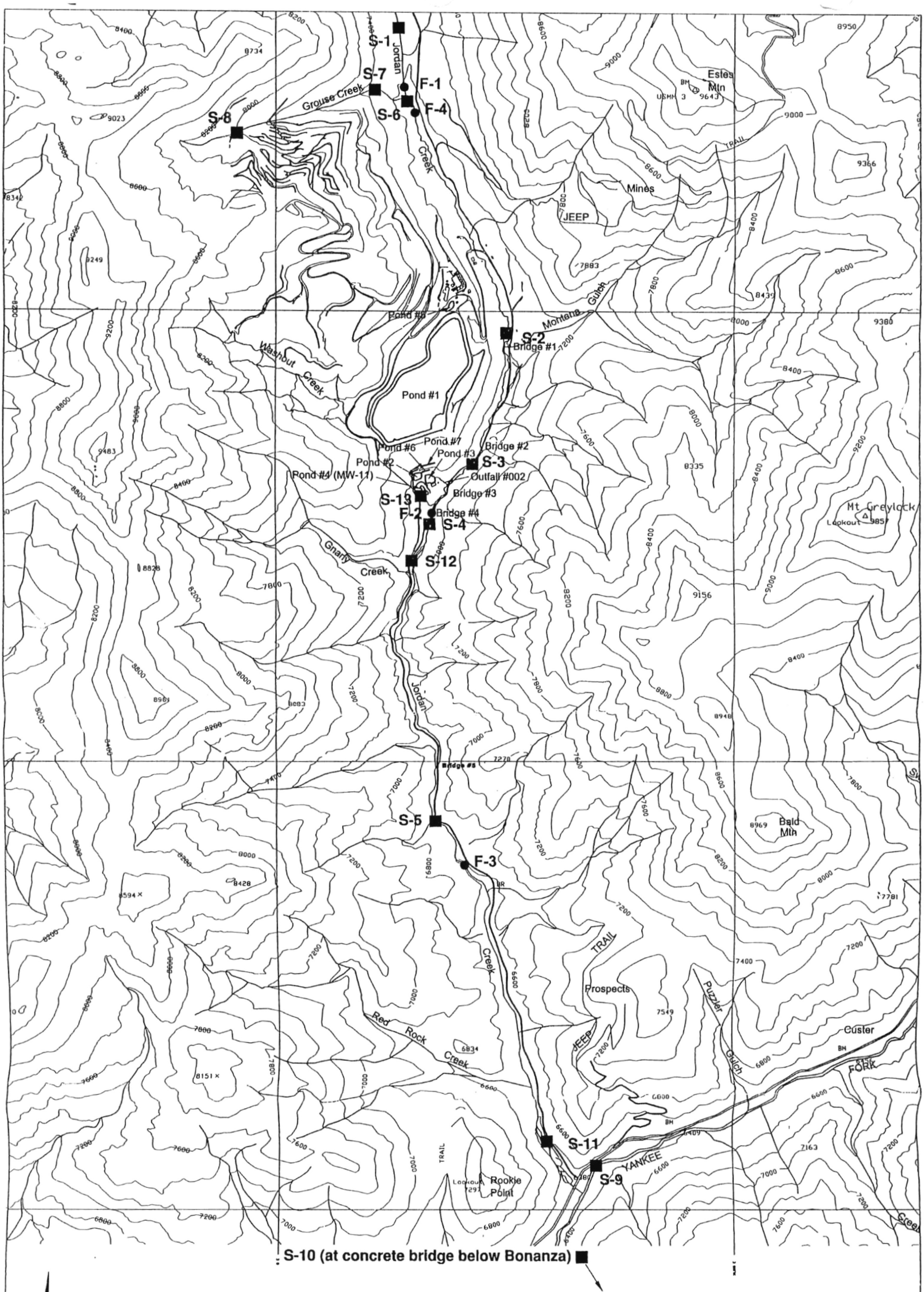
J_SNOW|K:\CAD\SDSKPROJ\9831252\302\84187.dwg|8-9-99 11:19|x:-|l:-

Golder Associates

FIGURE 3-3

Groundwater Monitoring Well MW-12 Water Quality





SOURCE: HECLA MINING COMPANY, "SURFACE AND GROUND WATER MONITORING STATIONS," DRAWING # JORDAREA.DWG

FIGURE **4-1**

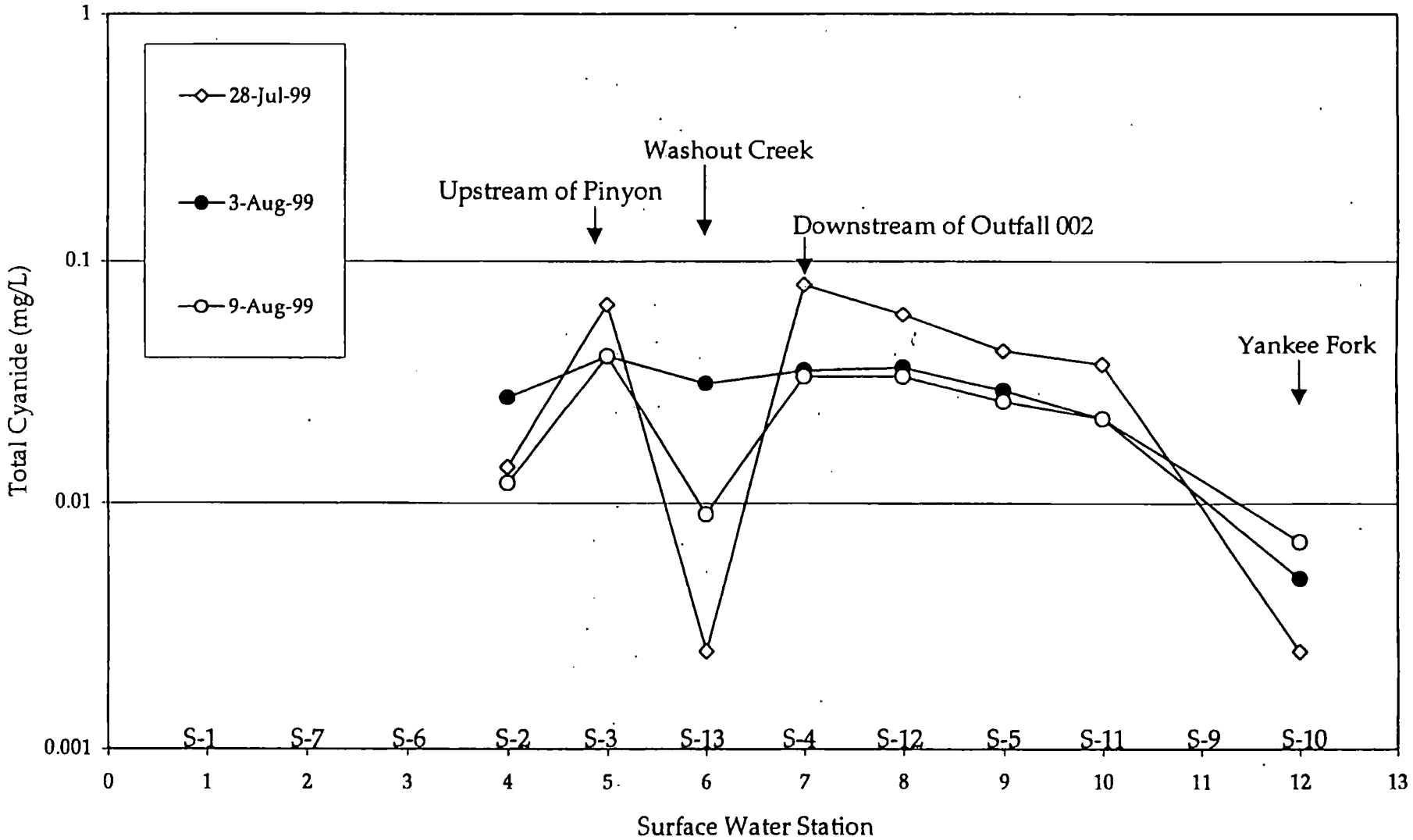
SURFACE WATER AND FISH POPULATION SAMPLING LOCATIONS

HECLA/WORK PLAN/ID

J_SNOW|K:\CAD\SDSKPROJ\9831252\302\84144.dwg|7-20-99 11:26|x:-|l:-

Golder Associates

FIGURE 5-1
Surface Water Total Cyanide Concentrations



Seep/Spring Cyanide Concentrations

Site Number	Sample Date	CN, Free (mg/l)	CN, Total (mg/l)	CN, WAD (mg/l)	Thiocyanate (mg/l)
JC-48	6/7/99	<0.1	0.03	<0.01	<0.1
	7/7/99	dry			
	8/19/99	dry			
JC-44	8/17/98		0.03	0.01	
	8/21/98		0.03	0.02	
	6/7/99	<0.1	0.13	0.11	<0.1
	7/7/99		0.037	0.023	
	8/5/99		0.03	0.02	
JC-43	6/7/99	<0.1	0.02	<0.01	<0.1
	7/7/99		0.005	<0.005	
	8/5/99		0.09	<0.005	
	8/19/99	dry			
JC-38I	6/7/99	0.3	3.8	0.36	<0.1
	7/7/99	dry			
	8/5/99	dry			
	8/19/99	dry			
JC-38	6/7/99	0.4	3.7	0.7	<0.1
	7/7/99		2.91	0.2	
	8/5/99	dry			
	8/19/99	dry			
JC-35	6/7/99	0.4	4.9	1.6	<0.1
	6/7/1999 (Dup.)	1	4.7	1.9	<0.1
	7/7/99		2.14	0.37	
	8/5/99	dry			
JC-30	6/7/99	0.4	3.5	0.6	<0.1
	7/7/99		2.03	0.122	
	8/5/99	dry			
	8/19/99	dry			
JC-28	8/17/98		0.08	0.04	
	8/21/98		0.07	0.04	
	6/7/99	<0.1	1	0.17	<0.1
	7/7/99		0.446	0.14	
	7/7/1999 (Dup.)		0.458	0.156	
	8/5/99		0.4	0.11	
JC-27	7/7/99		0.455	0.126	
	8/19/99	dry			
JC-26	8/17/98		0.26	0.2	
	8/21/98		0.28	0.13	
	9/2/98		0.25	0.13	
	11/11/98		0.1	0.03	
	6/7/99	0.2	3.3	0.35	<0.1
	7/7/99		2	0.89	
	8/5/99		1.08	0.11	

Seeps/springs listed from upstream to downstream location.
Dup. - duplicate sample

Jordan Creek Field Measured Turbidity

	8/3/99 (NTU)	8/9/99 (NTU)	8/16/99 (NTU)	8/23/99 (NTU)
S-2	0.9	0.9	1	0.9
S-3	1.8	1.1	1.2	1
S-13	3.9	3.7	3.4	3.7
S-4	3.6	2.4	1.9	2
S-12	1.5	1.5	2.9	1.8
S-5	1.2	1.1	1.1	1.1
S-11	1	1.11	1.2	1.4
S-10	2.6	2.17	2.8	2.1

Streamflow stations listed from upstream to downstream location.

Quality Assurance/Quality Control Evaluation

	Nitrate + Nitrite , T mg/L	Ammonia mg/L	Total CN mg/L	WAD CN mg/L
S-11 8/3/99			0.022	0.016
lab dup.			0.024	0.011
QA/QC			+/- MDL	+/- MDL
S-5 8/3/99			0.029	0.016
lab dup.			0.029	0.011
QA/QC			0%	+/- MDL
S-12 8/3/99			0.036	0.023
lab dup.			0.035	0.019
QA/QC			3%	+/- MDL
S-4 8/3/99			0.035	0.019
lab dup.			0.044	0.02
QA/QC			23%	+/- MDL
S-13 8/3/99			0.031	0.009
lab dup.			<0.005	<0.005
QA/QC			> +/- MDL	+/- MDL
S-2 8/3/99			0.027	0.015
lab dup.			0.03	0.005
QA/QC			11%	> +/- MDL
S-3 8/3/99	<0.02	<0.1	0.04	0.024
lab dup.			0.047	0.019
QA/QC			16%	23%
dup.	<0.02	<0.1	0.044	0.026
QA/QC	+/- MDL	+/- MDL	10%	8%

p. - lab duplicate
dup. - field duplicate
RPD - relative percent difference
Shaded values exceed QA/QC criterion.

Hecla
MINING COMPANY

September 9, 1999

Ms. Catherine Reno
Regional Environmental Manager
Idaho Division of Environmental Quality
900 North Skyline Drive, Suite B
Idaho Falls, ID 83402

RE: Hecla Mining Company – Grouse Creek Unit Monthly Water Quality Report

Dear Ms. Reno:

This letter is written in response to your letter dated June 15, 1999 requesting a monthly submittal of water quality data, drill logs, and interpretation of water quality. Golder Associates Inc. will prepare and issue the Summary of Water Quality Report for the month of August.

Enclosed you will find a support document prepared for the August Summary of Water Quality Report that contains the following information:

- New Monitoring Well Drill Logs
- Monitoring Well Location Table
- Pond 1 Capacity Report
- Monitoring Site Location Map
- Pond 1 & Pond 1 Floor Drain Data Summaries
- Pond 6 – Underdrain Composite Data Summary
- Surface Water Monitoring Site Data Summaries
- Jordan Creek Monitoring Site Data Summaries
- Groundwater Monitoring Site Data Summaries
- Internal Lab Groundwater Monitoring Site Data
- Outside Analytical Water Quality Data Sheets
- Outside Analytical Soil Quality Data Sheets
- Streamflow Summary Sheets

If you have any questions or need additional information, please do not hesitate to contact me at (208) 879-2304, extension 530.

Sincerely,

Eileen Stilman for

Doug Wollant
Hecla Mining Company
Unit Manager, Grouse Creek Unit

RECEIVED
YANKEE FORK R.D.
SEP 10 '99

C: Rene' Mabe (USFS)
Dave Tomten (USEPA)
Nick Ceto (USEPA)
George Johnson (HMC)
John Galbavy (HMC)
Gary Gamble (HMC)
Fred Stahlbush (HMC)
David Banton (Golder)
GCU Files

Grouse Creek Unit • P.O. Box 647 • Challis, ID 83226 • (208) 879-2304 • Fax (208) 879-5529

SUPPORTING DOCUMENTATION FOR AUGUST 1999 SUMMARY OF WATER QUALITY

Hecla Mining Company
Grouse Creek Unit

September 9, 1999

RECORD OF MONITORING WELL INSTALLATION

MW22

PROJECT NUMBER: 983 1252.202
BOREHOLE LOCATION: Stanley, ID
COORDINATES N: **E:** **EL.:**

SHEET 1 OF 2
PROJECT: Hecla/Grouse Creek/ID
BORING DATE: 7/11-12/99

STRATIGRAPHY								MONITORING WELL COMPLETION			
DEPTH (feet)	DESCRIPTION	GRAPHIC LOG	TIME	SAMPLE NUMBER	MOISTURE LEVEL	pH	COND.	DESCRIPTION	WELL SKETCH	DRILLING NOTES	DEPTH (feet)
								Locking Steel Monument			
0	Compact, variably weathered, altered and oxidized, dark yellowish brown (10YR 4/2) to moderate yellowish brown (10YR 5/4) when oxidized and weathered, to medium gray (N5) when fresh, medium to coarse SAND and GRAVEL, trace cobbles to boulders, trace to little silt (FILL MATERIAL)		1525	1	Dry			Concrete Plug		Start drilling. Soil samples for CN at 2.5 ft intervals	0
			1528	2				8-inch Diameter Borehole			
			1530	3						Becomes damp	
	– Mine waste rock material (andesite)		1532	4	Dry to Damp					8-inch diameter ODEX Down the Hole Hammer and Casing	
10			1535	5	Slightly Damp			Bentonite Grout Annular Sealant			10
			1555	6	Dry						
	– Larger fragments fractured and broken		1558	7				4-inch Diameter Sch. 40 PVC Riser		Bouldery, mostly rock fragments	
			1602	8	Slightly Damp					Some dust sticking to rock fragments	
20			1606	9	Slightly Damp to Dry			Centralizer			20
			1617	10	Dry						
			1620	11	Slightly Damp						
	– Large ANDESITE boulder, slightly weathered		1624	12	Dry						
30			1628	13							30
			1642	14	Slightly Damp					Trace moisture?	
			1645	15	Slightly Damp to Dry						
			1649	16	Slightly Damp					Moisture 39.5'	
40			1653 0748	17	Moist					Blow ~10 gallons at start up 7/12/99 pH = 7.32 SC = 0.778 mS/cm CN Sample	40
			0752	18							
	– Bouldery		0756	19						Rough drilling, driller reports hole should have fair amount of water	
	– Start lifting 2 gpm		0800	20	1-2 gpm					pH = 7.06 SC = 6.890 mS/cm CN Sample	
50	– Trace wood, vegetation		0805	21	Damp					Dries out. Boulder?	50
	Broken, slightly weathered, unoxidized, greenish black (5GY 2/1), aphanitic BASALTIC ANDESITE, unmineralized		0820	22	Moist					Large fragments, broken	
	– Less fractured/broken below 56 ft		0826	23	Dry					Dries out	
	– Grades to greenish black (5GY 2/1) to grayish olive (10Y 4/2) ANDESITE		0833	24							
60	– Weakly fractured with weak iron oxide staining on fractures		0837	25				Centralizer		Blow water at change pH = 7.35 SC = 1.05 mS/cm Dries out within 6 inches	60
	– Less fractured, 50% fragments blueish gray		0902	26							
	Strongly weathered, oxidized, weakly to moderately fractured, moderate yellowish brown (10YR 5/4) to moderate olive brown (5Y 4/4), aphanitic ANDESITE, iron oxide staining on fractures, fairly soft		0903	27							
70			0913	28							70
			0917	29	Damp					Picking up moisture, no dust, cuttings ball up	
			0929	30	Dry					Dries out, pull up and check for water	
	Fresh, weakly fractured, medium dark gray (N4) to dark greenish gray (5G 4/1), aphanitic ANDESITE, weak pyrite mineralization, trace hornblende phenocrysts		0933 1000	31						Slightly softer pH = 7.60 SC = 0.723 mS/cm	
			1003	32	Damp to Moist					Moist cuttings, damp, less dust CN Sample	
80			1012							Dries out at 80 ft	80

DRILL RIG: Speedstar 30K
DRILLING CONTRACTOR: Layne-Christensen
DRILLER: W. Franklin

LOGGED: M. Klisch
CHECKED:
DATE: 8/2/99

Golder Associates

RECORD OF MONITORING WELL INSTALLATION MW22

PROJECT NUMBER: 983 1252.202
BOREHOLE LOCATION: Stanley, ID
COORDINATES N: E: EL.:

SHEET 2 OF 2
PROJECT: Hecla/Grouse Creek/ID
BORING DATE: 7/11-12/99

STRATIGRAPHY								MONITORING WELL COMPLETION			
DEPTH (feet)	DESCRIPTION	GRAPHIC LOG	TIME	SAMPLE NUMBER	MOISTURE LEVEL	pH	COND.	DESCRIPTION	WELL SKETCH	DRILLING NOTES	DEPTH (feet)
80	Fresh, weakly fractured, medium dark gray (N4) to dark greenish gray (5G 4/1), aphanitic ANDESITE, weak pyrite mineralization, trace hornblende phenocrysts		1012	33	Damp			8-inch Diameter Borehole		Blow water pH = 7.74 SC = 0.379 mS/cm CN Sample	80
	– Fractured		1104							Moist cuttings, fractured	
	– Fractured, moist cuttings		1112	34	Dry			Bentonite Grout Annular Sealant			
	– Greenish black ANDESITE		1125	35	Damp					Fractured, moisture dries out ~6 inches	
	– Plagioclase and hornblende crystals, ??trace pyrite		1137	36	Damp to Moist					Dries out, damp, no dust	
90	– Strong fracture zone, large cuttings fragments, weak iron oxide staining		1151	37	Damp			4-inch Diameter Sch. 40 PVC Riser		Dries out Damp, blow 5 gallons at change pH = 8.34 SC = 0.225 mS/cm CN Sample	90
			1215	38	Dry					Moist to wet, fractured	
			1218								
	Soft, altered, medium gray (N5) ANDESITE, aphanitic, bleached, trace fine pyrite		1224	39	Moist			Bentonite Pellet Seal			
			1230	40	Damp			10/20 Silica Sand			
100	– Grades to fresh, greenish black ANDESITE, aphanitic		1240	41				Centralizer			100
			1249	42	Wet			4-inch Diameter Sch. 40 PVC 0.020-inch Slot Screen		Wet fracture Wet fracture Dries out then wet pH = 8.18 SC = 0.443 mS/cm CN Sample	
				43							
110			1320	44				Centralizer		~1 gpm	110
	End of hole at 110 ft							End Cap			
120											120
130											130
140											140
150											150
50											160

DRILL RIG: Speedstar 30K
DRILLING CONTRACTOR: Layne-Christensen
DRILLER: W. Franklin

LOGGED: M. Kilsch
CHECKED:
DATE: 8/2/99

Golder Associates

RECORD OF MONITORING WELL INSTALLATION

MW34

PROJECT NUMBER: 983 1252.202
BOREHOLE LOCATION: Stanley, ID
COORDINATES N: E: EL:

SHEET 1 OF 2
PROJECT: Hecla/Grouse Creek/ID
BORING DATE: 7/1-7/99

STRATIGRAPHY								MONITORING WELL COMPLETION			
DEPTH (feet)	DESCRIPTION	GRAPHIC LOG	TIME	SAMPLE NUMBER	MOISTURE LEVEL	pH	COND.	DESCRIPTION	WELL SKETCH	DRILLING NOTES	DEPTH (feet)
								Locking Steel Monument			
0	Loose to compact, weathered, altered, oxidized, dark yellowish brown (10YR 4/2) to dark yellowish orange (10YR 6/6), fine SAND and GRAVEL, trace cobbles, trace wood (FILL MATERIAL)		1410	1				Concrete Plug		Note: Grab samples for soil CN taken every 2.5 ft for lab analysis for total CN, WAD CN, SPLP CN	0
			1413	2	Damp			8-inch Diameter Borehole			
	– Predominantly altered ANDESITE, occasional clay		1416	3						Dark gray gravels, wood	
			1418	4	Slightly Damp					Sandy	
10			1420	5				Bentonite Grout Annular Seatant			10
			1428	6						8-inch diameter ODEX Down the Hole Hammer and Casing	
			1431	7				4-inch Diameter Sch. 40 PVC Riser			
	– Mostly sand, fast drilling		1433	8							
20	Loose to compact, olive gray (5Y 4/1), subrounded GRAVEL, some sand, trace wood		1435	9				Centralizer		A&WTP for call	20
				10							
				11							
	Loose to compact, weathered and oxidized, dark yellowish brown (10YR 4/2) to dark yellowish orange (10YR 6/6), GRAVEL and SAND, little silt, trace wood (FILL MATERIAL)			12							
30			1507	13	Damp						30
	– Mine waste rock, altered and unaltered		1511	14	Damp to Moist					Driller reports damp material	
			1514	15	Moist					Dries out	
			1518	16	Damp						
40	– Unoxidized		1547	17						No water after 25 minutes	40
	– Oxidized		1550	18						Slight moisture zone 6-inches	
	– Oxidized		1553	19							
			1557	20	Wet					Water blown when adding casing, take CN Sample	
50			1615	21	Moist					pH = 6.95 SC = 0.098 mS/cm	50
	Loose, soft, weathered, light olive brown (5Y 5/6) to pale olive (10Y 6/2), SAND, medium to coarse grained andesite in composition (COLLUVIUM)		1618	22						Pick up more water - muddy discharge	
			1624	23				Bentonite Pellet Seal			
			1627	24				10/20 Silica Sand		Blow water, then dries out	
60			1638	25				Centralizer		CN Sample pH = 7.09 SC = 0.098 mS/cm	60
			1642	26	Moist to Wet			4-inch Diameter Sch. 40 PVC 0.020-inch Slot Screen			
			1650	27	Wet					1 gpm	
	– Rocky andesite fragments, broken		1656							1 gpm pH = 7.72 SC = 0.154 mS/cm	
70	Weathered, soft, greenish gray (5GY 6/1) to light olive gray (5Y 6/1), aphanitic ANDESITE, weakly to moderately fractured/broken, trace iron oxide staining, rare trace pyrite (WEATHERED BEDROCK)		0733	28				Centralizer		7/7/99 - 39.4' btc water = 33.0' bgs	70
			0736	29				End Cap		~1 gpm	
			0744	30				Bentonite Chip Backfill		1-2 gpm	
			0849	31						1 gpm	
80			0852	32							80

DRILL RIG: Speedstar 30K
DRILLING CONTRACTOR: Layne-Christensen
DRILLER: W. Franklin

LOGGED: M. Klisch
CHECKED:
DATE: 8/2/99

Golder Associates

RECORD OF MONITORING WELL INSTALLATION

MW34

PROJECT NUMBER: 983 1252.202
BOREHOLE LOCATION: Stanley, ID
COORDINATES N: E: EL.:

SHEET 2 OF 2
PROJECT: Hecla/Grouse Creek/ID
BORING DATE: 7/1-7/99

STRATIGRAPHY								MONITORING WELL COMPLETION			
DEPTH (feet)	DESCRIPTION	GRAPHIC LOG	TIME	SAMPLE NUMBER	MOISTURE LEVEL	pH	COND.	DESCRIPTION	WELL SKETCH	DRILLING NOTES	DEPTH (feet)
80	Weathered, soft, greenish gray (5GY 6/1) to light olive gray (5Y 6/1), aphanitic ANDESITE, weakly to moderately fractured/broken, trace iron oxide staining, rare trace pyrite (WEATHERED BEDROCK)		0752		Wet			Bentonite Chip Backfill		Dries out below 81 ft pH = 7.46 SC = 0.109 mS/cm	80
			0822	33	Damp					Bedrock becomes more solid CN Sample	
			0825	34	Damp to Dry					No water below ~81 ft	
	– Grades to unweathered ANDESITE bedrock, weakly fractured, trace pyrite		0828	35	Slightly Damp						
90			0832	36							90
	End of hole at 92 ft										
100											100
110											110
120											120
130											130
140											140
150											150
160											160

DRILL RIG: Speedstar 30K
DRILLING CONTRACTOR: Layne-Christensen
DRILLER: W. Franklin

LOGGED: M. Klisch
CHECKED:
DATE: 8/2/99

Golder Associates

RECORD OF MONITORING WELL INSTALLATION

MW35

PROJECT NUMBER: 983 1252.202
BOREHOLE LOCATION: Stanley, ID
COORDINATES N: E: EL.:

SHEET 1 OF 2
PROJECT: Hecla/Grouse Creek/ID
BORING DATE: 7/8-9/99

STRATIGRAPHY: DEPTH (feet)	STRATIGRAPHY: DESCRIPTION	GRAPHIC LOG	TIME	SAMPLE NUMBER	MOISTURE LEVEL	pH	COND.	MONITORING WELL COMPLETION: DESCRIPTION	DRILLING NOTES	DEPTH (feet)
								Locking Steel Monument		
0	Road Fill Material – Gravel		1443	1				Slip Cap	Start drilling. Soil samples for CN at 2.5, 12.5, 22.5, 32.5, 42.5, 52.5 ft bgs	0
	Loose, weathered, variably oxidized, dark yellowish brown (10YR 4/2) to dark yellowish orange (10YR 6/6) when oxidized, medium light gray (N6) to medium gray (N5) when unoxidized, GRAVEL, some sand, trace to little silt, predominantly andesite composition (EMBANKMENT FILL)		1446	2	Dry			Concrete Plug; 8-inch Diameter Borehole		
			1448	3	Slightly Damp				Oxidized	
			1450	4					Unoxidized	
10			1452	5				Bentonite Grout Annular Seatant	Oxidized	10
			1459	6					8-inch diameter ODEX Down the Hole Hammer and Casing	
	– Rare boulders		1501	7				4-inch Diameter Sch. 40 PVC Riser	Unoxidized	
	– Sandy to silty sand		1503	8						
20			1505	9					Dries out	20
			1513	10	Damp					
	– Coarse gravel/boulders, unoxidized		1515	11	Dry			Centralizer		
	– Less boulders, finer		1517	12						
30			1520	13						30
			1526	14	Damp				Wood fragments	
			1529	15					Steel debris, water?	
			1532	16					~7212 old dam crest elevation	
	– Dark gray gravel/boulders, wood		1534	17						
40			1620	18					Shut down for water - no water after 1/2 hour	40
			1625	19						
			1627	20						
			1629	21						
50	– Oxidized and unoxidized gravelly material, some silt		1640	22	Moist				Lift casing and tools - blow water	50
	– Colluvial material - fill?		1644	23	Damp				–Base of dam 7200' elev. pH = 6.57 SC = 1.94 mS/cm CN Sample	
	Loose to compact, weathered, olive gray (5Y 5/2) to light olive gray (5Y 5/2), fine SAND, little gravel, trace to little silt, predominantly weathered ANDESITE, trace to little wood (COLLUVIAL FILL)		1649	24					Abundant wood material	
			1651	25					7/8/99 - end of day	
60			0811	26					7/9/99 - no water at startup	60
			0816	27						
			0820	28						
			0828	29						
70	Loose to compact, weathered, dark yellowish brown (10YR 4/2) to moderate yellowish brown (10YR 5/4), medium to fine SAND, little to some gravel, trace to little silt, trace wood, gravel of andesite composition mine waste rock (FILL MATERIAL)		0833	30						70
			0847	31						
			0852	32					Trace wood	
	– Andesite gravel fragments, variably oxidized and weathered		0859					Centralizer	Woody material	
			0904							
80										80

DRILL RIG: Speedstar 30K
DRILLING CONTRACTOR: Layne-Christensen
DRILLER: W. Franklin

LOGGED: M. Kilsch
CHECKED:
DATE: 8/2/99

Golder Associates

RECORD OF MONITORING WELL INSTALLATION

MW35

PROJECT NUMBER: 983 1252.202
BOREHOLE LOCATION: Stanley, ID
COORDINATES N: E: EL.:

SHEET 2 OF 2
PROJECT: Hecla/Grouse Creek/ID
BORING DATE: 7/8-9/99

STRATIGRAPHY								MONITORING WELL COMPLETION			
DEPTH (feet)	DESCRIPTION	GRAPHIC LOG	TIME	SAMPLE NUMBER	MOISTURE LEVEL	pH	COND.	DESCRIPTION	WELL SKETCH	DRILLING NOTES	DEPTH (feet)
80	Loose to compact, weathered, dark yellowish brown (10YR 4/2) to moderate yellowish brown (10YR 5/4), medium to fine SAND, little to some gravel, trace to little silt, trace wood, gravel of andesite composition mine waste rock (FILL MATERIAL)			33	Damp			8-inch Diameter Borehole		Fine gray silt, trace gravel	80
			0921	34	Slightly Damp					Wood	
			0926	35	Damp			Bentonite Grout Annular Seatant		Dries out, dusty	
	– Gray SILT, trace gravel		0931	36	Slightly Damp			4-inch Diameter Sch. 40 PVC Riser		Pickup water (?) less dust -DTW MW33	
90	– Becomes gravelly, less oxidized – More oxidized		0938	37	Damp					No dust	90
			0944	38						Oxidized, wood, sandy	
			0948	39							
			0952	40						Less oxidized	
100	– Less oxidized		0955	41	Slightly Damp						100
			1013	42						Moisture	
			1017	43	Damp					Dries out	
			1023	44						No water when adding casing	
110	– Oxidized, waste rock, some silt/clay		1027	45							110
			1035	46							
	– Sandy, waste rock, oxidized		1040	47							
			1044	48				Bentonite Pellet Seal		pH = 7.05 SC = 0.752 mS/cm CN Sample	
120			1049 / 1145	49							120
			1147	50	Moist						
			1152	51	Damp					Color change - colluvium? Woody material	
	Compact, weathered, moderate olive brown (5Y 4/4), SAND, medium to fine gravel, little gravel, trace to little silt (COLLUVIUM)		1157	52				10/20 Silica Sand		-128-129': subrounded gravels and fabric material - underdrain?	
130	– Underdrain (?), fabric/fill 128-129 ft		1200 / 1230	53				Centralizer			130
	Compact, grayish olive (10Y 4/2) to moderate yellowish brown (10YR 5/4), GRAVEL, little sand, subrounded to rounded to 2-inch diameter		1235	54	12 gpm			4-inch Diameter Sch. 40 PVC 0.020-inch Slot Screen		Rounded gravels Blow -10 gallons pH = 6.65 SC = 0.630 mS/cm CN Sample	
			1314	55	10 gpm			Centralizer			
	Weathered, oxidized, moderate yellowish brown (10YR 5/4) where weathered and oxidized to greenish gray (5G 6/1), aphanitic ANDESITE, trace fine pyrite, moderately fractured		1322	56	-5<10 gpm			Bentonite Chip Backfill		pH = 7.11 SC = 0.540 mS/cm CN Sample	
140			1327	57	5 gpm						140
	– Becomes less weathered and oxidized, fresher and less fractured		1341	58	2-3 gpm						
			1348	59	5 gpm					Color change	
			1450	60						pH = 7.53 SC = 0.600 mS/cm CN Sample	
150			1458		5 gpm						150
	End of hole at 150.6 ft										
160											160

DRILL RIG: Speedstar 30K
DRILLING CONTRACTOR: Layne-Christensen
DRILLER: W. Franklin

LOGGED: M. Klisch
CHECKED:
DATE: 8/2/99

Golder Associates

RECORD OF MONITORING WELL INSTALLATION — MW37

PROJECT NUMBER: 983 1252.202 | **SHEET 1 OF 2**
BOREHOLE LOCATION: Stanley, ID | **PROJECT:** Hecla/Grouse Creek/ID
COORDINATES N: E: EL: | **BORING DATE:** 7/15/99

STRATIGRAPHY DEPTH (feet)	STRATIGRAPHY DESCRIPTION	GRAPHIC LOG	TIME	SAMPLE NUMBER	MOISTURE LEVEL	pH	COND.	MONITORING WELL COMPLETION DESCRIPTION	WELL SKETCH	DRILLING NOTES	DEPTH (feet)
								Locking Steel Monument			
0	Road Fill Gravel		1004	1	Dry			Slip Cap Concrete Plug		Start drilling. Soil samples for CN at 2.5 ft intervals	0
			1008	2				8-inch Diameter Borehole		Woody material	
	Compact to loose, variably weathered, oxidized and altered, dark yellowish brown (10R 4/2) to dark yellowish orange (10YR 6/6) when oxidized, medium gray (N5) to medium dark gray (N4) when unoxidized, GRAVEL, some sand, little to trace silt, trace wood (EMBANKMENT FILL)		1010	3						Occasional thin slightly damp zones	
			1013	4						8-inch diameter ODEX Down the Hole Hammer and Casing	
10	– Local bouldery or cobbly zones		1014	5	Slightly Damp			Bentonite Grout Annular Sealant		Generally oxidized	10
			1023	6	Dry						
			1025	7				4-inch Diameter Sch. 40 PVC Riser		Unoxidized - fine sand, silt	
			1027	8						Oxidized - fine sand, silt, trace gravel	
20			1029	9				Centralizer			20
			1040	10						Poor returns, loosing air Air returns	
			1043	11						Unoxidized	
			1047	12						Oxidized, brown	
30			1049	13							30
			1058	14						Becomes damp	
	– Compact, penetration rate increases		1101	15	Damp						
	– Wood debris		1106	16							
			1109	17							
40			1158	18	Damp					No water after 45 minute shutdown	40
	– Oxidized, trace wood debris		1202	19							
	– Less oxidation		1204	20							
			1207	21						Base of dam	
50	– Unoxidized, trace wood		1215	22							50
	– Becomes oxidized, sandy gravel		1218	23						Dries out somewhat	
	Compact, dark yellowish brown (10YR 2/2), fine SAND, some silt, little gravel, trace wood debris (COLLUVIAL SOIL - FILL)		1222	24							
60	– Unoxidized		1227	25	Slightly Damp						60
			1244	26							
	– Woody debris		1250	27	Damp						
			1254	28							
70			1303	29				Centralizer			70
			1315	30							
	Oxidized, weathered, moderate yellowish brown (10YR x/x), GRAVEL, some sand, little silt (WASTE ROCK FILL)		1321	31	Damp to Mois					Moist zone	
	See description next page		1325	32	Damp						
80			1331								80

DRILL RIG: Speedstar 30K | **LOGGED:** M. Klisch
DRILLING CONTRACTOR: Layne-Christensen | **CHECKED:**
DRILLER: W. Franklin | **DATE:** 8/2/99

Golder Associates

RECORD OF MONITORING WELL INSTALLATION

MW37

PROJECT NUMBER: 983 1252.202
BOREHOLE LOCATION: Stanley, ID
COORDINATES N: **E:** **EL.:**

SHEET 2 OF 2
PROJECT: Hecla/Grouse Creek/ID
BORING DATE: 7/15/99

STRATIGRAPHY								MONITORING WELL COMPLETION			
DEPTH (feet)	DESCRIPTION	GRAPHIC LOG	TIME	SAMPLE NUMBER	MOISTURE LEVEL	pH	COND.	DESCRIPTION	WELL SKETCH	DRILLING NOTES	DEPTH (feet)
80	Compact, moderate olive brown (5Y 4/4) to olive gray (5Y 4/1), GRAVEL, little sand, little to some silt (COLLUVIUM)		1331	33	Damp					Shutdown 45 minutes - no water	80
	– Trace wood		1428	34				8-inch Diameter Borehole		Colluvium fill (?)	
	– Woody debris		1433	35						Pick up moisture	
	Compact, oxidized and weathered, moderate yellowish brown (10YR 5/4) to dark yellowish orange (10YR 6/6), GRAVEL, some sand, little silt (WASTE ROCK FILL)		1437	36							
90			1441	37				Bentonite Grout Annular Sealant		WL in MW33, oxidized material	90
			1457	38							
	– Gravelly		1503	39				4-inch Diameter Sch. 40 PVC Riser			
	– Less oxidized		1507	40							
100	Compact, moderate olive brown (5Y 4/4) to olive gray (5Y 4/1) to dark yellowish brown (10YR 4/2), GRAVEL, little silt, little sand, angular gray andesite fragments (COLLUVIUM)		1510	41							100
			1530	42						No water at rod change	
	– Wood debris		1535	43							
	– Becomes strongly oxidized and weathered - dark yellowish orange (10YR 6/6)		1539	44							
110	Weathered, oxidized, dark yellowish orange (10YR 6/6) to moderate yellowish brown (10YR 5/4), GRAVEL, some sand, trace silt (WASTE ROCK FILL)		1541	45							110
			1600	46						No water at rod change	
			1604	47				Bentonite Pellet Seal			
	– Wood debris		1606	48	Damp to Mois			10/20 Silica Sand			
	Weathered, olive gray (5Y 4/1), colluvium and andesite debris			49				Centralizer			
120	Compact, olive gray (5Y 3/2), subrounded GRAVEL, little sand (UNDERDRAIN)		1626	50	Wet			4-inch Diameter Sch. 40 PVC 0.020-inch Screen		121': Geotextile, moist cuttings	120
	Compact, weathered, oxidized, moderate yellowish brown (10YR 5/4) to moderate brown (10YR 3/4), SAND, little silt, little gravel (FILL MATERIAL)		1631	51						<1 gpm	
			1637	52	Moist					<1 gpm Blow water; pH = 6.31; SC = 0.422 mS/cm; CN Sample	
			1643	53				Centralizer		No water at change	
130			1651	54				End Cap			130
			1653	55	Dry						
	Weathered, oxidized, dark yellowish brown (10YR 4/2) to grayish olive (10Y 4/2), aphanitic ANDESITE (WEATHERED BEDROCK)		1707	56				Bentonite Chip Backfill		ROP decreases	
140	End of hole at 138.0 ft										140
150											150
160											160

DRILL RIG: Speedstar 30K
DRILLING CONTRACTOR: Layne-Christensen
DRILLER: W. Franklin

LOGGED: M. Klisch
CHECKED:
DATE: 8/2/99

Golder Associates

RECORD OF MONITORING WELL INSTALLATION

MW38

PROJECT NUMBER: 983 1252.202
BOREHOLE LOCATION: Stanley, ID
COORDINATES N: **E:** **EL.:**

SHEET 1 OF 2
PROJECT: Hecla/Grouse Creek/ID
BORING DATE: 7/18/99

STRATIGRAPHY								MONITORING WELL COMPLETION			
DEPTH (feet)	DESCRIPTION	GRAPHIC LOG	TIME	SAMPLE NUMBER	MOISTURE LEVEL	pH	COND.	DESCRIPTION	WELL SKETCH	DRILLING NOTES	DEPTH (feet)
0	Road Fill Gravel		1231	1						Start drilling. NOTE: Soil samples for CN taken at 2.5 ft intervals	0
			1234	2	Dry						
	Loose to compact, weathered, oxidized, moderate yellowish brown (10YR 5/4) to dark yellowish orange (10YR 6/6), SAND, some gravel, little silt (FILL MATERIAL)		1236	3	Slightly Damp			8-inch Diameter Borehole		8-inch diameter ODEX Down the Hole Hammer and Casing	
	– Oxidized mine waste rock – Occasional rare cobbles and boulders		1238	4							
10			1240	5				Bentonite Grout Annular Sealant			10
			1249	6							
			1251	7	Dry to Slightly Damp			4-inch Diameter Sch. 40 PVC Riser		Losing some air, gravelly voids?	
	– Gravel zone, 2 ft.		1254	8							
20	– Boulder		1257	9	Damp					Plastic and fabric fragments	20
			1300	10							
	– Less oxidized		1312	11							
			1315	12	Slightly Damp					Brownish gray organic rich soil	
	– Oxidized		1317	13							
30	31		1325	14							30
			1327	15						Wood debris	
	– Woody debris, organic rich soil		1329	16							
40			1333	17	Slightly damp						40
	– Gravelly		1342	18							
			1345	19							
	– Dark brownish gray soil? – Oxidized waste fill		1348	20						Abundant organic debris and wood	
50	Loose, dusky yellowish brown (10YR 2/2), fine SAND and SILT, some gravel, little wood (SOIL-FILL)		1351	21	Damp						50
	Compact, variably weathered and oxidized, dark yellowish orange (10YR 6/6) to moderate yellowish brown (10YR 5/4) when oxidized to dark greenish gray (5GY 4/1), SAND, some to little gravel, trace silt (FILL MATERIAL)		1357	22	Slightly damp						
			1402	23	Dry					Large Andesite boulder, pale green-gray	
60	– Dominantly mine waste rock		1404	24	Slightly damp					Gravelly, bouldery	60
			1409	25	Dry						
	– Pale gray-green ANDESITE boulder		1419	26	Damp					Rough drilling, trace moisture	
			1423	27	Slightly damp					Rough drilling, rods torquing up	
	– Sandy, less oxidized		1433	28							
70			1443	29				Bentonite Pellet Seal			70
			1445	30				10/20 Silica Sand			
	– Bouldery		1449	31	Dry			Centralizer			
	– Oxidized		1454	32	Slightly damp			4-inch Diameter Sch. 40 PVC 0.020-inch Slotted Screen			
80			1500								80

DRILL RIG: Speedstar 30K
DRILLING CONTRACTOR: Layne-Christensen
DRILLER: W. Franklin

LOGGED: M. Klisch
CHECKED:
DATE: 8/2/99

Golder Associates

RECORD OF MONITORING WELL INSTALLATION

MW38

PROJECT NUMBER: 983 1252.202
BOREHOLE LOCATION: Stanley, ID
COORDINATES N: **E:** **EL.:**

SHEET 2 OF 2
PROJECT: Hecla/Grouse Creek/ID
BORING DATE: 7/18/99

STRATIGRAPHY								MONITORING WELL COMPLETION			
DEPTH (feet)	DESCRIPTION	GRAPHIC LOG	TIME	SAMPLE NUMBER	MOISTURE LEVEL	pH	COND.	DESCRIPTION	WELL SKETCH	DRILLING NOTES	DEPTH (feet)
80	Compact, variably weathered and oxidized, dark yellowish orange (10YR 6/6) to moderate yellowish brown (10YR 5/4) when oxidized to dark greenish gray (5GY 4/1), SAND, some to little gravel, trace silt (FILL MATERIAL) – Less oxidized/weathered		1500	33	Slightly Damp			8-inch Diameter Borehole; 10/20 Silica Sand; 4-inch Diameter Sch. 40 PVC 0.020-inch Slotted Screen; Centralizer; Bentonite Chips Backfill		Blow water – pH = 7.52 SC = 0.154 mS/cm CN Sample	80
			1522	34	Wet					1 gpm	
			1525	35						<1 gpm	
			1529	36						<1 gpm	
90			1535	37						Blow hole – pH = 7.50 SC = 0.213 mS/cm CN Sample	90
	End of hole at 92.0 ft										
100											100
110											110
120											120
130											130
140											140
150											150
160											160

DRILL RIG: Speedstar 30K
DRILLING CONTRACTOR: Layne-Christensen
DRILLER: W. Franklin

LOGGED: M. Klisch
CHECKED:
DATE: 8/2/99

Golder Associates

Hecla Mining Co.
Grouse Creek Unit

Ground Water Monitoring Well and Piezometer Data Table

Updated: ################
By: REC

IDWR Location	Monitoring Well Identification	Northing (Y)	Easting (X)	Casing Elev. Top of PVC (ft. msl)	Ground Elevation (ft. msl)	Well Depth (ft. below grnd.)	Bottom of Hole Elev. (ft. msl)	Screened Interval (ft. below grnd. elev.)	Gravel Pack Zone (ft. below ground elev.)	Bentonite Backfill (ft. below ground elev.)	Water Depth (ft. below top PVC casing)	PVC Casing Size (in.)	Date Well Drilled	Drill Log Available	Hydraulic Conductivity (cm/s)	Well Completion Material
	MW-1	21668.1	3720.2	7182.0	7178.7	67.0	7111.7	55.0 - 65.0	21.0 - 67.0	-		4	Oct. 1987	no	n/a	BR
	MW-3	21301.0	4112.8	7112.6	7116.0	67.0	7049.0	55.0 - 65.0	21.0 - 67.0	-		4	Oct. 1987	no	n/a	BR
	MW-7	24097.3	459.7	7749.0	7748.5	110.0	7638.5	60.0 - 110.0	60.0 - 110.0	-		4	Sep. 1990	no	n/a	A
	MW-10	16166.3	3351.5	6950.2	6954.7	55.0	6899.7	35.0 - 55.0	34.0 - 55.0	-	37.00	4	Sep.1993	no	n/a	F/C
Pond 4	MW-11	~16100	~3225	-	-	-	-	-	-	-		n/a				
Sunbeam Adit	MW-12	~20116	~3919	-	-	-	-	-	-	-		n/a				
	MW-13	16139.6	3341.2	6954.7	6950.7	95.0	6855.7	78.0 - 83.0	-	-		4	Dec. 1995	yes	2.1x10-3	CG
	MW-14	15978.0	3202.9	6918.6	6914.8	86.4	6828.4	68.0 - 73.0	-	-		4	Dec. 1995	yes	2.0x10-3	WB
4a	MW-15	15981.0	3199.8	6917.6	6915.0	29.5	6885.5	19.0 - 29.0	17.8 - 29.5	-	dry	4	Oct. 1998	yes	dry	F/C
	MW-16	19495.4	4549.4	7191.7	7190.2	124.0	7066.2			-	23.80	4	Jul. 1996	yes	1.5x10-4	WB
1a	MW-17	19798.4	4409.5	7213.9	7211.1	70.0	7141.1	60.0 - 70.0	56.5 - 70.0	-	69.34	4	Oct. 1998	yes	8.6x10-3	S
	MW-18															
2a	MW-19	19626.8	4614.1	7175.3	7173.0	47.0	7126.0	36.5 - 46.5	31.0 - 47.0	-	48.42	4	Oct. 1998	yes	1.6x10-6	A
2b	MW-20	19632.4	4605.5	7175.2	7173.2	70.0	7103.2	60.0 - 70.0	57.0 - 70.0	-	54.91	4	Oct. 1998	yes	3.4x10-6	A
	MW-21															
	MW-22	19626.8	4400.7	7196.8	7194.5	110.0	7084.5	100.0 - 110.0	97.5 - 110.0	-		4	Jul. 1999			A
5a	MW-23	15899.2	3357.7	6918.2	6915.0	50.5	6864.5	40.0 - 50.0	34.0 - 50.0	-	49.53	4	Oct. 1998	yes	3.0x10-5	LM
5b	MW-24	15905.2	3355.5	6918.0	6915.6	80.0	6835.6	70.0 - 80.0	66.7 - 80.0	-	49.45	4	Nov. 1998	yes	1.5x10-4	WB
6a	MW-25	16103.9	3419.7	6957.3	6954.7	60.0	6894.7	50.0 - 60.0	47.0 - 60.0	-	48.47	4	Nov. 1998	yes	1.3x10-2	LM
6b	MW-26	16101.4	3414.6	6956.2	6955.7	102.0	6853.7	77.0 - 87.0	69.7 - 102.0	-	48.31	4	Dec. 1998	yes	1.8x10-2	LM
7a	MW-27	19473.1	4301.3	7202.0	7199.3	85.0	7114.3	58.0 - 78.0	54.2 - 78.0	-	49.21	4	Dec. 1998	yes	2.2x10-2	G
7b	MW-28	19463.0	4301.1	7201.3	7199.2	182.0	7017.2	145.0 - 175.0	141.0 - 175.0	-	52.87	4	Dec. 1998	yes	5.3x10-5	A
	MW-29	16190.7	3266.4	6958.4	6956.0	175.5	6780.5	142.5 - 172.5	136.5 - 175.5	-	35.92	4	Jun. 1999	yes	~1.3x10-3	A
	MW-30	16163.9	3527.9	6958.8	6954.7	60.5	6894.2	50.5 - 60.5	47.7 - 60.5	-	56.59	4	Jun. 1999	yes	~7.0x10-2	A
	MW-31	16175.0	3377.4	6953.2 (4)	6954.6	117.0	6837.6	104.0 - 114.0	100.1 - 117.0	-	51.08	6 (3)	Jun. 1999	yes		LM
	MW-32	15909.7	3346.8	6917.6	6915.6	149.4 (1)	6766.2	136.4 -146.4	131.3 - 149.4	149.4 - 174.7	135.71 (2)	4	Jun. 1999	yes		A
	MW-33	19475.6	4294.7	7201.3	7198.6	93.4 (1)	7105.2	70.4 - 90.4	65.6 - 90.4	93.4 - 95.0	41.93	6 (3)	Jun. 1999	yes		G
	MW-34	20017.9	4102.3	7213.8	7211.6	92.1	7119.5	60.0 - 70.0	57.2 - 70.0	70.0 - 92.1	36.45	4	Jul. 1999	yes		G
	MW-35	19490.7	4179.6	7252.5	7249.9	150.6	7099.3	127.6 - 137.6	120.7 - 137.6	137.6 - 150.6	84.07	4	Jul. 1999	yes		G
	MW-36	19632.2	4399.0	7196.9	7194.7	52.5	7142.2	42.5 - 52.5	38.5 - 52.5	-	38.58	4	Jul. 1999	yes		G/A
	MW-37	19591.6	4154.7	7252.4	7250.7	138.0	7112.7	118.1 - 128.1	114.9 - 128.1	128.1 - 138.0	85.65	4	Jul. 1999	yes		F/CG (UD)
	MW-38	20030.6	3986.9	7252.8	7250.5	93.0	7157.5	77.2 - 87.2	74.8 - 87.2	87.2 - 93.0	70.42	4	Jul. 1999	yes		A
	MW-39	20637.9	4148.0	7283.5	7281.3	200.0	7081.3	134.3 - 144.3	129.5 - 144.3	-	50.49	4	Jul. 1999	yes		A
	MW-40	20764.3	4373.1	7116.4	7113.9	201.9	6912.0	60.2 - 70.2	57.2 - 70.2	-	89.25	4	Aug. 1999	yes		A
	MW-41	20642.0	4145.8	7283.6	7281.1	126.0	7155.1	116.0 - 126.0	113.4 - 126.0	-	89.16	4	Jul. 1999	yes		A
	MW-42	15983.2	3196.2	6917.4	6914.7	140.6	6774.1	117.6 - 137.6	114.6 - 140.6	-	13.29	4	Aug. 1999	yes		A
	MW-43	16165.6	3532.6	6955.0 (4)	6956.2	104.8	6850.4	94.8 - 104.8	90.7 - 104.8	-	55.11	4	Aug. 1999	yes		A
	MW-44	19341.1	4314.5	7206.7	7205.0							4	Aug. 1999	yes		F/CG (UD)
	P-24	19430.0	4195.6	7253.2	7250.5	126.3	7124.2	31.8 - 41.8	29.2-41.8; 118.2-124.0; 102.9-109.1	-		2	Aug. 1999	yes		F/C
	P-25	19239.0	4239.2	7253.3	7251.1	116.2	7134.9	89.3 - 99.3	84.7-99.3; 102.2-108.1; 108.3-113.2	-	96.79	4	Aug. 1999	yes		F/C
	P-26	19771.8	4103.7	7253.8	7251.3	121.0	7130.3	104.0 - 114.0	59.5-66.0; 85.0-91.0; 100.8-114.0	-	105.03	2	Aug. 1999	yes		F/C

Well Completion Material:

A = Andesite
BR = Broken Rock
CG = Clayey Gravel
F/C = Fill/Colluvium
G = Gravel
LM = Landslide Material
S = Sand
WB = Weathered Bedrock

(1) MW-33 solid PVC tailpipe from 90.4 - 93.4
(2) MW-32 water level still rising (slow recovery)
(3) MW-31 & MW-33 casing is 6" steel
(4) Top of casing recessed below ground level

FILE: MWLoc599.xls

Hecla Mining Co. - Grouse Creek Unit

TAILINGS POND #1 CAPACITY REPORT

08-Sep-99
08:50 AM

CAPACITIES		
7240 Elev.	=	206,881,783
7250 Elev.	=	238,274,324
PMF Limit =	7240 to 7250 =	31,392,541

ACTUAL			
Survey Date	Water Elev. (ft.)	Rmng. Pond Vol. to 7209' (cu.ft.)	Volume Change (cu.ft.)
04-Dec-94	7117.10	117,760,551	
09-Dec-94	7117.50	117,621,145	(139,406)
17-Dec-94	7117.50	117,821,145	0
23-Dec-94	7119.20	117,006,978	(514,167)
30-Dec-94	7120.00	116,703,168	(303,810)
06-Jan-95	7121.30	116,182,276	(520,892)
16-Jan-95	7122.90	115,502,511	(679,765)
20-Jan-95	7123.40	115,278,503	(224,008)
26-Jan-95	7124.40	114,819,011	(459,492)
02-Feb-95	7125.60	114,243,680	(575,330)
16-Feb-95	7128.50	112,762,810	(1,480,870)
23-Feb-95	7130.10	111,892,354	(870,456)
02-Mar-95	7131.80	110,916,661	(975,692)
09-Mar-95	7131.80	110,916,661	0
16-Mar-95	7135.40	108,665,568	(2,251,093)
25-Mar-95	7137.30	107,382,848	(1,282,720)
30-Mar-95	7138.50	106,541,520	(841,329)
07-Apr-95	7141.20	104,558,020	(1,983,500)
15-Apr-95	7144.00	102,343,448	(2,214,572)
18-Apr-95	7144.00	101,593,909	(749,539)
19-Apr-95	7145.20	101,339,287	(254,622)
20-Apr-95	7145.60	100,996,608	(342,679)
21-Apr-95	7145.80	100,825,269	(171,340)
22-Apr-95	7146.00	100,653,929	(171,340)
23-Apr-95	7146.20	100,477,388	(176,541)
24-Apr-95	7146.50	100,212,577	(264,812)
25-Apr-95	7146.60	100,124,306	(88,271)
26-Apr-95	7146.90	99,859,495	(264,812)
27-Apr-95	7147.10	99,680,313	(179,182)
29-Apr-95	7147.40	99,407,580	(272,733)
02-May-95	7148.00	98,862,114	(545,466)
07-May-95	7149.40	97,540,953	(1,321,161)
09-May-95	7150.00	96,963,067	(577,886)
13-May-95	7150.00	96,072,334	(890,733)
16-May-95	7151.60	95,364,029	(708,305)
21-May-95	7153.30	93,595,487	(1,768,542)
24-May-95	7154.00	92,847,618	(747,869)
28-May-95	7155.00	91,752,349	(1,095,269)
03-Jun-95	7156.00	89,607,065	(2,145,284)
10-Jun-95	7159.20	86,908,687	(2,698,377)
19-Jun-95	7162.00	82,335,823	(4,573,064)
25-Jun-95	7163.50	81,565,334	(770,289)
02-Jul-95	7164.90	79,804,464	(1,821,413)
10-Jul-95	7166.30	77,936,262	(1,868,202)
15-Jul-95	7167.10	76,850,298	(1,085,964)
23-Jul-95	7167.50	76,298,992	(551,306)
31-Jul-95	7168.20	75,329,407	(969,585)
05-Aug-95	7168.50	74,908,730	(420,677)
12-Aug-95	7169.40	73,637,036	(1,271,694)
19-Aug-95	7169.90	72,923,830	(713,206)
27-Aug-95	7171.00	71,331,443	(1,592,387)
03-Sep-95	7171.80	70,153,649	(1,177,794)
10-Sep-95	7172.40	69,261,254	(892,395)
17-Sep-95	7173.50	67,605,502	(1,655,752)
24-Sep-95	7173.60	67,453,736	(151,766)
01-Oct-95	7174.30	66,384,481	(1,069,255)
08-Oct-95	7175.10	65,139,775	(1,244,706)
15-Oct-95	7176.00	63,743,381	(1,396,394)
22-Oct-95	7176.60	62,476,300	(1,267,081)
29-Oct-95	7177.50	61,356,884	(1,119,416)
05-Nov-95	7178.30	60,066,175	(1,290,709)
12-Nov-95	7178.40	59,903,487	(162,688)
19-Nov-95	7180.20	56,944,505	(2,958,982)
26-Nov-95	7181.20	55,269,033	(1,675,472)
05-Dec-95	7182.60	52,884,228	(2,384,805)
09-Dec-95	7183.10	52,023,677	(860,551)
16-Dec-95	7183.80	50,806,015	(1,217,662)
26-Dec-95	7184.80	49,047,957	(1,758,058)
31-Dec-95	7185.30	48,160,111	(887,846)
07-Jan-96	7185.90	47,089,498	(1,070,613)
14-Jan-96	7186.60	45,828,340	(1,261,158)
22-Jan-96	7187.20	44,741,550	(1,086,790)
26-Jan-96	7188.40	42,543,513	(2,198,037)
04-Feb-96	7188.60	42,174,445	(369,068)
11-Feb-96	7189.80	39,943,584	(2,230,861)
18-Feb-96	7192.30	35,197,889	(4,745,695)
1) 20-Feb-96	7190.00	39,570,402	N/A

ACTUAL			
Survey Date	Water Elev. (ft.)	Rmng. Pond Vol. to 7209' (cu.ft.)	Volume Change (cu.ft.)
25-Feb-96	7190.60	38,438,416	(1,131,986)
04-Mar-96	7191.30	37,111,534	(1,326,882)
10-Mar-96	7191.80	36,157,826	(953,708)
17-Mar-96	7192.60	34,233,798	(1,924,028)
24-Mar-96	7193.60	32,678,727	(1,555,071)
31-Mar-96	7194.40	31,111,133	(1,567,594)
07-Apr-96	7195.30	29,331,876	(1,779,257)
14-Apr-96	7197.00	25,955,755	(3,376,121)
21-Apr-96	7198.10	23,686,248	(2,269,507)
28-Apr-96	7199.30	21,212,984	(2,473,264)
05-May-96	7200.10	19,458,789	(1,754,195)
12-May-96	7200.50	17,868,868	(1,589,921)
19-May-96	7203.00	13,390,096	(4,478,772)
28-May-96	7203.50	12,908,350	(481,746)
02-Jun-96	7203.70	11,906,857	(1,001,493)
09-Jun-96	7203.60	12,157,230	250,373
16-Jun-96	7203.50	12,305,554	148,324
23-Jun-96	7203.40	12,522,462	216,908
30-Jun-96	7203.40	12,522,462	0
07-Jul-96	7203.20	12,956,259	433,797
14-Jul-96	7203.10	13,173,188	216,929
21-Jul-96	7203.40	12,522,462	(650,726)
27-Jul-96	7203.60	12,088,645	(433,817)
03-Aug-96	7204.10	11,001,783	(1,086,862)
10-Aug-96	7204.40	10,344,098	(657,685)
17-Aug-96	7204.80	9,467,185	(876,913)
25-Aug-96	7205.10	8,807,018	(660,167)
01-Sep-96	7205.30	8,363,597	(443,421)
08-Sep-96	7205.60	7,698,465	(665,132)
2) 15-Sep-96	7205.90	6,792,791	(905,674)
21-Sep-96	7206.30	6,085,347	(707,444)
28-Sep-96	7206.50	5,641,525	(443,822)
05-Oct-96	7206.80	4,975,791	(665,734)
12-Oct-96	7207.10	4,306,931	(668,860)
19-Oct-96	7207.50	3,406,781	(900,150)
Survey Date	Water Elev. (ft.)	Rmng. Pond Vol. to 7240' (cu.ft.)	Volume Change (cu.ft.)
3) 26-Oct-96	7207.90	87,954,351	N/A
02-Nov-96	7208.20	86,372,824	86,372,824
09-Nov-96	7208.60	85,460,187	(912,637)
20-Nov-96	7209.60	83,186,742	(2,273,445)
24-Nov-96	7210.40	81,359,347	(1,827,395)
01-Dec-96	7210.70	80,669,205	(690,142)
11-Dec-96	7211.30	79,265,446	(1,403,759)
15-Dec-96	7211.70	78,313,957	(951,489)
23-Dec-96	7212.00	77,600,341	(713,616)
30-Dec-96	7212.60	76,153,028	(1,447,313)
06-Jan-97	7213.60	73,720,619	(2,432,409)
13-Jan-97	7214.30	71,998,316	(1,722,303)
20-Jan-97	7214.30	71,993,316	0
29-Jan-97	7214.90	70,510,421	(1,487,895)
03-Feb-97	7215.60	68,754,042	(1,756,379)
09-Feb-97	7215.30	68,754,042	0
16-Feb-97	7218.30	66,983,925	(1,770,117)
23-Feb-97	7216.60	66,219,406	(764,519)
02-Mar-97	7217.00	65,200,048	(1,019,358)
09-Mar-97	7217.40	64,166,835	(1,033,213)
16-Mar-97	7217.80	63,133,622	(1,033,213)
23-Mar-97	7218.50	61,308,064	(1,825,558)
30-Mar-97	7219.30	59,203,198	(2,104,866)
06-Apr-97	7219.60	58,407,284	(795,914)
13-Apr-97	7219.90	57,611,370	(795,914)
20-Apr-97	7220.90	54,933,593	(2,677,777)
27-Apr-97	7222.00	51,964,995	(2,968,598)
05-May-97	7222.50	50,604,655	(1,360,340)
12-May-97	7223.10	48,970,226	(1,634,429)
19-May-97	7223.70	47,325,691	(1,644,535)
26-May-97	7223.90	46,777,513	(548,178)
30-May-97	7224.40	45,122,889	(1,654,624)
06-Jun-97	7224.70	44,570,395	(552,294)
13-Jun-97	7224.80	44,294,248	(276,147)
20-Jun-97	7224.80	44,294,248	0
27-Jun-97	7224.70	44,570,395	276,147
03-Jul-97	7224.80	44,294,248	(276,147)
11-Jul-97	7224.80	44,294,248	0
18-Jul-97	7224.50	45,122,689	828,441
25-Jul-97	7224.50	45,122,689	0
31-Jul-97	7224.40	45,398,836	276,147
07-Aug-97	7224.40	45,398,836	0
14-Aug-97	7224.20	45,951,130	552,294
21-Aug-97	7223.80	47,051,602	1,100,472
4) 28-Aug-97	7223.80	47,051,602	0

ACTUAL			
Survey Date	Water Elev. (ft.)	Rmng. Pond Vol. to 7240' (cu.ft.)	Volume Change (cu.ft.)
04-Sep-97	7223.90	46,777,513	(274,089)
11-Sep-97	7223.90	46,777,513	0
22-Sep-97	7223.80	47,051,602	274,089
25-Sep-97	7223.60	47,599,780	548,178
02-Oct-97	7223.90	46,777,513	(822,267)
09-Oct-97	7223.80	47,051,602	274,089
17-Oct-97	7223.84	47,051,602	0
23-Oct-97	7223.90	46,777,513	(274,089)
06-Nov-97	7223.94	46,777,513	0
13-Nov-97	7224.06	46,227,277	(550,236)
02-Dec-97	7224.70	44,570,395	(1,656,882)
30-Dec-97	7224.97	43,741,954	(828,441)
30-Jan-98	7225.70	41,794,673	(1,947,281)
19-Feb-98	7225.80	41,516,490	(278,183)
22-Mar-98	7226.15	40,539,784	(976,706)
20-Apr-98	7226.30	40,119,444	(420,340)
11-May-98	7227.00	38,157,858	(1,061,586)
27-May-98	7227.24	37,480,320	(677,538)
08-Jun-98	7227.13	37,790,858	310,538
18-Jun-98	7227.23	37,508,551	(282,307)
07-Jul-98	7227.70	36,181,706	(1,326,845)
13-Jul-98	7227.50	36,746,321	564,615
21-Jul-98	7228.00	35,334,784	(1,411,537)
05-Aug-98	7228.15	34,908,235	(426,549)
17-Aug-98	7227.80	35,899,399	991,164
24-Aug-98	7227.70	36,181,706	282,307
31-Aug-98	7227.60	36,464,014	282,307
22-Sep-98	7227.55	36,605,167	141,154
02-Oct-98	7227.30	37,310,936	705,769
14-Oct-98	7227.06	37,988,474	677,538
02-Nov-98	7226.98	38,213,903	225,429
06-Jan-99	7227.74	36,068,783	(2,145,120)
12-Jan-99	7227.75	36,040,553	(28,230)
07-Apr-99	7228.77	33,145,168	(2,895,387)
26-May-99	7229.66	30,600,574	(2,544,591)
24-Jun-99	7229.97	29,712,589	(887,985)
02-Jul-99	7229.40	31,345,366	1,632,777
26-Jul-99	7228.77	33,145,168	1,799,800
02-Aug-99	7228.67	33,429,532	284,366
19-Aug-99	7228.40	34,205,851	776,319

CC:
D Berberick
E Lancaster
E Steiman
D Wollart

NOTES:
1) Survey Elevation Adjustment
2) Volume recalculation (7205.4-7250.0) from 8/19/96 Aerographics topo.
3) Target based on "Tailings Impoundment Water Balance - Sunbeam Only" (6/22/96)
4) Survey Control Adjustment

Evaporative Area for Average Monthly Elevation		
7220.0	2,854,065	sq. ft.

FILE:TLSCAP99.wk4

Water Qua.. Monitoring Data
Site Pond 1

Site Number	Sample Date	Duplicate/ Rerun/No Sample	CN, WAD (mg/l)	Cyanate (mg/l)	Thiocyanate (mg/l)	TSS (mg/l)	TDS (mg/l)	Aluminum, D (mg/l)	Aluminum, TR (mg/l)	Aluminum, T (mg/l)	Antimony, D (mg/l)	Antimony, TR (mg/l)	Antimony, T (mg/l)	Arsenic, D (mg/l)	Arsenic, T (mg/l)	Cadmium, D (mg/l)
Pond 1	6/17/99															
Pond 1	6/24/99															
Pond 1	6/30/99		6		9.3		980	0.12	0.13		0.016	0.016		0.004	0.004	
Pond 1	6/30/99	Filtered	6.9													
Pond 1	7/1/99															
Pond 1	7/8/99															
Pond 1	7/26/99		4.3		6.8	<5	960	<0.06	0.05		<0.02	0.012		<0.01	0.002	<0.006
Pond 1	7/29/99															
Pond 1	8/5/99															
Pond 1	8/12/99															

Statistical Summary: Mean & Standard Deviation Using All An

Mean			7.06	39	20.7	10.6	1088.3	0.289	0.133	0.422	0.0226	0.0127	0.038	0.0072	0.0089	0.0054
Std Dev			3.92	18.4	10.7	10.5	258.6	0.494	0.085	0.412	0.0137	0.0031	0.0127	0.0063	0.0075	0.0057
Mean + 1X Std Dev			10.98	57.4	31.4	21.1	1346.9	0.783	0.218	0.834	0.0363	0.0158	0.0507	0.0135	0.0164	0.0111

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Hecla Mining Company
Grouse Creek Unit

Water Quality Monitoring Data
Site Pond 1

Report Date: 9/7/99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Thallium, TR (mg/l)	Thallium, T (mg/l)	Zinc, D (mg/l)	Zinc, TR (mg/l)	Zinc, T (mg/l)	Temperature (Cent)	Conductivity @ 25 C (micromho)	Conductivity, Field (micromho)	pH, Lab (su)	pH, Field (su)	Turbidity, Lab (NTU)	Turbidity, Field (NTU)
Pond 1	6/17/99									1120		7.51		18.7
Pond 1	6/24/99									1510		8.03		37.4
Pond 1	6/30/99								1870		8.1		5.1	
Pond 1	6/30/99	Filtered												
Pond 1	7/1/99									1410		8.23		21.6
Pond 1	7/8/99									1320		8.26		18
Pond 1	7/26/99		<0.002		<0.02	<0.01			1700		8.1		8.3	
Pond 1	7/29/99									1310		8.25		12.5
Pond 1	8/5/99									1250		8.24		9
Pond 1	8/12/99									1540		8.2		8.3

Statistical Summary: Mean & Standard Deviation Using All An

Mean			0.0505	0.00082	0.0161	0.005	0.0263							
Std Dev			0.07	0.00071	0.0315	0	0.0312							
Mean + 1X Std Dev			0.1205	0.00153	0.0476	0.005	0.0575							

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Hecla Mining Company
Grouse Creek Unit

Water Quality Monitoring Data
Site Pond 1

Report Date: 9/7/99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Nickel, TR (mg/l)	Nickel, T (mg/l)	Potassium, D (mg/l)	Potassium, TR (mg/l)	Selenium, D (mg/l)	Selenium, TR (mg/l)	Selenium, T (mg/l)	Silver, D (mg/l)	Silver, TR (mg/l)	Silver, T (mg/l)	Sodium, D (mg/l)	Sodium, TR (mg/l)	Sodium, T (mg/l)	Thallium, D (mg/l)
Pond 1	6/17/99															
Pond 1	6/24/99															
Pond 1	6/30/99		0.02		12.2	10.6	0.054	0.05		0.05	0.07		230	206		
Pond 1	6/30/99	Filtered														
Pond 1	7/1/99															
Pond 1	7/8/99															
Pond 1	7/26/99		0.02		12.2	12.9	0.047	0.032		0.012	0.026		239	232		<0.02
Pond 1	7/29/99															
Pond 1	8/5/99															
Pond 1	8/12/99															

Statistical Summary: Mean & Standard Deviation Using All An

Mean			0.02	0.0917	10.9	10.5	0.0766	0.04	0.102	0.295	0.045	0.307	280.3	196	281.4	0.0857
Std Dev			0	0.0441	2.31	2.5	0.0334	0.0092	0.0353	0.516	0.0226	0.349	60.2	41.9	35.2	0.203
Mean + 1X Std Dev			0.02	0.1358	13.21	13	0.11	0.0492	0.1373	0.811	0.0676	0.656	340.6	237.9	316.6	0.2887

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Hecla Mining Company
Grouse Creek Unit

Water Quality Monitoring Data
Site Pond 1

Report Date: 9/7/99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Lead, D (mg/l)	Lead, TR (mg/l)	Lead, T (mg/l)	Magnesium, D (mg/l)	Magnesium, TR (mg/l)	Magnesium, T (mg/l)	Manganese, D (mg/l)	Manganese, TR (mg/l)	Manganese, T (mg/l)	Mercury, D (mg/l)	Mercury, TR (mg/l)	Mercury, T (mg/l)	Nickel, D (mg/l)
Pond 1	6/17/99														
Pond 1	6/24/99														
Pond 1	6/30/99					3.2	2.8		0.006	0.007		0.0003	0.0002		0.02
Pond 1	6/30/99	Filtered													
Pond 1	7/1/99														
Pond 1	7/8/99														
Pond 1	7/26/99		<0.08	<0.04		3.8	3.3		0.01	<0.005		0.0002	<0.0002		0.02
Pond 1	7/29/99														
Pond 1	8/5/99														
Pond 1	8/12/99														

Statistical Summary: Mean & Standard Deviation Using All An

Mean			0.0667	0.02	0.0667	2.83	2.8	2.23	0.0188	0.0242	0.012	0.00049	0.00013	0.00055	0.053
Std Dev			0.0723	0	0.04	0.538	0.5	0.495	0.0245	0.0337	0.0072	0.00038	0.000058	0.00039	0.0595
Mean + 1X Std Dev			0.139	0.02	0.1067	3.368	3.3	2.725	0.0433	0.0579	0.0192	0.00087	0.000188	0.00094	0.1125

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Water Quality Monitoring Data
Site Pond 1

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Cadmium, TR (mg/l)	Cadmium, T (mg/l)	Calcium, D (mg/l)	Calcium, TR (mg/l)	Calcium, T (mg/l)	Chromium, D (mg/l)	Chromium, TR (mg/l)	Chromium, T (mg/l)	Copper, D (mg/l)	Copper, TR (mg/l)	Copper, T (mg/l)	Iron, D (mg/l)	Iron, TR (mg/l)	Iron, T (mg/l)
Pond 1	6/17/98															
Pond 1	6/24/99															
Pond 1	6/30/99				82.5	54					0.03	0.02		14.2	13.4	
Pond 1	6/30/99	Filtered														
Pond 1	7/1/99															
Pond 1	7/8/99															
Pond 1	7/26/99		<0.003		64.7	63.2		<0.02	<0.01		<0.02	0.01		8.53	9.69	
Pond 1	7/29/99															
Pond 1	8/5/99															
Pond 1	8/12/99															

Statistical Summary: Mean & Standard Deviation Using All An

Mean			0.0015	0.0072	89.7	53.2	83.3	0.0121	0.005	0.013	0.267	0.0117	0.821	34.4	11.7	52.8
Std Dev			0	0.004	47.3	10.5	53.6	0.0168	0	0.0103	0.751	0.0076	0.903	21.2	1.87	16.9
Mean + 1X Std Dev			0.0015	0.0112	137	63.7	136.9	0.0289	0.005	0.0233	1.018	0.0193	1.724	55.6	13.57	69.7

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Site Number	Sample Date	Duplicate/ Rerun/No Sample	()	Alkalinity (mg/l)	Bicarbonate (mg/l)	Carbonate (mg/l)	Hydroxide (mg/l)	Chloride (mg/l)	Nitrate + Nitrite, D (mg/l)	Nitrite, D (mg/l)	Ammonia (mg/l)	Sulfate (mg/l)	Sulfide (mg/l)	CN, Free (mg/l)	CN, Total (mg/l)	CN, WAD (mg/l)	Thiocyanate (mg/l)	TSS (mg/l)	TDS (mg/l)
Floor Drain	10/1/98	n/a																	
Floor Drain	10/8/98																		
Floor Drain	10/15/98																		
Floor Drain	10/21/98														90	18			
Floor Drain	10/22/98																		
Floor Drain	10/31/98	n/a																	
Floor Drain	11/1/98																		
Floor Drain	11/5/98																		
Floor Drain	11/8/98																		
Floor Drain	11/12/98																		
Floor Drain	11/19/98	N/A																	
Floor Drain	11/22/98																		
Floor Drain	11/26/98																		
Floor Drain	12/1/98																		
Floor Drain	12/3/98																		
Floor Drain	12/8/98																		
Floor Drain	12/11/98																		
Floor Drain	12/15/98																		
Floor Drain	12/22/98																		
Floor Drain	1/1/99																		
Floor Drain	1/8/99																		
Floor Drain	1/14/99																		
Floor Drain	1/15/99																		
Floor Drain	1/21/99	Dry																	
Floor Drain	1/22/99																		
Floor Drain	2/11/99	Unsafe Access																	
Floor Drain	3/18/99	Snowed Over																	
Floor Drain	5/6/99																		
Floor Drain	5/27/99																		
Floor Drain	6/10/99																		
Floor Drain	6/15/99			113	113	<2	<2	8.4	0.26	0.15	3.73	1390	2	<0.1	88	1.6	30	<5	2210
Floor Drain	6/17/99																		
Floor Drain	6/24/99																		
Floor Drain	7/1/99																		
Floor Drain	7/8/99																		
Floor Drain	7/28/99														69.8	0.84			
Floor Drain	7/29/99																		
Floor Drain	8/5/99																		
Floor Drain	8/12/99																		
Floor Drain	8/30/99																		

Statistical Summary: Mean & Standard Deviation Using All Analyses

Mean			0.0312	113	113	1	1	8.4	0.26	0.15	3.73	1390	2	0.05	82.6	8.15	30	2.5	2210
Std Dev			0.0312	113	113	.1	1	8.4	0.26	0.15	3.73	1390	2	0.05	11.1	8.54	30	2.5	2210
Mean + 1X Std Dev			0.0624	226	226	2	2	16.8	0.52	0.3	7.46	2780	4	0.1	93.7	14.69	60	5	4420

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Water Quality Monitoring Data
Site Floor Drain

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Conductivity, Field (micromho)	pH, Lab (su)	pH, Field (su)	Turbidity, Lab (NTU)	Turbidity, Field (NTU)	Flow (gpm)	Flow (cfs)
Floor Drain	10/1/98	n/a						50	0.1114
Floor Drain	10/8/98		1980		7.81		1.6	30	0.0668
Floor Drain	10/15/98		1710		8.2		1.1	25	0.0557
Floor Drain	10/21/98			7.4					
Floor Drain	10/22/98							35	0.078
Floor Drain	10/31/98	n/a							
Floor Drain	11/1/98							30	0.0668
Floor Drain	11/5/98		1970		8.14		1.6		
Floor Drain	11/8/98							30	0.0668
Floor Drain	11/12/98		1450		8.12		0.6		
Floor Drain	11/19/98	N/A							
Floor Drain	11/22/98							37	0.0824
Floor Drain	11/26/98		1990		7.9		0.7	35	0.0779
Floor Drain	12/1/98							38	0.0847
Floor Drain	12/3/98		1990		7.72		0.6	35	0.0779
Floor Drain	12/8/98							40	0.0891
Floor Drain	12/11/98		1640		8.49		3.9	40	0.0891
Floor Drain	12/15/98							47	0.1047
Floor Drain	12/22/98							47	0.1047
Floor Drain	1/1/99							47	0.1047
Floor Drain	1/8/99							49	0.1092
Floor Drain	1/14/99		2000		7.7		1.2		
Floor Drain	1/15/99							49	0.1092
Floor Drain	1/21/99	Dry							
Floor Drain	1/22/99							45	0.1003
Floor Drain	2/11/99	Unsafe Access							
Floor Drain	3/18/99	Snowed Over							
Floor Drain	5/6/99		1630		6.87		1.3		
Floor Drain	5/27/99		2000		7.52		1.4		
Floor Drain	6/10/99		1920		8.17		2.2		
Floor Drain	6/15/99			7.7		0.3			
Floor Drain	6/17/99		2000		7.29		2.2		
Floor Drain	6/24/99		2000		7.88		1.5		
Floor Drain	7/1/99		2000		7.9		0.9		
Floor Drain	7/8/99				8.11		5	38	0.0846
Floor Drain	7/28/99								
Floor Drain	7/29/99		1920		7.91		2.4	35	0.0779
Floor Drain	8/5/99		1760		7.97		1.1		
Floor Drain	8/12/99		2000		7.45		1.1	40	0.0891
Floor Drain	8/30/99				8.01				

Statistical Summary: Mean & Standard Deviation Using All A

Mean			1880	7.522878745	7.857577319	0.3	1.7	39.1	0.0872
Std Dev			173.2	7.853871964	7.522878745	0.3	1.14	7.28	0.0162
Mean + 1X Std Dev			2053.2	7.356547324	7.283998856	0.6	2.84	46.38	0.1034

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Hecla Mining Company
Grouse Creek Unit

Water Quality Monitoring Data
Site Floor Drain

Report Date: 9/7/99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Iron, D (mg/l)	Iron, TR (mg/l)	Iron, T (mg/l)	Lead, D (mg/l)	Lead, TR (mg/l)	Lead, T (mg/l)	Magnesium, D (mg/l)	Magnesium, TR (mg/l)	Manganese, D (mg/l)	Manganese, TR (mg/l)	Mercury, D (mg/l)	Mercury, TR (mg/l)	Mercury, T (mg/l)	Nickel, D (mg/l)	Nickel, TR (mg/l)	Nickel, T (mg/l)
Floor Drain	10/1/98	n/a																
Floor Drain	10/8/98																	
Floor Drain	10/15/98																	
Floor Drain	10/21/98		34.5		34.9	<0.001		<0.001							<0.0002	<0.02		0.02
Floor Drain	10/22/98																	
Floor Drain	10/31/98	n/a																
Floor Drain	11/1/98																	
Floor Drain	11/5/98																	
Floor Drain	11/8/98																	
Floor Drain	11/12/98																	
Floor Drain	11/19/98	N/A																
Floor Drain	11/22/98																	
Floor Drain	11/26/98																	
Floor Drain	12/1/98																	
Floor Drain	12/3/98																	
Floor Drain	12/8/98																	
Floor Drain	12/11/98																	
Floor Drain	12/15/98																	
Floor Drain	12/22/98																	
Floor Drain	1/1/99																	
Floor Drain	1/8/99																	
Floor Drain	1/14/99																	
Floor Drain	1/15/99																	
Floor Drain	1/21/99	Dry																
Floor Drain	1/22/99																	
Floor Drain	2/11/99	Unsafe Access																
Floor Drain	3/18/99	Snowed Over																
Floor Drain	5/6/99																	
Floor Drain	5/27/99																	
Floor Drain	6/10/99																	
Floor Drain	6/15/99		28.9	30.2		<0.01	<0.01		13	13.6	0.49	0.534	<0.0002	<0.0002		<0.05	0.02	
Floor Drain	6/17/99																	
Floor Drain	6/24/99																	
Floor Drain	7/1/99																	
Floor Drain	7/8/99																	
Floor Drain	7/28/99																	
Floor Drain	7/29/99																	
Floor Drain	8/5/99																	
Floor Drain	8/12/99																	
Floor Drain	8/30/99																	

Statistical Summary: Mean & Standard Deviation Using All A

Mean			31.7	30.2	34.9	0.0027	0.005	0.0005	13	13.6	0.49	0.534	0.0001	0.0001	0.0001	0.0175	0.02	0.02
Std Dev			3.96	30.2	34.9	0.0032	0.005	0.0005	13	13.6	0.49	0.534	0.0001	0.0001	0.0001	0.0106	0.02	0.02
Mean + 1X Std Dev			35.66	60.4	69.8	0.0059	0.01	0.001	26	27.2	0.98	1.068	0.0002	0.0002	0.0002	0.0281	0.04	0.04

Le: :table data assumed as one-half the detection limit in Mean and Standar calculations.

Hecla Mining Company
Grouse Creek Unit

Water Quality Monitoring Data
Site Pond 6-UD Comp

Report Date: 9/7/99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Alkalinity (mg/l)	Bicarbonate (mg/l)	Carbonate (mg/l)	Hydroxide (mg/l)	Hardness (mg/l)	Chloride (mg/l)	Nitrate + Nitrite, D (mg/l)	Nitrate + Nitrite, T (mg/l)	Nitrate, D (mg/l)	Nitrite, D (mg/l)	Ammonia (mg/l)	Sulfate (mg/l)	Sulfide (mg/l)	CN, Free (mg/l)	CN, Total (mg/l)
Pond 6-UD Comp	1/14/99																16.8
Pond 6-UD Comp	2/18/99																13.8
Pond 6-UD Comp	3/10/99																9.75
Pond 6-UD Comp	4/8/99																8.03
Pond 6-UD Comp	5/5/99																3.38
Pond 6-UD Comp	6/7/99		24	24	<2	<2	69	0.8	1.53		1.51	0.02	0.1	60	2	0.3	2.8
Pond 6-UD Comp	6/17/99																1.34
Pond 6-UD Comp	7/7/99									0.98			<0.1				0.818
Pond 6-UD Comp	7/8/99																2.09
Pond 6-UD Comp	7/22/99																2.96
Pond 6-UD Comp	7/30/99																4.56
Pond 6-UD Comp	8/3/99									2.02			0.1				3.35

Statistical Summary: Mean & Standard Deviation Using All Analyses

Mean			24	23.5	1	1	78	0.8	1.35	1.5	1.33	0.025	0.0875	60	1.05	0.3	4.13
Std Dev			24	0.707	0	0	12.7	0.8	0.247	0.735	0.255	0.0071	0.025	60	1.34	0.3	4.59
Mean + 1X Std Dev			48	24.207	1	1	90.7	1.6	1.597	2.235	1.585	0.0321	0.1125	120	2.39	0.6	8.72

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Water Quali... Monitoring Data
Site Pond 6-UD Comp

Site Number	Sample Date	Duplicate/ Rerun/No Sample	CN, WAD (mg/l)	Thiocyanate (mg/l)	TSS (mg/l)	TDS (mg/l)	SAR (Ratio)	Sum of Cations (meq/l)	Sum of Anions (meq/l)	Cation & Anion Sum (meq/l)	Aluminum, D (mg/l)	Aluminum, TR (mg/l)	Aluminum, T (mg/l)	Arsenic, D (mg/l)	Arsenic, TR (mg/l)
Pond 6-UD Comp	1[illegible]/[illegible]/99		3.24												
Pond 6-UD Comp	2/18/99		4.19												0.002
Pond 6-UD Comp	3/10/99		3.88												0.005
Pond 6-UD Comp	4/8/99		1.89												0.105
Pond 6-UD Comp	5/6/99		0.77												
Pond 6-UD Comp	6/7/99		1.94	<0.1	50	130		1.9	1.8	2.7	<0.03	1.84	1.84	0.001	0.156
Pond 6-UD Comp	6/17/99		0.38												
Pond 6-UD Comp	7/7/99		0.171												
Pond 6-UD Comp	7/8/99		0.78												
Pond 6-UD Comp	7/22/99		1.34												0.004
Pond 6-UD Comp	7/30/99		1.01												0.008
Pond 6-UD Comp	8/3/99		0.818												

Statistical Summary: Mean & Standard Deviation Using All An

Mean			0.956	0.05	26.5	140	0.47	1.9	1.8	2.7	0.0576	1.84	1.31	0.0014	0.0468
Std Dev			1.21	0	33.2	14.1	0.47	1.9	1.8	2.7	0.0601	1.84	0.75	0.0011	0.0668
Mean + 1X Std Dev			2.168	0.05	59.7	154.1	0.94	3.8	3.6	5.4	0.1176	3.68	2.06	0.0025	0.1136

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Hecla Mining Company
Grouse Creek Unit

Water Quality Monitoring Data
Site Pond 6-UD Comp

Report Date: 9/7/99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Arsenic, T (mg/l)	Cadmium, D (mg/l)	Cadmium, TR (mg/l)	Cadmium, T (mg/l)	Calcium, D (mg/l)	Calcium, TR (mg/l)	Calcium, T (mg/l)	Chromium, D (mg/l)	Chromium, T (mg/l)	Copper, D (mg/l)	Copper, TR (mg/l)	Copper, T (mg/l)	Iron, D (mg/l)	Iron, TR (mg/l)
Pond 6-UD Comp	1/28/99		<0.005			<0.002								0.01		
Pond 6-UD Comp	2/18/99		0.002		<0.002	<0.002								0.013		
Pond 6-UD Comp	3/10/99		0.006		<0.002	<0.002								0.007		
Pond 6-UD Comp	4/8/99		0.105		<0.002	<0.002								0.021		
Pond 6-UD Comp	5/6/99		0.092			<0.0024								0.022		
Pond 6-UD Comp	6/7/99			<0.0005	<0.0005		22.3	21.6				<0.01	0.04		0.52	6.98
Pond 6-UD Comp	6/17/99		0.006			0.0028							0.005	0.005		
Pond 6-UD Comp	7/7/99															
Pond 6-UD Comp	7/8/99															
Pond 6-UD Comp	7/22/99				<0.0024								0.007			1.37
Pond 6-UD Comp	7/30/99		0.008		<0.0024	<0.0024								0.01		
Pond 6-UD Comp	8/3/99															

Statistical Summary: Mean & Standard Deviation Using All An

Mean			0.0132	0.00094	0.00094	0.0026	22.3	21.6	25.4	0.0087	0.0022	0.0063	0.0173	0.0087	1.65	4.18
Std Dev			0.022	0.0014	0.00035	0.00079	22.3	21.0	25.4	0.0141	0.0023	0.0025	0.0197	0.0078	1.47	3.97
Mean + 1X Std Dev			0.0352	0.00234	0.00129	0.00339	44.6	43.2	50.8	0.0228	0.0047	0.0088	0.037	0.0165	3.12	8.15

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Hecla Mining Company
Grouse Creek Unit

Water Quality Monitoring Data
Site Pond 6-UD Comp

Report Date: 9/7/99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Iron, T (mg/l)	Lead, D (mg/l)	Lead, TR (mg/l)	Lead, T (mg/l)	Magnesium, D (mg/l)	Magnesium, TR (mg/l)	Magnesium, T (mg/l)	Manganese, D (mg/l)	Manganese, TR (mg/l)	Manganese, T (mg/l)	Mercury, D (mg/l)	Mercury, TR (mg/l)	Mercury, T (mg/l)
Pond 6-UD Comp	1[illegible]/[illegible]/99		0.24			<0.005									0.0019
Pond 6-UD Comp	2/18/99		5.69			<0.001								0.0014	0.0014
Pond 6-UD Comp	3/10/99		3.84			<0.001								0.0014	0.0014
Pond 6-UD Comp	4/8/99		7.65			<0.001								0.0019	0.0019
Pond 6-UD Comp	5/6/99		5.6			<0.005									0.0043
Pond 6-UD Comp	6/7/99			<0.001	0.001		3.1	3		0.142	0.165		0.0009	0.0023	0.0009
Pond 6-UD Comp	6/17/99		0.68			<0.005								0.0007	0.0007
Pond 6-UD Comp	7/7/99														
Pond 6-UD Comp	7/8/99														0.0014
Pond 6-UD Comp	7/22/99				1.37									0.0058	
Pond 6-UD Comp	7/30/99		1.51			<0.001								0.0061	0.0061
Pond 6-UD Comp	8/3/99														

Statistical Summary: Mean & Standard Deviation Using All An

Mean			2.36	0.0104	0.685	0.0029	3.1	3	3.6	0.201	0.165	0.234	0.0018	0.0028	0.004
Std Dev			2.07	0.0198	0.968	0.0024	3.1	3	3.6	0.0834	0.165	0.234	0.0011	0.0022	0.0107
Mean + 1X Std Dev			4.43	0.0302	1.653	0.0053	6.2	6	7.2	0.2844	0.33	0.468	0.0029	0.005	0.0147

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Hecla Mining Company
Grouse Creek Unit

Water Quality Monitoring Data
Site Pond 6-UD Comp

Report Date: 9/7/99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Nickel, D (mg/l)	Nickel, TR (mg/l)	Nickel, T (mg/l)	Potassium, D (mg/l)	Potassium, TR (mg/l)	Potassium, T (mg/l)	Selenium, D (mg/l)	Selenium, TR (mg/l)	Selenium, T (mg/l)	Silver, D (mg/l)	Silver, TR (mg/l)	Silver, T (mg/l)	Silica, D (mg/l)	Silica, T (mg/l)
Pond 6-UD Comp	12/28/98															
Pond 6-UD Comp	2/16/99															
Pond 6-UD Comp	3/10/99															
Pond 6-UD Comp	4/8/99															
Pond 6-UD Comp	5/6/99															
Pond 6-UD Comp	6/7/99		<0.01	<0.01		1.8	2.1		0.003	0.003		0.001	0.001			
Pond 6-UD Comp	6/17/99															
Pond 6-UD Comp	7/7/99															
Pond 6-UD Comp	7/8/99															
Pond 6-UD Comp	7/22/99															
Pond 6-UD Comp	7/30/99															
Pond 6-UD Comp	8/3/99															

Statistical Summary: Mean & Standard Deviation Using All An

Mean			0.005	0.005	0.005	1.8	2.1	2.3	0.0035	0.003	0.004	0.0052	0.001	0.0025	22	20.9
Std Dev			0	0.005	8E-11	1.8	2.1	2.3	0.00071	0.003	0.004	0.0065	0.001	4E-11	22	20.9
Mean + 1X Std Dev			0.005	0.01	0.005	3.6	4.2	4.6	0.00421	0.006	0.008	0.0117	0.002	0.0025	44	41.8

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Water Quality Monitoring Data
Site Pond 6-UD Comp

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Sodium, D (mg/l)	Sodium, TR (mg/l)	Sodium, T (mg/l)	Zinc, D (mg/l)	Zinc, TR (mg/l)	Zinc, T (mg/l)	Temperature (C)	Conductivity @ 25 C (micromho)	Conductivity (umhos/cm)	pH, Lab (su)	Turbidity, Lab (NTU)	Turbidity, Fld (NTU)	Flow (gpm)	pH (Standard Units)
Pond 6-UD Comp	12/28/98							0.02			460				100	6.2
Pond 6-UD Comp	2/18/99						0.024	0.024			430				94	5.88
Pond 6-UD Comp	3/10/99						0.033	0.033			420				82	5.98
Pond 6-UD Comp	4/8/99						0.089	0.089			350				110	5.82
Pond 6-UD Comp	5/6/99							0.087			480				250	5.51
Pond 6-UD Comp	6/7/99		10.4	9.4		<0.01	0.02			214	210	8.2	53		185	6.4
Pond 6-UD Comp	6/17/99						0.004	0.004			140			5.2		7.79
Pond 6-UD Comp	7/7/99								13.5							7
Pond 6-UD Comp	7/8/99										460			6.5	255	6.46
Pond 6-UD Comp	7/22/99						0.008									
Pond 6-UD Comp	7/30/99						0.01	0.01			230			2.2	213	6.31
Pond 6-UD Comp	8/3/99										220			6.7	190	6.49

Statistical Summary: Mean & Standard Deviation Using All An

Mean			10.4	9.4	8.6	0.0163	0.0269	0.024								
Std Dev			10.4	9.4	8.6	0.0225	0.0292	0.0226								
Mean + 1X Std Dev			20.8	18.8	17.2	0.0388	0.0561	0.0468								

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Site Number	Sample Date	Duplicate/ Rerun/No Sample	()	Alkalinity (mg/l)	Bicarbonate (mg/l)	Carbonate (mg/l)	Hydroxide (mg/l)	Hardness (mg/l)	Chloride (mg/l)	Nitrate + Nitrite, D (mg/l)	Nitrate + Nitrite, T (mg/l)	Nitrate, D (mg/l)	Nitrite, D (mg/l)	Ammonia (mg/l)	Sulfate (mg/l)	Sulfide (mg/l)	CN, Total (mg/l)	CN, WAD (mg/l)	Thiocyanate (mg/l)
S-1	8/6/98																		
S-1	8/13/98																		
S-1	8/19/98			4.36				7.6	<1			<0.1		<0.04			<0.005	<0.005	
S-1	8/21/98																		
S-1	8/27/98																		
S-1	9/3/98																		
S-1	9/10/98																		
S-1	9/17/98																		
S-1	10/1/98																		
S-1	10/8/98	t collected not enough staff available																	
S-1	10/15/98																		
S-1	10/21/98			35	35	<2	<2	38	<1	<0.02		<0.02	<0.01	<0.05			<0.01	<0.01	
S-1	10/31/98																		
S-1	11/5/98																		
S-1	11/12/98																		
S-1	12/13/98																		
S-1	3/29/99	Unsafe Access																	
S-1	4/30/99	Unsafe Access																	
S-1	5/13/99	Unsafe Access																	
S-1	6/2/99																		
S-1	6/7/99			18	18	<2	<2		<0.5	<0.02			<0.01	<0.05	<10		<0.01	<0.01	
S-1	6/7/99	Duplicate		18	18	<2	<2		<0.5	0.17			<0.01	0.07	20		0.02	0.01	
S-1	6/15/99										<0.02			<0.1			<0.01	<0.01	
S-1	6/15/99	Duplicate									<0.02			<0.1			<0.01	<0.01	
S-1	7/8/99										<0.02			<0.1			0.009	<0.005	
S-1	7/13/99																		
S-1	7/19/99																		
S-1	7/20/99																		
S-1	7/28/99																		
S-1	8/5/99																		
S-1	8/9/99																		
S-1	8/10/99																		
S-1	8/16/99																		
S-1	8/19/99																		
S-1	8/23/99																		

Statistical Summary: Mean & Standard Deviation Using All Analyses

Mean			0	27.4	28.3	1	1	30.3	0.605	0.0156	0.01	0.0332	0.0058	0.0277	26.4	0.01	0.0034	0.0025	0.05
Std Dev			0	7.83	7.35	0	0	11.1	0.363	0.0156	0	0.0226	0.0029	0.0212	43.8	0	0.0038	0.0014	0.05
Mean + 2X Std Dev			0	43.06	43	1	1	52.5	1.331	0.0468	0.01	0.0784	0.0116	0.0701	114	0.01	0.011	0.0053	0.15

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Site Number	Sample Date	Duplicate/ Rerun/No Sample	TSS (mg/l)	TDS (mg/l)	SAR (Ratio)	Aluminum, D (mg/l)	Aluminum, TR (mg/l)	Arsenic, D (mg/l)	Arsenic, TR (mg/l)	Cadmium, D (mg/l)	Cadmium, TR (mg/l)	Calcium, D (mg/l)	Calcium, TR (mg/l)	Chromium, D (mg/l)	Chromium, TR (mg/l)	Copper, D (mg/l)	Copper, TR (mg/l)	Iron, D (mg/l)
S-1	8/8/98																	
S-1	8/13/98																	
S-1	8/19/98		<2					<0.005	<0.005	<0.005	<0.005					<0.01	<0.01	<0.05
S-1	8/21/98																	
S-1	8/27/98																	
S-1	9/3/98																	
S-1	9/10/98																	
S-1	9/17/98																	
S-1	10/1/98																	
S-1	10/8/98	t collected not enough staff available																
S-1	10/15/98																	
S-1	10/21/98		<5					<0.001	0.001	<0.0005	<0.0005	13.6				<0.01	<0.001	<0.01
S-1	10/31/98																	
S-1	11/5/98																	
S-1	11/12/98																	
S-1	12/13/98																	
S-1	3/29/99	Unsafe Access																
S-1	4/30/99	Unsafe Access																
S-1	5/13/99	Unsafe Access																
S-1	6/2/99																	
S-1	6/7/99		<5	20				0.001	<0.001	<0.0005	<0.0005	5.8	5.6			<0.01	<0.01	
S-1	6/7/99	Duplicate	<5	60				<0.001	0.003	<0.0005	<0.0005	14.3	13.3			<0.01	<0.01	
S-1	6/15/99																	
S-1	6/15/99	Duplicate																
S-1	7/8/99																	
S-1	7/13/99																	
S-1	7/19/99																	
S-1	7/20/99																	
S-1	7/28/99																	
S-1	8/5/99																	
S-1	8/9/99																	
S-1	8/10/99																	
S-1	8/16/99																	
S-1	8/19/99																	
S-1	8/23/99																	

Statistical Summary: Mean & Standard Deviation Using All Analyses

Mean			1.68	45.2	0.17	0.015	0.015	0.0011	0.0016	0.00074	0.0016	10.4	10.9	0.005	0.005	0.0034	0.0036	0.02
Std Dev			1.44	18.8	0.17	0.015	0.015	0.0008	0.0012	0.0011	0.0018	5.63	4.6	0.005	0.005	0.0044	0.0026	0.0127
Mean + 2X Std Dev			4.68	82.8	0.51	0.046	0.045	0.0027	0.004	0.00294	0.0052	21.66	20.1	0.015	0.015	0.0122	0.0088	0.0454

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Water Quality Monitoring Data
Site S-1

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Iron, TR (mg/l)	Lead, D (mg/l)	Lead, TR (mg/l)	Magnesium, D (mg/l)	Magnesium, TR (mg/l)	Manganese, D (mg/l)	Manganese, TR (mg/l)	Mercury, D (mg/l)	Mercury, TR (mg/l)	Nickel, D (mg/l)	Nickel, TR (mg/l)	Potassium, D (mg/l)	Potassium, TR (mg/l)	Selenium, D (mg/l)
S-1	8/8/98															
S-1	8/13/98															
S-1	8/19/98		<0.05	<0.005	<0.005					<0.0002	<0.0002					<0.005
S-1	8/21/98															
S-1	8/27/98															
S-1	9/3/98															
S-1	9/10/98															
S-1	9/17/98															
S-1	10/1/98															
S-1	10/8/98	I collected not enough staff available														
S-1	10/15/98															
S-1	10/21/98		<0.01	<0.001	<0.001	1				<0.0002	<0.0002					<0.001
S-1	10/31/98															
S-1	11/5/98															
S-1	11/12/98															
S-1	12/13/98															
S-1	3/26/99	Unsafe Access														
S-1	4/30/99	Unsafe Access														
S-1	5/13/99	Unsafe Access														
S-1	6/2/99															
S-1	6/7/99			<0.001	<0.001	0.6	0.6			<0.0002	<0.0002			0.6	0.6	<0.001
S-1	6/7/99	Duplicate		<0.001	<0.001	1.3	1.1			<0.0002	<0.0002			0.8	0.7	<0.001
S-1	6/15/99															
S-1	6/15/99	Duplicate														
S-1	7/6/99															
S-1	7/13/99															
S-1	7/19/99															
S-1	7/20/99															
S-1	7/28/99															
S-1	8/5/99															
S-1	8/9/99															
S-1	8/10/99															
S-1	8/16/99															
S-1	8/19/99															
S-1	8/23/99															

Statistical Summary: Mean & Standard Deviation Using All Analyses

Mean			0.078	0.0023	0.0052	0.79	0.767	0.0025	0.0025	0.00012	0.00012	0.005	0.005	0.6	0.6	0.0013
Std Dev			0.0811	0.0033	0.0066	0.277	0.231	0.0025	0.0025	0.00011	0.000081	0.005	0.005	0	0.141	0.00093
Mean + 2X Std Dev			0.2402	0.0089	0.0184	1.344	1.229	0.0075	0.0075	0.00034	0.000282	0.015	0.015	0.6	0.882	0.00316

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Water Quality Monitoring Data
Site S-1

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Selenium, TR (mg/l)	Silver, D (mg/l)	Silver, TR (mg/l)	Silica, D (mg/l)	Silica, T (mg/l)	Sodium, D (mg/l)	Sodium, TR (mg/l)	Zinc, D (mg/l)	Zinc, TR (mg/l)	Temperature (Cent)	Conductivity @ 25 C (micromho)	Conductivity, Field (micromho)	pH, Lab (su)	pH, Field (su)
S-1	8/8/98													20		6.4
S-1	8/13/98											21.7		70		6.8
S-1	8/19/98		<0.005	<0.005	<0.005					0.02	0.025					
S-1	8/21/98											18.3		60		7.02
S-1	8/27/98											12		80		6.49
S-1	9/3/98											12.4		80		6.87
S-1	9/10/98											13.4		20		6.77
S-1	9/17/98											15		20		6.25
S-1	10/1/98											5.7		100		7.15
S-1	10/8/98	I collected not enough staff available														
S-1	10/15/98											5.7		90		6.72
S-1	10/21/98		<0.001	<0.005	<0.005					<0.01	<0.01		91	91	6.5	6.5
S-1	10/31/98											1.4		90		6.71
S-1	11/5/98											15.8		100		6.5
S-1	11/12/98											13.7		70		7.07
S-1	12/13/98															
S-1	3/20/99	Unsafe Access														
S-1	4/30/99	Unsafe Access														
S-1	5/13/99	Unsafe Access														
S-1	6/2/99											3		40		7.9
S-1	6/7/99		<0.001	<0.0005	<0.0005			1.8	1	<0.01	<0.01	4.5	39	30	6.3	6
S-1	6/7/99	Duplicate	<0.001	<0.0005	<0.0005			2.7	2	0.01	0.02		99		6.4	
S-1	6/15/99											5.6		20		7.5
S-1	6/15/99	Duplicate														
S-1	7/6/99											20		20		7.6
S-1	7/13/99															
S-1	7/19/99															
S-1	7/20/99															
S-1	7/28/99															
S-1	8/5/99															
S-1	8/9/99															
S-1	8/10/99															
S-1	8/16/99															
S-1	8/19/99															
S-1	8/23/99															

Statistical Summary: Mean & Standard Deviation Using All Analyses

Mean			0.002	0.0014	0.0023	9.9	9.1	2.2	1.76	0.0077	0.0221	6.31	72.8	57.4	6.85	7.00
Std Dev			0.0022	0.0018	0.0041	9.9	9.1	0.566	1.06	0.0069	0.023	5.44	21.2	27.1	6.70	0.85
Mean + 2X Std Dev			0.0064	0.005	0.0105	29.7	27.3	3.332	3.87	0.0215	0.0681	17.19	115.2	111.6	6.27	8.42

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Water Quality Monitoring Data
Site S-1

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Turbidity, Lab (NTU)	Turbidity, Fld (NTU)	DO, Field (mg/l)	Staff Gage Height (feet)	Flow (gpm)	Flow (cfs)
S-1	8/8/98							
S-1	8/13/98							
S-1	8/19/98						237	0.53
S-1	8/21/98							
S-1	8/27/98							
S-1	9/3/98							
S-1	9/10/98							
S-1	9/17/98							
S-1	10/1/98							
S-1	10/8/98	I collected not enough staff available						
S-1	10/15/98							
S-1	10/21/98			3.4			471	1.05
S-1	10/31/98							
S-1	11/5/98							
S-1	11/12/98							
S-1	12/13/98							
S-1	3/29/99	Unsafe Access						
S-1	4/30/99	Unsafe Access						
S-1	5/13/99	Unsafe Access						
S-1	6/2/99							
S-1	6/7/99		1.5		13.8			
S-1	6/7/99	Duplicate	3.2					
S-1	6/15/99				15.7			
S-1	6/15/99	Duplicate						
S-1	7/8/99			1.2	12.1			
S-1	7/13/99					0.66	8255.29	18.3941
S-1	7/18/99					0.46		
S-1	7/20/99					0.46	4187	9.33
S-1	7/28/99					0.32	2549	5.68
S-1	8/5/99					0.28		
S-1	8/9/99					0.18		
S-1	8/10/99					0.18	2434.34	5.4241
S-1	8/16/99					0.16		
S-1	8/19/99					0.12	4250.4	9.4839
S-1	8/23/99							

Statistical Summary: Mean & Standard Deviation Using All Analyses

Mean			0.849	1.56	10.6	0.311	3769.4	8.73
Std Dev			0.864	1.16	3.38	0.181	5745.3	12.8
Mean + 2X Std Dev			2.577	3.88	17.36	0.673	15260	34.33

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Sum of Anions (meq/l)	Cation & Anion Sum (meq/l)	Arsenic, D (mg/l)	Arsenic, TR (mg/l)	Cadmium, D (mg/l)	Cadmium, TR (mg/l)	Calcium, D (mg/l)	Calcium, TR (mg/l)	Copper, D (mg/l)	Copper, TR (mg/l)	Iron, D (mg/l)	Iron, TR (mg/l)	Lead, D (mg/l)	Lead, TR (mg/l)	Magnesium, D (mg/l)
S-2	5/11/87					<0.001		<0.005	5			<0.01				<0.02	<1
S-2	8/10/87					0.002		<0.005	14			0.02				<0.02	1
S-2	11/10/87					<0.001		<0.005	16			<0.01				<0.02	1
S-2	2/2/88				0.001	0.003	0.001	<0.0001			<0.001	0.001			0.001	0.002	
S-2	5/16/88				<0.001	<0.001	<0.0001	<0.0001			<0.001	<0.001			<0.001	<0.001	
S-2	7/29/88				0.001	<0.001	<0.0001	<0.0001			0.001	0.001			<0.001	<0.001	
S-2	11/3/88				0.001	0.002	<0.0001	<0.0001			<0.001	<0.001			<0.001	<0.001	
S-2	3/15/89				<0.001	<0.001	<0.0001	<0.0001			<0.001	<0.001			<0.001	<0.001	
S-2	5/17/89				<0.001	0.001	<0.0001	<0.0001			0.002	<0.001			<0.001	<0.001	
S-2	8/15/89				0.001	0.001	<0.0001	<0.0001			<0.001	0.000			<0.001	0.014	
S-2	10/25/89				<0.001	<0.001	<0.0001	<0.0001			<0.001	<0.001			<0.001	0.001	
S-2	2/23/90				<0.001	<0.001	<0.0001	<0.0001			<0.001	<0.001			<0.001	<0.001	
S-2	5/31/90				<0.001	<0.001	<0.0001	<0.0001			<0.001	<0.001			<0.001	<0.001	
S-2	8/29/90				<0.001	0.002	0.0001	0.0001			<0.001	0.003			<0.001	0.002	
S-2	10/29/90					0.002		<0.0002				0.002				0.01	
S-2	2/28/91				<0.001	0.001	<0.0001	<0.0001			0.001	0.001			<0.001	0.001	
S-2	6/18/91				<0.001	0.001	<0.0001	<0.0001			<0.001	0.001			0.008	0.008	
S-2	8/9/91				0.002	0.002	0.0001	0.0001			<0.001	<0.001			<0.001	<0.001	
S-2	10/31/91				0.001	0.001	<0.0001	<0.0001			<0.001	<0.001			<0.001	<0.001	
S-2	3/20/92				<0.002	<0.002	0.0001	0.0001			<0.001	0.001			<0.001	0.001	
S-2	6/17/92				<0.002	<0.002	<0.0001	0.0028			0.001	<0.001			<0.001	0.003	
S-2	9/15/92				0.002	0.002	<0.0001	0.003			0.001	0.002			<0.001	0.003	
S-2	12/3/92				<0.002	<0.002	0.0001	0.0002			0.002	0.002			0.002	0.002	
S-2	2/25/93				<0.002	<0.002	0.0001	0.0002			<0.001	<0.001	<0.05	<0.05	0.005	0.006	
S-2	5/27/93				<0.001	<0.001	0.0001	0.0008			<0.001	<0.001	0.05	0.43	0.001	0.004	
S-2	8/25/93				<0.006	<0.005	<0.0005	<0.0005			0.004	<0.001			<0.005	0.007	
S-2	12/2/93				<0.006	<0.005	<0.005	<0.005			<0.01	<0.01	<0.05	0.14	<0.001	0.003	
S-2	3/11/94					<0.005		<0.005				<0.01		<0.06			
S-2	5/4/94					<0.005		<0.005				<0.01		0.06		0.012	
S-2	6/23/94					0.008		<0.005				<0.01		0.22		<0.005	
S-2	8/10/94					<0.005		<0.005				0.01		<0.05		0.009	
S-2	11/19/94					<0.005		<0.005				0.02		0.13			
S-2	3/24/95					<0.005		<0.005				<0.01		0.054		<0.006	
S-2	5/25/95					<0.005		<0.005				<0.01		0.23		<0.006	
S-2	6/14/95					<0.005		<0.005				<0.01		0.14		<0.006	
S-2	9/8/95					<0.005		<0.005				0.01		0.06		<0.006	
S-2	11/16/95					<0.005		<0.005				0.01		0.05		<0.005	
S-2	11/16/95	Duplicate				<0.005		<0.005				<0.01				<0.005	
S-2	2/10/96					<0.005		<0.005				<0.01		0.06		<0.005	
S-2	6/25/96					<0.005		<0.005				<0.01		0.07		<0.005	
S-2	8/20/96				<0.005	<0.005	<0.005	<0.005			<0.01	<0.01	<0.05	0.13	<0.005	<0.005	
S-2	10/1/96				<0.005	0.001	<0.005	<0.003			<0.01	<0.01	<0.05	0.04	<0.005	<0.02	
S-2	11/19/96				<0.005	<0.005	<0.005	<0.005			<0.01	<0.01	<0.05	0.37	<0.005	<0.005	
S-2	3/24/97				<0.005	<0.005	<0.005	<0.005			<0.01	<0.01	<0.05	0.46	<0.005	<0.005	
S-2	5/20/97																
S-2	6/24/97				0.001	0.001	<0.003	<0.003	5.8		0.01	<0.01	0.01	0.07		<0.04	0.4
S-2	8/23/97				<0.005	<0.005	<0.005	<0.005			<0.01	0.01	<0.05	<0.05	<0.005	<0.005	
S-2	10/1/97																
S-2	10/13/97																
S-2	12/18/97				<0.005	<0.005	<0.005	<0.005			<0.01	<0.01	<0.05	<0.05	<0.005	0.008	
S-2	1/28/98																
S-2	2/11/98																
S-2	2/19/98	frozen															
S-2	3/12/98																
S-2	3/18/98																
S-2	3/24/98				<0.005	<0.005	<0.005	<0.005			<0.01	<0.01	<0.05	0.14	<0.005	<0.005	
S-2	4/4/98																
S-2	4/16/98																
S-2	5/14/98																

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Sum of Anions (meq/l)	Cation & Anion Sum (meq/l)	Arsenic, D (mg/l)	Arsenic, TR (mg/l)	Cadmium, D (mg/l)	Cadmium, TR (mg/l)	Calcium, D (mg/l)	Calcium, TR (mg/l)	Copper, D (mg/l)	Copper, TR (mg/l)	Iron, D (mg/l)	Iron, TR (mg/l)	Lead, D (mg/l)	Lead, TR (mg/l)	Magnesium, D (mg/l)
S-2	5/3/99																
S-2	5/4/99																
S-2	5/5/99																
S-2	5/6/99																
S-2	5/7/99																
S-2	5/12/99																
S-2	5/13/99		0.91	0.8	0.002		<0.0004		<0.0004	12.8	<0.003	<0.003			<0.001	<0.001	
S-2	5/13/99	5/13/99															
S-2	5/13/99	Duplicate	0.9	0.8	<0.001		<0.0004		<0.0004	12.9	<0.003	<0.003			<0.001	<0.001	
S-2	5/13/99	5/13/99															
S-2	5/17/99																
S-2	5/21/99																
S-2	5/23/99																
S-2	5/26/99																
S-2	5/27/99																
S-2	5/30/99																
S-2	6/2/99																
S-2	6/6/99																
S-2	6/7/99				<0.001	0.002	<0.0005	<0.0005	8.8	7.6	<0.01	<0.01			<0.001	<0.001	0.9
S-2	6/13/99																
S-2	6/15/99																
S-2	6/16/99	? Bob															
S-2	6/20/99																
S-2	6/22/99																
S-2	6/26/99																
S-2	6/29/99																
S-2	6/29/99	Duplicate															
S-2	7/8/99																
S-2	7/13/99																
S-2	7/13/99	Rerun															
S-2	7/19/99																
S-2	7/19/99	Rerun															
S-2	7/19/99	Duplicate															
S-2	7/19/99	Dup. Rerun															
S-2	7/20/99																
S-2	7/28/99																
S-2	8/3/99																
S-2	8/3/99	Rerun															
S-2	8/5/99																
S-2	8/9/99																
S-2	8/10/99																
S-2	8/16/99																
S-2	8/19/99																
S-2	8/23/99																

Statistical Summary: Mean & Standard Deviation Using All An

Mean			0.91	0.8	0.0013	0.0016	0.00074	0.0014	8.98	11.2	0.0025	0.0042	0.0227	0.121	0.0019	0.0043	0.786
Std Dev			0.91	0.8	0.00083	0.0012	0.001	0.0012	5.33	3.09	0.0024	0.0042	0.0115	0.125	0.0035	0.0048	0.279
Mean + 2X Std Dev			2.73	2.4	0.00298	0.0042	0.00274	0.0038	19.64	17.38	0.0073	0.0126	0.0457	0.371	0.0089	0.0139	1.344

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Water Quality Monitoring Data
Site S-2

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Magnesium, TR (mg/l)	Mercury, D (mg/l)	Mercury, TR (mg/l)	Potassium, D (mg/l)	Potassium, TR (mg/l)	Selenium, D (mg/l)	Selenium, TR (mg/l)	Silver, D (mg/l)	Silver, TR (mg/l)	Sodium, D (mg/l)	Sodium, TR (mg/l)	Zinc, D (mg/l)	Zinc, TR (mg/l)	Temperature (Cent)	Conductivity @ 25 C (micromho)
S-2	5/3/99															10.4	
S-2	5/4/99																
S-2	5/5/99																
S-2	5/6/99																
S-2	5/7/99															3.7	
S-2	5/12/99															4	
S-2	5/13/99		1.1	<0.0002	<0.0002		<1.7	0.002	<0.002		<0.0004		1.72	0.01	0.01	2	84
S-2	5/13/99	5/13/99															
S-2	5/13/99	Duplicate	1.1	<0.0002	<0.0002		<1.7	0.003	<0.002		<0.0004		1.72	0.009	0.01	2	84
S-2	5/13/99	5/13/99															
S-2	5/17/99															1	
S-2	5/21/99															2	
S-2	5/23/99															4.9	
S-2	5/26/99															2	
S-2	5/27/99																
S-2	5/30/99															8.5	
S-2	6/2/99															3	
S-2	6/6/99															11.2	
S-2	6/7/99		0.7	<0.0002	<0.0002	0.7	0.6	<0.001	<0.001	<0.0005	<0.0005	2.1	1.2	0.02	0.03	5.1	63
S-2	6/13/99															3.9	
S-2	6/15/99															3.8	
S-2	6/16/99	7 Bob															
S-2	6/20/99															6.4	
S-2	6/22/99															4.2	
S-2	6/26/99															7	
S-2	6/29/99															4.7	
S-2	6/29/99	Duplicate														4.7	
S-2	7/6/99															15.6	
S-2	7/13/99															7.9	
S-2	7/13/99	Rerun															
S-2	7/19/99															7.3	
S-2	7/19/99	Rerun															
S-2	7/19/99	Duplicate															
S-2	7/19/99	Dup. Rerun															
S-2	7/20/99																
S-2	7/28/99															7.7	
S-2	8/3/99															9.8	
S-2	8/3/99	Rerun															
S-2	8/5/99																
S-2	8/9/99															9.3	
S-2	8/10/99																
S-2	8/18/99															7.3	
S-2	8/19/99																
S-2	8/23/99															9.2	

Statistical Summary: Mean & Standard Deviation Using All An

Mean			0.9	0.00011	0.00011	0.7	0.725	0.0014	0.002	0.0011	0.0017	2.1	1.46	0.0122	0.0192	8.08	70.8
Std Dev			0.283	0.00011	0.000087	0.7	0.177	0.00094	0.002	0.0012	0.0010	2.1	0.366	0.036	0.0216	5.12	21.1
Mean + 2X Std Dev			1.466	0.00033	0.000244	2.1	1.079	0.00328	0.006	0.0035	0.0055	6.3	2.196	0.0842	0.0624	18.32	113

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Water Quali. .onitoring Data
Site S-2

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Conductivity, Field (micromho)	pH, Lab (su)	pH, Field (su)	Turbidity, Lab (NTU)	Turbidity, Fld (NTU)	DO, Field (mg/l)	Staff Gage Height (feet)	Flow (gpm)	Flow (cfs)
S-2	5/26/98			6.4							
S-2	6/11/98		30		6.75						
S-2	6/19/98		30		6.9						
S-2	6/27/98		30		7.28						
S-2	7/1/98									2397	5.34
S-2	7/9/98		40		6.91						
S-2	7/22/98	5/26/98									
S-2	7/26/98		60		6.31						
S-2	7/30/98		70		6.9						
S-2	8/6/98		70		6.3						
S-2	8/13/98		80		6.74						
S-2	8/17/98										
S-2	8/19/98		70		7.53					1099	2.45
S-2	8/21/98		70		6.9						
S-2	8/27/98		80		6.53						
S-2	9/2/98										
S-2	9/2/98	Duplicate									
S-2	9/2/98										
S-2	9/3/98		80		6.87						
S-2	9/10/98		60		6.8						
S-2	9/15/98										
S-2	9/17/98		70		6.72						
S-2	9/24/98		60		7.15						
S-2	9/30/98										
S-2	10/1/98		100		7.3						
S-2	10/7/98										
S-2	10/15/98		80		672						
S-2	10/21/98		98	6.5	6.5		2.39			727	1.62
S-2	10/29/98										
S-2	10/31/98		80		6.68						
S-2	11/5/98		100		6.66						
S-2	11/6/98										
S-2	11/11/98										
S-2	11/12/98		70		7.00						
S-2	11/26/98		80		7						
S-2	12/2/98										
S-2	12/6/98		70		7.22						
S-2	12/10/98										
S-2	12/13/98		60		7.67						
S-2	12/27/98		60		7.00						
S-2	1/7/99		60		7.20						
S-2	1/31/99		90		6.9						
S-2	2/7/99		90		7.07						
S-2	2/16/99	Unsafe Access									
S-2	2/21/99		70		7.23						
S-2	2/26/99		80		7.11						
S-2	3/4/99	Unsafe Access									
S-2	3/13/99	ob- carbon transfer									
S-2	3/28/99		90		6.8						
S-2	3/29/99		70	6.4	7.94	2.2	2.75	7.9			
S-2	4/4/99		80		6.89						
S-2	4/11/99		90		7.02						
S-2	4/25/99		70		6.85						
S-2	4/27/99										
S-2	4/30/99		110		6.14						
S-2	4/30/99	Duplicate									
S-2	5/1/99		60		7.66						
S-2	5/2/99		60		7.97						
S-2	5/2/99	Duplicate									

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Hecla M...ng Company
Grouse Creek Unit

Water Quality Monitoring Data
Site S-3

Report Date. ..7/99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	()	Alkalinity (mg/l)	Bicarbonate (mg/l)	Carbonate (mg/l)	Hydroxide (mg/l)	Hardness (mg/l)	Chloride (mg/l)	Nitrate + Nitrite, D (mg/l)	Nitrate + Nitrite, T (mg/l)	Nitrate, D (mg/l)	Nitrite, D (mg/l)	Ammonia (mg/l)	Sulfate (mg/l)	Sulfide (mg/l)	CN, Total (mg/l)
S-3	5/4/99																
S-3	5/5/99																
S-3	5/6/99																
S-3	5/7/99																
S-3	5/9/99																
S-3	5/12/99																
S-3	5/13/99			27	27	<1	<1		0.6	0.08				<0.1	18.3		0.05
S-3	5/13/99	5/13/99															0.08
S-3	5/17/99																
S-3	5/19/99																
S-3	5/21/99																
S-3	5/23/99																
S-3	5/26/99																
S-3	5/29/99																
S-3	5/30/99																
S-3	6/2/99									0.06		0.06	<0.05				0.02
S-3	6/6/99																
S-3	6/7/99			18	18	<2	<2		<0.5	0.03			<0.01	<0.05	10		0.02
S-3	6/13/99																
S-3	6/15/99										<0.02			<0.1			0.01
S-3	6/16/99	7 Bob															
S-3	6/20/99																
S-3	6/22/99										0.03			<0.1			0.01
S-3	6/26/99																
S-3	6/29/99										<0.02			<0.1			0.014
S-3	7/6/99										<0.02			<0.1			0.025
S-3	7/13/99										<0.02			<0.1			0.097
S-3	7/13/99	Rerun															0.035
S-3	7/14/99																
S-3	7/19/99										<0.02			<0.1			0.053
S-3	7/19/99	Rerun															0.05
S-3	7/20/99																
S-3	7/28/99																
S-3	7/28/99	Duplicate									<0.02			<0.1			0.066
S-3	8/3/99										<0.02			<0.1			0.04
S-3	8/3/99	Rerun															0.047
S-3	8/3/99	Duplicate									<0.02			<0.1			0.044
S-3	8/5/99																
S-3	8/9/99										<0.02			<0.1			0.04
S-3	8/10/99																
S-3	8/16/99																
S-3	8/19/99																
S-3	8/23/99																

Statistical Summary: Mean & Standard Deviation Using All Analyses

Mean			20.5	31.4	30.8	0.938	0.938	34.3	0.59	0.0282	0.0125	0.0432	0.0061	0.0278	9.12	0.01	0.0139
Std Dev			20.5	8.13	8.04	0.177	0.177	10.6	0.286	0.0437	0.0071	0.0811	0.0038	0.0162	5.87	0	0.0211
Mean + 2X Std Dev			61.5	47.66	46.88	1.292	1.292	55.5	1.162	0.1156	0.0267	0.1654	0.0137	0.0602	20.86	0.01	0.0561

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Site Number	Sample Date	Duplicate/ Rerun/No Sample	CN, WAD (mg/l)	Thiocyanate (mg/l)	TSS (mg/l)	TDS (mg/l)	SAR (Ratio)	Sum of Anions (meq/l)	Cation & Anion Sum (meq/l)	Aluminum, D (mg/l)	Aluminum, TR (mg/l)	Arsenic, D (mg/l)	Arsenic, TR (mg/l)	Cadmium, D (mg/l)	Cadmium, TR (mg/l)	Calcium, D (mg/l)
S-3	5/4/99		0.02													
S-3	5/5/99		0.03													
S-3	5/6/99		0.02													
S-3	5/7/99															
S-3	5/9/99		0.01													
S-3	5/12/99															
S-3	5/13/99		0.04		2.2	91		0.94	0.84			0.002		<0.0004		<0.0004
S-3	5/13/99	5/13/99	0.05													
S-3	5/17/99															
S-3	5/19/99		0.03													
S-3	5/21/99															
S-3	5/23/99															
S-3	5/26/99															
S-3	5/29/99		<0.01													
S-3	5/30/99															
S-3	6/2/99		0.01													
S-3	6/6/99															
S-3	6/7/99		0.01		<5	40						<0.001	0.002	<0.0005	<0.0005	8.5
S-3	6/13/99															
S-3	6/15/99		<0.01													
S-3	6/16/99	? Bob														
S-3	6/20/99															
S-3	6/22/99		<0.01													
S-3	6/26/99															
S-3	6/29/99		0.011													
S-3	7/8/99		0.022													
S-3	7/13/99		0.016													
S-3	7/13/99	Rerun	0.016													
S-3	7/14/99															
S-3	7/19/99		0.023													
S-3	7/19/99	Rerun														
S-3	7/20/99															
S-3	7/28/99															
S-3	7/28/99	Duplicate	0.022													
S-3	8/3/99		0.024													
S-3	8/3/99	Rerun	0.019													
S-3	8/3/99	Duplicate	0.026													
S-3	8/5/99															
S-3	8/9/99		0.021													
S-3	8/10/99															
S-3	8/16/99															
S-3	8/19/99															
S-3	8/23/99															

Statistical Summary: Mean & Standard Deviation Using All An

Mean			0.0094	0.05	2.34	50.2	0.23	0.94	0.84	0.015	0.015	0.0013	0.0016	0.00079	0.0016	11.1
Std Dev			0.0123	0.05	2.14	26.7	0.23	0.94	0.84	0.015	0.015	0.0008	0.001	0.0011	0.0016	5.19
Mean + 2X Std Dev			0.034	0.15	6.82	103.6	0.69	2.82	2.52	0.045	0.045	0.0029	0.0036	0.00299	0.0048	21.48

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Hecla Mining Company
Grouse Creek Unit

Water Quality Monitoring Data
Site S-3

Report Date: 9/7/99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Calcium, TR (mg/l)	Chromium, D (mg/l)	Chromium, TR (mg/l)	Copper, D (mg/l)	Copper, TR (mg/l)	Iron, D (mg/l)	Iron, TR (mg/l)	Lead, D (mg/l)	Lead, TR (mg/l)	Magnesium, D (mg/l)	Magnesium, TR (mg/l)	Manganese, D (mg/l)	Manganese, TR (mg/l)
S-3	5/2/99														
S-3	5/5/99														
S-3	5/6/99														
S-3	5/7/99														
S-3	5/9/99														
S-3	5/12/99														
S-3	5/13/99		13			0.003	<0.003			<0.001	<0.001		1.31		
S-3	5/13/99	5/13/99													
S-3	5/17/99														
S-3	5/19/99														
S-3	5/21/99														
S-3	5/23/99														
S-3	5/26/99														
S-3	5/29/99														
S-3	5/30/99														
S-3	6/2/99														
S-3	6/6/99														
S-3	6/7/99		8			<0.01	<0.01			<0.001	<0.001	1.1	0.9		
S-3	6/13/99														
S-3	6/15/99														
S-3	6/16/99	? Bob													
S-3	6/20/99														
S-3	6/22/99														
S-3	6/26/99														
S-3	6/29/99														
S-3	7/8/99														
S-3	7/13/99														
S-3	7/13/99	Rerun													
S-3	7/14/99														
S-3	7/19/99														
S-3	7/19/99	Rerun													
S-3	7/20/99														
S-3	7/28/99														
S-3	7/28/99	Duplicate													
S-3	8/3/99														
S-3	8/3/99	Rerun													
S-3	8/3/99	Duplicate													
S-3	8/5/99														
S-3	8/9/99														
S-3	8/10/99														
S-3	8/16/99														
S-3	8/19/99														
S-3	8/23/99														

Statistical Summary: Mean & Standard Deviation Using All An

Mean			12.6	0.005	0.005	0.004	0.0038	0.0213	0.0769	0.002	0.0042	1.08	1.3	0.0025	0.0025
Std Dev			3.13	0.005	0.005	0.0081	0.0032	0.0067	0.0785	0.0036	0.005	0.408	0.294	0.0025	0.0025
Mean + 2X Std Dev			18.86	0.015	0.015	0.0202	0.0102	0.0347	0.2339	0.0092	0.0142	1.896	1.888	0.0075	0.0075

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Mercury, D (mg/l)	Mercury, TR (mg/l)	Nickel, D (mg/l)	Nickel, TR (mg/l)	Potassium, D (mg/l)	Potassium, TR (mg/l)	Selenium, D (mg/l)	Selenium, TR (mg/l)	Silver, D (mg/l)	Silver, TR (mg/l)	Silica, D (mg/l)	Silica, T (mg/l)	Sodium, D (mg/l)	Sodium, TR (mg/l)	Zinc, D (mg/l)
S-3	8/2/98																
S-3	5/5/99																
S-3	5/6/99																
S-3	5/7/99																
S-3	5/9/99																
S-3	5/12/99																
S-3	5/13/99		<0.0002	<0.0002				<1.7	0.002	<0.002		<0.0004				1.91	0.01
S-3	5/13/99	5/13/99															
S-3	5/17/99																
S-3	5/19/99																
S-3	5/21/99																
S-3	5/23/99																
S-3	5/26/99																
S-3	5/29/99																
S-3	5/30/99																
S-3	6/2/99																
S-3	6/6/99																
S-3	6/7/99		<0.0002	<0.0002			0.6	0.5	<0.001	<0.001	<0.0005	<0.0005			2.6	1.6	0.01
S-3	6/13/99																
S-3	6/15/99																
S-3	6/16/99	? Bob															
S-3	6/20/99																
S-3	6/22/99																
S-3	6/26/99																
S-3	6/29/99																
S-3	7/8/99																
S-3	7/13/99																
S-3	7/13/99	Rerun															
S-3	7/14/99																
S-3	7/19/99																
S-3	7/19/99	Rerun															
S-3	7/20/99																
S-3	7/28/99																
S-3	7/28/99	Duplicate															
S-3	8/3/99																
S-3	8/3/99	Rerun															
S-3	8/3/99	Duplicate															
S-3	8/5/99																
S-3	8/9/99																
S-3	8/10/99																
S-3	8/16/99																
S-3	8/19/99																
S-3	8/23/99																

Statistical Summary: Mean & Standard Deviation Using All An

Mean			0.00011	0.00013	0.005	0.005	0.55	0.85	0.0015	0.0019	0.0018	0.0017	11.4	10.5	3.05	2.27	0.0040
Std Dev			0.00011	0.00014	0.005	0.005	0.0707	0.18	0.0011	0.0014	0.0042	0.002	11.4	10.5	0.636	0.905	0.0030
Mean + 2X Std Dev			0.00033	0.00041	0.015	0.015	0.6914	1.01	0.0037	0.0047	0.0102	0.0057	34.2	31.5	4.322	4.08	0.0124

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Water Quality Monitoring Data
Site S-3

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Zinc, TR (mg/l)	Temperature (Cent)	Conductivity @ 25 C (micromho)	Conductivity, Field (micromho)	pH, Lab (su)	pH, Field (su)	Turbidity, Lab (NTU)	Turbidity, Fld (NTU)	DO, Field (mg/l)	Staff Gage Height (feet)	Flow (gpm)	Flow (cfs)
S-3	5/4/99													
S-3	5/5/99													
S-3	5/6/99													
S-3	5/7/99			3.1		110		7.39			6.5			
S-3	5/9/99													
S-3	5/12/99			5		120		7.47			3.9			
S-3	5/13/99		0.009	3	95	70	7.64	7.8	2.33	2.9	3.5			
S-3	5/13/99	5/13/99												
S-3	5/17/99			1		80		7.3			3.7			
S-3	5/19/99													
S-3	5/21/99			2		70		7.8			2.7	8.25		
S-3	5/23/99			5.2		70		7.54						
S-3	5/26/99			2		50		8.3			2.7	9.4		
S-3	5/29/99													
S-3	5/30/99			8.7		50		7.26						
S-3	6/2/99			3		50		8						
S-3	6/6/99			10.2		50		7.63						
S-3	6/7/99		0.02	5.3	68	50	6.4	7.9	3.4		14.6			
S-3	6/13/99			4		40		7.8						
S-3	6/15/99			4.6		30		7.5			16.5			
S-3	6/16/99	? Bob												
S-3	6/20/99			6.6		40		6.99						
S-3	6/22/99			4.4		30		8		5.7	16.8	8.7		
S-3	6/26/99			7.1		30		7.45						
S-3	6/29/99			4.9		30		8		2.5	14.6	8.25		
S-3	7/8/99			14.5		30		7.8		1.9	19.7	8		
S-3	7/13/99			8.3		40		8		1.5		0.68		
S-3	7/13/99	Rerun												
S-3	7/14/99											0.64	10571.48	23.5549
S-3	7/19/99			7.3		50		8		1.4	14.8	0.48		
S-3	7/19/99	Rerun												
S-3	7/20/99												7710	17.18
S-3	7/28/99			7.3		70		7.39		1.3	15.6	0.32	4757	10.6
S-3	7/28/99	Duplicate												
S-3	8/3/99			9.3		70		7.68		1.8	17.3			
S-3	8/3/99	Rerun												
S-3	8/3/99	Duplicate												
S-3	8/5/99											0.24	4254	9.48
S-3	8/9/99			9.1		70		7.7		1.1	21.2	7.38		
S-3	8/10/99											0.17	3590	8
S-3	8/16/99			6.9		80		7.66		1.2	31.6	0.12		
S-3	8/19/99											0.1	6247	13.92
S-3	8/23/99			9.3		80		7.76		1	22.8	7.34		

Statistical Summary: Mean & Standard Deviation Using All An

Mean			0.0159	6.52	79.3	70.4	6.96	7.14	1.17	3.02	12	4	7076	15.8
Std Dev			0.0163	4.96	21.3	22.3	6.85	7.10	1.24	2.92	5.99	4.08	9905.4	22.1
Mean + 2X Std Dev			0.0485	16.44	121.9	115	6.41	6.63	3.65	8.86	23.98	12.16	26886.8	60

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Hecla Mining Company
Grouse Creek Unit

Water Quality Monitoring Data
Site S-4

Report Date: 9/7/99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	()	Alkalinity (mg/l)	Bicarbonate (mg/l)	Carbonate (mg/l)	Hydroxide (mg/l)	Hardness (mg/l)	Chloride (mg/l)	Nitrate + Nitrite, D (mg/l)	Nitrate + Nitrite, T (mg/l)	Nitrate, D (mg/l)	Nitrite, D (mg/l)	Ammonia (mg/l)	Sulfate (mg/l)	Sulfide (mg/l)	CN, Total (mg/l)	CN, WAD (mg/l)	Thiocyanate (mg/l)	TSS (mg/l)	TDS (mg/l)	SAR (Ratio)
S-4	3/4/99	Unsafe Access																				
S-4	3/13/99	ob- carbon transfer																				
S-4	3/28/99																					
S-4	3/29/99			30	30	<2	<2		<1	0.34			0.03	0.07			0.09	0.06		16		
S-4	4/4/99																					
S-4	4/11/99																					
S-4	4/25/99																					
S-4	4/27/99																0.04	0.03				
S-4	4/30/99																	0.02				
S-4	4/30/99	Duplicate																0.04				
S-4	5/1/99																	0.03				
S-4	5/2/99																	0.02				
S-4	5/3/99																	0.02				
S-4	5/4/99																	0.02				
S-4	5/5/99																	0.03				
S-4	5/6/99																	0.02				
S-4	5/7/99																					
S-4	5/11/99																	<0.01				
S-4	5/12/99																					
S-4	5/13/99			24.8	24.8	<1	<1		0.0					<0.1	49.2		0.05	0.04		1.3	140	
S-4	5/13/99	5/13/99															0.00	0.03				
S-4	5/17/99																					
S-4	5/21/99																	0.02				
S-4	5/23/99																					
S-4	5/26/99																					
S-4	5/30/99																	0.01				
S-4	6/2/99									0.13		0.13	<0.05				0.03	0.01				
S-4	6/6/99																					
S-4	6/7/99			18	18	<2	<2		<0.5	0.11			<0.01	<0.05	20		0.02	0.02		<5	60	
S-4	6/13/99																					
S-4	6/15/99										0.04			<0.1			0.01	<0.01				
S-4	6/15/99																					
S-4	6/20/99																					
S-4	6/22/99										0.07			<0.1			0.01	<0.01				
S-4	6/26/99																					
S-4	6/29/99										0.07			<0.1			0.015	0.013				
S-4	7/6/99										<0.02			<0.1			0.021	0.015				
S-4	7/13/99										0.09			<0.1			0.075	0.017				
S-4	7/13/99	Rerun															0.038	0.017				
S-4	7/13/99	Duplicate									0.00			<0.1			0.040	0.018				
S-4	7/13/99	Dup. Rerun															0.036	0.018				
S-4	7/14/99																					
S-4	7/19/99										0.13			<0.1			0.03	0.024				
S-4	7/19/99	Rerun															0.049					
S-4	7/20/99																					
S-4	7/28/99										0.18			<0.1			0.08	0.023				
S-4	8/3/99										0.2			<0.1			0.035	0.019				
S-4	8/3/99	Rerun															0.044	0.02				
S-4	8/5/99																					
S-4	8/9/99																					
S-4	8/9/99	Duplicate									0.19			<0.1			0.033	0.021				
S-4	8/10/99																					
S-4	8/16/99																					
S-4	8/19/99																					
S-4	8/23/99																					

Statistical Summary: Mean & Standard Deviation Using All Analyses

Mean			22.1	30.7	30	0.929	0.929	39.2	0.021	0.065	0.0003	0.0871	0.0069	0.0309	22.4	0.01	0.0145	0.0089	0.05	3.54	63.8	0.23
Std Dev			22.1	7.71	7.55	0.189	0.189	14.3	0.346	0.101	0.0032	0.0784	0.0056	0.0214	18.7	0.01	0.0189	0.0105	0.05	3.52	33.1	0.23
Mean + 2X Std Dev			66.3	46.12	45.1	1.307	1.307	67.8	1.313	0.267	0.2227	0.2330	0.0181	0.0737	59.0	0.03	0.0523	0.0299	0.15	10.58	130	0.69

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Sum of Anions (meq/l)	Cation & Anion Sum (meq/l)	Aluminum, D (mg/l)	Aluminum, TR (mg/l)	Arsenic, D (mg/l)	Arsenic, TR (mg/l)	Cadmium, D (mg/l)	Cadmium, TR (mg/l)	Calcium, D (mg/l)	Calcium, TR (mg/l)	Chromium, D (mg/l)	Chromium, TR (mg/l)	Copper, D (mg/l)	Copper, TR (mg/l)	Iron, D (mg/l)	Iron, TR (mg/l)	Lead, D (mg/l)
S-4	3/2/99	Unsafe Access																	
S-4	3/13/99	ob- carbon transfer																	
S-4	3/26/99																		
S-4	3/29/99						0.001	0.008	<0.003	0.004					<0.01	0.01			<0.04
S-4	4/4/99																		
S-4	4/11/99																		
S-4	4/25/99																		
S-4	4/27/99																		
S-4	4/30/99																		
S-4	4/30/99	Duplicate																	
S-4	5/1/99																		
S-4	5/2/99																		
S-4	5/3/99																		
S-4	5/4/99																		
S-4	5/5/99																		
S-4	5/6/99																		
S-4	5/7/99																		
S-4	5/11/99																		
S-4	5/12/99																		
S-4	5/13/99		1.53	1.38			0.002		<0.0004		<0.0004	22.9			<0.003	0.003			<0.001
S-4	5/13/99	5/13/99																	
S-4	5/17/99																		
S-4	5/21/99																		
S-4	5/23/99																		
S-4	5/26/99																		
S-4	5/30/99																		
S-4	6/2/99																		
S-4	6/6/99																		
S-4	6/7/99						<0.001	0.002	<0.0005	<0.0005	14.7	12.2			<0.01	<0.01			<0.001
S-4	6/13/99																		
S-4	6/15/99																		
S-4	6/16/99																		
S-4	6/20/99																		
S-4	6/22/99																		
S-4	6/26/99																		
S-4	6/29/99																		
S-4	7/6/99																		
S-4	7/13/99																		
S-4	7/13/99	Rerun																	
S-4	7/13/99	Duplicate																	
S-4	7/13/99	Dup. Rerun																	
S-4	7/14/99																		
S-4	7/19/99																		
S-4	7/19/99	Rerun																	
S-4	7/20/99																		
S-4	7/25/99																		
S-4	8/3/99																		
S-4	8/3/99	Rerun																	
S-4	8/5/99																		
S-4	8/8/99																		
S-4	8/9/99	Duplicate																	
S-4	8/10/99																		
S-4	8/10/99																		
S-4	8/19/99																		
S-4	8/23/99																		

Statistical Summary: Mean & Standard Deviation Using All A

Mean			1.53	1.38	0.06	0.1	0.0015	0.0022	0.00075	0.0017	12.9	17.5	0.005	0.005	0.0026	0.0038	0.0257	0.155	0.002
Std Dev			1.53	1.38	0.06	0.1	0.00081	0.0014	0.001	0.0017	6.79	4.47	0.005	0.005	0.0024	0.0033	0.0095	0.142	0.0038
Mean + 2X Std Dev			4.59	4.14	0.18	0.3	0.00312	0.005	0.00278	0.0051	26.48	26.44	0.015	0.015	0.0074	0.0104	0.0440	0.439	0.0092

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Hecla Mining Company
Grouse Creek Unit

Water Quality Monitoring Data
Site S-4

Report Date: 9/7/99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Lead, TR (mg/l)	Magnesium, D (mg/l)	Magnesium, TR (mg/l)	Manganese, D (mg/l)	Manganese, TR (mg/l)	Mercury, D (mg/l)	Mercury, TR (mg/l)	Nickel, D (mg/l)	Nickel, TR (mg/l)	Potassium, D (mg/l)	Potassium, TR (mg/l)	Selenium, D (mg/l)	Selenium, TR (mg/l)	Silver, D (mg/l)	Silver, TR (mg/l)	Silica, D (mg/l)	Silica, T (mg/l)
S-4	2/2/99	Unsafe Access																	
S-4	3/13/99	ob- carbon transfer																	
S-4	3/28/99																		
S-4	3/29/99		<0.04					<0.0002	<0.0002					0.002	0.001	<0.005	<0.005		
S-4	4/4/99																		
S-4	4/11/99																		
S-4	4/25/99																		
S-4	4/27/99																		
S-4	4/30/99																		
S-4	4/30/99	Duplicate																	
S-4	5/1/99																		
S-4	5/2/99																		
S-4	5/3/99																		
S-4	5/4/99																		
S-4	5/5/99																		
S-4	5/6/99																		
S-4	5/7/99																		
S-4	5/11/99																		
S-4	5/12/99																		
S-4	5/13/99		<0.001		1.71			<0.0002	<0.0002				<1.7	<0.002	<0.002		<0.0004		
S-4	5/13/99	5/13/99																	
S-4	5/17/99																		
S-4	5/21/99																		
S-4	5/23/99																		
S-4	5/26/99																		
S-4	5/30/99																		
S-4	6/2/99																		
S-4	6/6/99																		
S-4	6/7/99		<0.001	1.4	1			<0.0002	<0.0002			0.7	0.7	<0.001	<0.001	<0.0005	<0.0005		
S-4	6/13/99																		
S-4	6/15/99																		
S-4	6/16/99																		
S-4	6/20/99																		
S-4	6/22/99																		
S-4	6/26/99																		
S-4	6/28/99																		
S-4	7/8/99																		
S-4	7/13/99																		
S-4	7/13/99	Rerun																	
S-4	7/13/99	Duplicate																	
S-4	7/13/99	Dup. Rerun																	
S-4	7/14/99																		
S-4	7/19/99																		
S-4	7/19/99	Rerun																	
S-4	7/20/99																		
S-4	7/28/99																		
S-4	8/3/99																		
S-4	8/3/99	Rerun																	
S-4	8/5/99																		
S-4	8/9/99																		
S-4	8/9/99	Duplicate																	
S-4	8/10/99																		
S-4	8/16/99																		
S-4	8/19/99																		
S-4	8/23/99																		

Statistical Summary: Mean & Standard Deviation Using All A

Mean			0.005	1.48	1.54	0.016	0.015	0.00011	0.00016	0.005	0.005	0.7	0.817	0.0016	0.0023	0.0012	0.0014	12.2	11.9
Std Dev			0.0056	0.887	0.474	0.016	0.015	0.00015	0.00017	0.005	0.005	0	0.104	0.0011	0.0023	0.0014	0.0012	12.2	11.9
Mean + 2X Std Dev			0.0162	2.854	2.488	0.048	0.045	0.00041	0.0005	0.015	0.015	0.7	1.025	0.0038	0.0068	0.004	0.0038	38.6	35.7

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Sodium, D (mg/l)	Sodium, TR (mg/l)	Zinc, D (mg/l)	Zinc, TR (mg/l)	Temperature (Cent)	Conductivity @ 25 C (micromho)	Conductivity, Field (micromho)	pH, Lab (su)	pH, Field (su)	Turbidity, Lab (NTU)	Turbidity, Fld (NTU)	DO, Field (mg/l)	Staff Gage Height (feet)	Flow (gpm)	Flow (cfs)
S-4	2/1/99	Unsafe Access															
S-4	3/13/99	ob- carbon transfer															
S-4	3/28/99						0.07		180		7						
S-4	3/29/99				0.01	0.02	3.2	224	210	6.5	6.55	6.5	3.88	7.7			
S-4	4/4/99								190		7.05						
S-4	4/11/99						2.7		220		7.33						
S-4	4/25/99						5.1		200		6.81						
S-4	4/27/99																
S-4	4/30/99						10.4		180		9.2						
S-4	4/30/99	Duplicate															
S-4	5/1/99						4.2		130		7.29				7.75		
S-4	5/2/99						3.7		120		7.99				7.75		
S-4	5/3/99						10.8		150		8.11						
S-4	5/4/99														7.6		
S-4	5/5/99																
S-4	5/6/99																
S-4	5/7/99						3.2		120		7.4			5.9	7.75		
S-4	5/11/99														7.7		
S-4	5/12/99						5		120		7.86			3.8	7.75		
S-4	5/13/99			2.25	0.013	0.019	3	161	140	7.63	7.7	2.46	3.4	3.7	7.72		
S-4	5/13/99	5/13/99															
S-4	5/17/99						1		150		7.2			3.5	7.55		
S-4	5/21/99						2		100		7.6			2.9	8.05		
S-4	5/23/99						5.4		100		7.59						
S-4	5/26/99						2		70		8.4			2.8	8.75		
S-4	5/30/99						8.3		70		7.17						
S-4	6/2/99						3		70		8.1						
S-4	6/6/99						9.8		80		7.53						
S-4	6/7/99		2.8	1.6	0.01	0.02	4.8	100	80	6.4	8.1	3.6		13.6			
S-4	6/13/99						4.8		80		7.67						
S-4	6/15/99						3.7		40		7.6			16.7			
S-4	6/16/99																
S-4	6/20/99						6.7		60		6.95						
S-4	6/22/99						4.6		40		8		4.5	16.6			
S-4	6/26/99						7.2		50		7.43						
S-4	6/29/99						5.1		50		8		2.7	14.8			
S-4	7/8/99						14.8		40		8		2.4	16.7	7.84		
S-4	7/13/99						7.4		60		8.2		2		0.82		
S-4	7/13/99	Rerun															
S-4	7/13/99	Duplicate					7.4		60		8.2						
S-4	7/13/99	Dup. Rerun															
S-4	7/14/99														0.78	13164.27	29.3321
S-4	7/19/99						7.4		80		8		1.9	14.3	0.6		
S-4	7/19/99	Rerun															
S-4	7/20/99														0.58	8051	17.94
S-4	7/28/99						8		70		7.44		4.6	15.2	0.42	4851	10.81
S-4	8/3/99						9.6		110		7.87		3.6	18			
S-4	8/3/99	Rerun															
S-4	8/5/99														0.36	5226	11.65
S-4	8/9/99						8.9		120		7.76		2.4	20	0.28		
S-4	8/9/99	Duplicate															
S-4	8/10/99														0.28	4178	9.31
S-4	8/16/99						7		140		7.73		1.9	29.7	0.25		
S-4	8/19/99														0.14	5874	13.09
S-4	9/23/99						9.7		140		7.88		2	22.7	0.2		

Statistical Summary: Mean & Standard Deviation Using All A

Mean			3.4	2.58	0.0062	0.0168	6.22	89.6	105	7.02	7.18	1.99	4.10	11.5	4.13	8396	10.2
Std Dev			0.707	0.903	0.0048	0.0155	4.92	37.1	43.3	0.89	7.12	2.49	4.31	5.7	3.8	12674.4	28.1
Mean + 2X Std Dev			4.814	4.566	0.0154	0.0476	16.06	163.8	192.6	8.45	6.66	8.97	12.78	22.9	11.73	33744.8	75.4

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Hecla Mining Company
Grouse Creek Unit

Water Quality Monitoring Data
Site S-5

Report Date: 9/7/99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	()	Alkalinity (mg/l)	Bicarbonate (mg/l)	Carbonate (mg/l)	Hydroxide (mg/l)	Hardness (mg/l)	Chloride (mg/l)	Nitrate + Nitrite, D (mg/l)	Nitrate + Nitrite, T (mg/l)	Nitrate, D (mg/l)	Nitrite, D (mg/l)	Ammonia (mg/l)	Sulfate (mg/l)	Sulfide (mg/l)
S-5	5/4/99															
S-5	5/5/99															
S-5	5/6/99															
S-5	5/7/99															
S-5	5/12/99															
S-5	5/13/99			28.5	28.5	<1	<1		0.7					<0.1	37.9	
S-5	5/13/99	5/13/99														
S-5	5/17/99															
S-5	5/21/99															
S-5	5/23/99															
S-5	5/26/99															
S-5	5/30/99															
S-5	6/2/99									0.09		0.09	<0.05			
S-5	6/6/99															
S-5	6/7/99			21	21	<2	<2		<0.5	0.09			<0.01	<0.05	20	
S-5	6/13/99															
S-5	6/15/99										0.04			<0.1		
S-5	6/16/99															
S-5	6/20/99															
S-5	6/22/99										0.06			<0.1		
S-5	6/26/99															
S-5	6/29/99										0.04			<0.1		
S-5	7/8/99										<0.02			<0.1		
S-5	7/13/99										0.04			<0.1		
S-5	7/13/99	Rerun														
S-5	7/14/99															
S-5	7/19/99										0.06			<0.1		
S-5	7/19/99	Rerun														
S-5	7/20/99															
S-5	7/28/99										<0.02			<0.1		
S-5	8/3/99										0.08			<0.1		
S-5	8/3/99	Rerun														
S-5	8/5/99															
S-5	8/9/99										0.08			<0.1		
S-5	8/10/99															
S-5	8/16/99															
S-5	8/19/99															
S-5	8/23/99															

Statistical Summary: Mean & Standard Deviation Using All Analyses

Mean			28.1	33.1	31.6	0.929	0.929	39.9	0.763	0.05	0.0467	0.224	0.0077	0.0317	18.1	0.01
Std Dev			28.1	8.87	8.83	0.189	0.189	13.4	0.62	0.0752	0.026	1.2	0.0061	0.0209	14.5	0.01
Mean + 2X Std Dev			84.3	50.84	49.26	1.307	1.307	66.7	2.003	0.2004	0.0987	2.624	0.0199	0.0735	47.1	0.03

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Site Number	Sample Date	Duplicate/ Rerun/No Sample	CN, Total (mg/l)	CN, WAD (mg/l)	TSS (mg/l)	TDS (mg/l)	Sum of Anions (meq/l)	Cation & Anion Sum (meq/l)	Arsenic, D (mg/l)	Arsenic, TR (mg/l)	Cadmium, D (mg/l)	Cadmium, TR (mg/l)	Calcium, D (mg/l)	Calcium, TR (mg/l)	Copper, D (mg/l)
S-5	8/2/98			0.02											
S-5	5/5/99			0.02											
S-5	5/6/99			0.02											
S-5	5/7/99														
S-5	5/12/99														
S-5	5/13/99		0.12	0.01	3.2	118	1.38	1.28	<0.001		<0.0004		<0.0004	20.4	<0.003
S-5	5/13/99	5/13/99	0.04	0.03											
S-5	5/17/99														
S-5	5/21/99														
S-5	5/23/99			<0.01											
S-5	5/26/99														
S-5	5/30/99														
S-5	6/2/99		0.02	0.01											
S-5	6/6/99														
S-5	6/7/99		0.01	0.01	<5	60			<0.001	0.002	<0.0005	<0.0005	13.8	12.1	<0.01
S-5	6/13/99														
S-5	6/15/99		<0.01	<0.01											
S-5	6/16/99														
S-5	6/20/99														
S-5	6/22/99		0.01	<0.01											
S-5	6/26/99														
S-5	6/29/99		0.01	0.009											
S-5	7/8/99		0.02	0.012											
S-5	7/13/99		0.052	0.014											
S-5	7/13/99	Rerun	0.028	0.014											
S-5	7/14/99														
S-5	7/19/99		0.039	0.021											
S-5	7/19/99	Rerun	0.038												
S-5	7/20/99														
S-5	7/28/99		0.042	0.016											
S-5	8/3/99		0.029	0.016											
S-5	8/3/99	Rerun	0.029	0.011											
S-5	8/5/99														
S-5	8/9/99		0.026	0.014											
S-5	8/10/99														
S-5	8/16/99														
S-5	8/19/99														
S-5	8/23/99														

Statistical Summary: Mean & Standard Deviation Using All Anal

Mean			0.0129	0.0074	3.31	63.2	1.38	1.28	0.0015	0.002	0.00092	0.0015	12.8	17.2	0.0028
Std Dev			0.0196	0.0085	3.32	32.4	1.38	1.28	0.001	0.0015	0.0015	0.0013	6.73	4.49	0.0022
Mean + 2X Std Dev			0.0521	0.0244	9.95	128	4.14	3.84	0.0035	0.005	0.00392	0.0041	26.26	26.18	0.007

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Water Quality Monitoring Data
Site S-5

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Copper, TR (mg/l)	Iron, D (mg/l)	Iron, TR (mg/l)	Lead, D (mg/l)	Lead, TR (mg/l)	Magnesium, D (mg/l)	Magnesium, TR (mg/l)	Mercury, D (mg/l)	Mercury, TR (mg/l)	Potassium, D (mg/l)	Potassium, TR (mg/l)	Selenium, D (mg/l)
S-5	5/2/99													
S-5	5/5/99													
S-5	5/6/99													
S-5	5/7/99													
S-5	5/12/99													
S-5	5/13/99		<0.003			<0.001	<0.001		1.83	<0.0002	<0.0002		<1.7	<0.002
S-5	5/13/99	5/13/99												
S-5	5/17/99													
S-5	5/21/99													
S-5	5/23/99													
S-5	5/26/99													
S-5	5/30/99													
S-5	6/2/99													
S-5	6/6/99													
S-5	6/7/99		<0.01			<0.001	<0.001	1.3	1.2	<0.0002	<0.0002	0.7	0.7	<0.001
S-5	6/13/99													
S-5	6/15/99													
S-5	6/16/99													
S-5	6/20/99													
S-5	6/22/99													
S-5	6/26/99													
S-5	6/29/99													
S-5	7/8/99													
S-5	7/13/99													
S-5	7/13/99	Rerun												
S-5	7/14/99													
S-5	7/19/99													
S-5	7/19/99	Rerun												
S-5	7/20/99													
S-5	7/28/99													
S-5	8/3/99													
S-5	8/3/99	Rerun												
S-5	8/5/99													
S-5	8/9/99													
S-5	8/10/99													
S-5	8/16/99													
S-5	8/19/99													
S-5	8/23/99													

Statistical Summary: Mean & Standard Deviation Using All Anal

Mean			0.0039	0.0275	0.107	0.0019	0.0033	1.57	1.78	0.00011	0.00015	0.7	0.775	0.0015
Std Dev			0.0028	0.0159	0.104	0.0033	0.0037	0.76	0.552	0.00012	0.00018	0.7	0.106	0.00093
Mean + 2X Std Dev			0.0095	0.0593	0.315	0.0085	0.0107	3.09	2.884	0.00035	0.00051	2.1	0.987	0.00336

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Hecla Mining Company
Grouse Creek Unit

Water Quality Monitoring Data
Site S-5

Report Date: 9/7/99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Selenium, TR (mg/l)	Silver, D (mg/l)	Silver, TR (mg/l)	Sodium, D (mg/l)	Sodium, TR (mg/l)	Zinc, D (mg/l)	Zinc, TR (mg/l)	Temperature (Cent)	Conductivity @ 25 C (micromho)	Conductivity, Field (micromho)	pH, Lab (su)	pH, Field (su)
S-5	8/2/89													
S-5	5/5/99													
S-5	5/6/99													
S-5	5/7/99									3.2		100		7.46
S-5	5/12/99									6		120		7.97
S-5	5/13/99		0.002		<0.0004		2.61	0.006	0.013	4	143	110	7.91	7.8
S-5	5/13/99	5/13/99												
S-5	5/17/99									1		130		7.3
S-5	5/21/99									3		90		7.8
S-5	5/23/99									6		100		7.62
S-5	5/26/99									3		70		8.6
S-5	5/30/99									8.1		70		7.19
S-5	6/2/99									4		60		7.8
S-5	6/6/99									9.1		70		7.55
S-5	6/7/99		<0.001	<0.0005	<0.0005	2.9	2.1	<0.01	0.01	5.4	93	70	6.4	8.2
S-5	6/13/99									6		60		7.58
S-5	6/15/99									4		40		7.7
S-5	6/16/99													
S-5	6/20/99									7.1		60		6.96
S-5	6/22/99									4.7		40		8.1
S-5	6/26/99									7.7		50		7.47
S-5	6/29/99									5.3		50		8.3
S-5	7/8/99									20.6		40		8.3
S-5	7/13/99									9.5		60		8.3
S-5	7/13/99	Rerun												
S-5	7/14/99													
S-5	7/19/99									7.2		80		8.3
S-5	7/19/99	Rerun												
S-5	7/20/99													
S-5	7/28/99									7.9		20		7.31
S-5	8/3/99									9.5		110		7.9
S-5	8/3/99	Rerun												
S-5	8/5/99													
S-5	8/9/99									8.6		110		7.77
S-5	8/10/99													
S-5	8/16/99									6.7		120		7.9
S-5	8/19/99													
S-5	8/23/99									9.3		130		7.44

Statistical Summary: Mean & Standard Deviation Using All Anal

Mean			0.0018	0.0014	0.0015	2.9	2.35	0.0058	0.0142	6.61	89.2	98.6	6.72	7.22
Std Dev			0.0013	0.0016	0.0014	2.9	0.361	0.0066	0.0149	5.03	32.1	38.8	6.28	7.19
Mean + 2X Std Dev			0.0044	0.0046	0.0043	8.7	3.072	0.019	0.044	16.67	153.4	176.2	5.91	8.72

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Water Quality Monitoring Data
Site S-5

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Turbidity, Lab (NTU)	Turbidity, Fld (NTU)	DO, Field (mg/l)	Staff Gage Height (feet)	Flow (gpm)	Flow (cfs)
S-5	5/3/99							
S-5	5/5/99							
S-5	5/6/99							
S-5	5/7/99				6.1	8.1		
S-5	5/12/99				3.6	8.05		
S-5	5/13/99		1.58	2.5	3.3	8.05		
S-5	5/13/99	5/13/99						
S-5	5/17/99				3.5	7.925		
S-5	5/21/99				2.9	8.25		
S-5	5/23/99							
S-5	5/26/99				2.8			
S-5	5/30/99							
S-5	6/2/99							
S-5	6/6/99							
S-5	6/7/99		2.6		15.7			
S-5	6/13/99							
S-5	6/15/99				16.8			
S-5	6/18/99							
S-5	6/20/99							
S-5	6/22/99			4.5	17.2			
S-5	6/26/99							
S-5	6/29/99			2.2	15.8			
S-5	7/8/99			2.2	12.5	0.98		
S-5	7/13/99			1.6		0.88		
S-5	7/13/99	Rerun						
S-5	7/14/99					0.82	16641	37.08
S-5	7/19/99			1.8	15	0.7		
S-5	7/19/99	Rerun						
S-5	7/20/99					0.7	11327	25.24
S-5	7/28/99			1.3	15.6	0.56	7678	17.11
S-5	8/3/99			1.2	17.9			
S-5	8/3/99	Rerun						
S-5	8/5/99					0.5	8132	18.12
S-5	8/9/99			1.1	21.2	0.46		
S-5	8/10/99					0.46	6388	14.19
S-5	8/16/99			1.1	30.9	0.42		
S-5	8/19/99						14920.89	33.2461
S-5	8/23/99			1.1	23	0.38		

Statistical Summary: Mean & Standard Deviation Using All Anal

Mean			1.98	3.41	12.3	2.95	9641.2	21.5
Std Dev			2.51	4.03	5.84	3.57	13781.3	30.7
Mean + 2X Std Dev			7	11.47	23.98	10.09	37163.8	82.9

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Hecla Mining Company
Grouse Creek Unit

Water Quality Monitoring Data
Site S-6

Report Date: 9/7/99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	()	Alkalinity (mg/l)	Bicarbonate (mg/l)	Carbonate (mg/l)	Hydroxide (mg/l)	Hardness (mg/l)	Chloride (mg/l)	Nitrate + Nitrite, D (mg/l)	Nitrate, D (mg/l)	Nitrite, D (mg/l)	Ammonia (mg/l)	Sulfate (mg/l)
S-6	6/25/97													
S-6	8/23/97			30.2				34.9	<1		<0.1		<0.04	
S-6	10/1/97													
S-6	10/13/97			33	33	1	1	38	0.25	0.01	0.01	0.005	0.025	22.9
S-6	12/18/97			32.9				35.5	<1		<0.1		<0.04	
S-6	1/28/98													
S-6	5/26/98			20	20	<2	<2	20	<1	<0.02			0.06	
S-6	6/18/98			20	20				1	<0.02	<0.02	<0.01	<0.05	
S-6	7/1/98													
S-6	8/6/98													
S-6	8/19/98			28.7				31.6	<1		<0.1		<0.04	
S-6	8/25/98													
S-6	10/21/98			35	35	<2	<2	38	<1	<0.02	<0.02	<0.01	<0.05	
S-6	10/22/98													
S-6	12/2/98													
S-6	3/29/99	Unsafe Access												
S-6	6/7/99			18	18	<2	<2		<0.5	0.03		<0.01	0.07	<10
S-6	6/15/99													
S-6	7/14/99													
S-6	7/19/99													
S-6	7/20/99													
S-6	7/28/99													
S-6	8/5/99													
S-6	8/9/99													
S-6	8/10/99													
S-6	8/16/99													
S-6	8/19/99													
S-6	8/23/99													

Statistical Summary: Mean & Standard Deviation Using All Analyses

Mean			0	27.6	28.2	70.8	0.837	28.3	0.489	0.0129	0.04	0.0053	0.0245	13.9
Std Dev			0	6.8	6.76	171.1	0.4	9.19	0.154	0.0073	0.0373	0.0011	0.0125	12.7
Mean + 2X Std Dev			0	41.2	41.72	413	1.637	46.68	0.797	0.0275	0.1146	0.0075	0.0495	39.3

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Water Quality Monitoring Data
Site S-6

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Sulfide (mg/l)	CN, Total (mg/l)	CN, WAD (mg/l)	TSS (mg/l)	TDS (mg/l)	Arsenic, D (mg/l)	Arsenic, TR (mg/l)	Cadmium, D (mg/l)	Cadmium, TR (mg/l)	Calcium, D (mg/l)	Calcium, TR (mg/l)
S-6	6/25/97												
S-6	8/23/97			<0.005	<0.005	<2		<0.005	<0.005	<0.005	<0.005		
S-6	10/1/97												
S-6	10/13/97		0.01			3	60	0.0005	0.0005			13.9	13.2
S-6	12/18/97			<0.005	<0.005	<2		<0.005	<0.005	<0.005	<0.005		
S-6	1/28/98												
S-6	5/26/98			<0.01	<0.01	<5		<0.001	0.001	<0.0005	<0.0005	7.2	
S-6	6/18/98			<0.002	<0.002	<2		<0.001	<0.001	<0.0001	<0.0001		
S-6	7/1/98												
S-6	8/6/98												
S-6	8/19/98			<0.005	<0.005	<2		<0.005	<0.005	<0.005	<0.005		
S-6	8/25/98												
S-6	10/21/98				<0.01	<5		<0.001	0.001	<0.0005	<0.0005	13.6	
S-6	10/22/98												
S-6	12/2/98			<0.01	<0.01								
S-6	3/29/99	Unsafe Access											
S-6	6/7/99			<0.01	<0.01	<5	30	<0.001	0.001	<0.0005	<0.0005	6.3	5
S-6	6/15/99												
S-6	7/14/99												
S-6	7/19/99												
S-6	7/20/99												
S-6	7/28/99												
S-6	8/5/99												
S-6	8/9/99												
S-6	8/10/99												
S-6	8/16/99												
S-6	8/19/99												
S-6	8/23/99												

Statistical Summary: Mean & Standard Deviation Using All Anal

Mean			0.01	0.0028	0.0028	1.61	43.8	0.0013	0.0021	0.00095	0.0014	9.28	9.1
Std Dev			0.01	0.0025	0.0019	1.53	20.3	0.00092	0.0016	0.0012	0.0012	4.13	5.8
Mean + 2X Std Dev			0.03	0.0078	0.0066	4.67	84.4	0.00314	0.0053	0.00335	0.0038	17.54	20.7

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Water Quality Monitoring Data
Site S-6

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Copper, D (mg/l)	Copper, TR (mg/l)	Iron, D (mg/l)	Iron, TR (mg/l)	Lead, D (mg/l)	Lead, TR (mg/l)	Magnesium, D (mg/l)	Magnesium, TR (mg/l)	Mercury, D (mg/l)	Mercury, TR (mg/l)
S-6	6/25/97											
S-6	8/23/97		<0.01	0.01	<0.05	<0.05	<0.005	<0.005			0.0002	0.0002
S-6	10/1/97											
S-6	10/13/97		0.005	0.005	0.005	0.01			0.9	0.9	0.0001	0.0001
S-6	12/18/97		<0.01	<0.01	<0.05	<0.05	<0.005	0.006			<0.0002	<0.0002
S-6	1/28/98											
S-6	5/26/98		<0.01	<0.01	0.01	0.07	<0.001	<0.001	0.4		<0.0002	<0.0002
S-6	6/18/98		<0.001	<0.001			0.001	0.001			<0.0001	<0.0001
S-6	7/1/98											
S-6	8/6/98											
S-6	8/19/98		<0.01	<0.01	<0.05	<0.05	<0.005	<0.005			<0.0002	<0.0002
S-6	8/25/98											
S-6	10/21/98		<0.01	<0.01	<0.01	<0.01	<0.001	<0.001	0.9		<0.0002	<0.0002
S-6	10/22/98											
S-6	12/2/98											
S-6	3/29/99	Unsafe Access										
S-6	6/7/99		<0.01	<0.01			<0.001	<0.001	0.6	0.3	<0.0002	<0.0002
S-6	6/15/99											
S-6	7/14/99											
S-6	7/19/99											
S-6	7/20/99											
S-6	7/28/99											
S-6	8/5/99											
S-6	8/9/99											
S-6	8/10/99											
S-6	8/16/99											
S-6	8/19/99											
S-6	8/23/99											

Statistical Summary: Mean & Standard Deviation Using All Anal

Mean			0.003	0.0047	0.022	0.0574	0.0013	0.0079	0.64	0.6	0.0001	0.00013
Std Dev			0.0025	0.0049	0.0111	0.0397	0.0011	0.0127	0.251	0.424	0.000099	0.000077
Mean + 2X Std Dev			0.008	0.0145	0.0442	0.1368	0.0035	0.0333	1.142	1.448	0.000298	0.000284

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Potassium, D (mg/l)	Potassium, TR (mg/l)	Selenium, D (mg/l)	Selenium, TR (mg/l)	Silver, D (mg/l)	Silver, TR (mg/l)	Sodium, D (mg/l)	Sodium, TR (mg/l)	Zinc, D (mg/l)	Zinc, TR (mg/l)
S-6	6/25/97											
S-6	8/23/97				<0.005	<0.005	<0.005	<0.005			<0.005	<0.005
S-6	10/1/97											
S-6	10/13/97				0.0005	0.0005	0.005	0.0025			0.005	0.02
S-6	12/18/97				<0.005	<0.005	<0.005	<0.005			<0.005	<0.005
S-6	1/28/98											
S-6	5/26/98				<0.001	<0.001	<0.005	<0.005			<0.01	<0.01
S-6	6/18/98				<0.001	<0.001	<0.0005	<0.0005			<0.01	0.02
S-6	7/1/98											
S-6	8/6/98											
S-6	8/19/98				<0.005	<0.005	<0.005	<0.005			<0.005	0.006
S-6	8/25/98											
S-6	10/21/98				<0.001	<0.001	<0.005	<0.005			<0.01	<0.01
S-6	10/22/98											
S-6	12/2/98											
S-6	3/29/99	Unsafe Access										
S-6	6/7/99		0.6	0.5	<0.001	<0.001	<0.0005	<0.0005	1.8	0.9	<0.01	<0.01
S-6	6/15/99											
S-6	7/14/99											
S-6	7/19/99											
S-6	7/20/99											
S-6	7/28/99											
S-6	8/5/99											
S-6	8/9/99											
S-6	8/10/99											
S-6	8/16/99											
S-6	8/19/99											
S-6	8/23/99											

Statistical Summary: Mean & Standard Deviation Using All Anal

Mean			0.6	0.5	0.0016	0.0019	0.0041	0.0018	1.8	0.9	0.006	0.0186
Std Dev			0.6	0.5	0.0012	0.0016	0.0143	0.002	1.8	0.9	0.0057	0.0149
Mean + 2X Std Dev			1.8	1.5	0.004	0.0051	0.0327	0.0058	5.4	2.7	0.0174	0.0484

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Hecla Mining Company
Grouse Creek Unit

Water Quality Monitoring Data
Site S-6

Report Date: 9/7/99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Temperature (Cent)	Conductivity @ 25 C (micromho)	Conductivity, Field (micromho)	pH, Lab (su)	pH, Field (su)	Turbidity, Lab (NTU)	Turbidity, Fld (NTU)	DO, Field (mg/l)
S-6	6/25/97									
S-6	8/23/97		11.7		70		7.8			
S-6	10/1/97									
S-6	10/13/97		2.8	82	50	6.6	7.4		1.27	12.3
S-6	12/18/97		<0.1		50				0.72	13.1
S-6	1/28/98		4.8		40		7.35			
S-6	5/26/98			41		6.1				
S-6	6/18/98			35		7		1.08		
S-6	7/1/98									
S-6	8/6/98				70		6.6			
S-6	8/19/98		8.2		70		7.58			
S-6	8/25/98									
S-6	10/21/98		5.5	90	90	6.7	6.7		2.32	
S-6	10/22/98									
S-6	12/2/98									
S-6	3/29/99	Unsafe Access								
S-6	6/7/99		4.5	38	30	6.4	7.9	1.6		14.5
S-6	6/15/99		6		20		7.8			14.9
S-6	7/14/99									
S-6	7/19/99									
S-6	7/20/99									
S-6	7/28/99									
S-6	8/5/99									
S-6	8/9/99									
S-6	8/10/99									
S-6	8/16/99									
S-6	8/19/99									
S-6	8/23/99									

Statistical Summary: Mean & Standard Deviation Using All Anal

Mean			4.52	68.8	58.7	6.92	7.20	1.08	1.74	10.4
Std Dev			3.21	21.7	24.9	6.80	7.06	1.09	1.44	3.07
Mean + 2X Std Dev			10.94	112.2	108.5	6.36	6.62	3.26	4.62	16.54

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Water Quality Monitoring Data
Site S-6

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Staff Gage Height (feet)	Flow (gpm)	Flow (cfs)
S-6	6/25/97			5924	13.2
S-6	8/23/97			825	1.84
S-6	10/1/97			969	2.16
S-6	10/13/97			971	2.1635
S-6	12/18/97				
S-6	1/28/98				
S-6	5/26/98				
S-6	6/18/98				
S-6	7/1/98			4035	8.99
S-6	8/6/98				
S-6	8/19/98				
S-6	8/25/98			772	1.72
S-6	10/21/98				
S-6	10/22/98			637	1.42
S-6	12/2/98				
S-6	3/29/99	Unsafe Access			
S-6	6/7/99				
S-6	6/15/99				
S-6	7/14/99		0.94	7845.05	17.48
S-6	7/19/99		0.74		
S-6	7/20/99		0.72	5560	12.39
S-6	7/28/99		0.58	3128	6.97
S-6	8/5/99		0.58	2701	6.02
S-6	8/9/99		0.5		
S-6	8/10/99		0.5	2688	5.99
S-6	8/16/99		0.48		
S-6	8/19/99		0.5	5443	12.13
S-6	8/23/99				

Statistical Summary: Mean & Standard Deviation Using All Anal

Mean			0.616	3829.8	8.53
Std Dev			0.155	5490.2	12.2
Mean + 2X Std Dev			0.926	14810.2	32.93

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Hecla Mining Company
Crouse Creek Unit

Water Quality Monitoring Data
Site S-7

Report Date: 9/7/99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	()	Alkalinity (mg/l)	Bicarbonate (mg/l)	Carbonate (mg/l)	Hydroxide (mg/l)	Hardness (mg/l)	Chloride (mg/l)	Nitrate + Nitrite, D (mg/l)	Nitrate, D (mg/l)	Nitrite, D (mg/l)	Ammonia (mg/l)	Sulfate (mg/l)	Sulfide (mg/l)	CN, Total (mg/l)
S-7	8/9/99	NO DATA														
S-7	8/18/99															
S-7	8/23/99	CALCULATIUON (GPM) .24														
Statistical Summary: Mean & Standard Deviation Using All Analyses																
Mean			12.2	17.2	17.4	1	1	19.6	0.477	0.011	0.0409	0.005	0.0297	5.73	0.01	0.004
Std Dev			12.2	5.24	4.92	0	0	8.58	0.131	0.0039	0.0552	0	0.0201	2.93	0	0.0054
Mean + 2X Std Dev		..	36.6	27.68	27.24	1	1	36.76	0.739	0.0188	0.1513	0.005	0.0699	11.59	0.01	0.0148

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Hecla Mining Company
Grouse Creek Unit

Water Quality Monitoring Data
Site S-7

Report Date: 9/7/99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	CN, WAD (mg/l)	Thiocyanate (mg/l)	TSS (mg/l)	TDS (mg/l)	SAR (Ratio)	Aluminum, D (mg/l)	Aluminum, TR (mg/l)	Arsenic, D (mg/l)	Arsenic, TR (mg/l)	Cadmium, D (mg/l)	Cadmium, TR (mg/l)	Calcium, D (mg/l)	Calcium, TR (mg/l)
S-7	5/8/99	NO DATA													
S-7	8/16/99														
S-7	8/23/99	CALCULATIUON (GPM) .24													

Statistical Summary: Mean & Standard Deviation Using All Analyses

Mean			0.0025	0.05	1.99	40.6	0.24	0.015	0.015	0.0016	0.0022	0.00092	0.0012	8.67	7.13
Std Dev			0.0014	0.05	2.03	13.5	0.24	0.015	0.015	0.00074	0.0017	0.0011	0.0013	2.98	3.24
Mean + 2X Std Dev			0.0053	0.15	6.05	67.6	0.72	0.045	0.045	0.00308	0.0056	0.00312	0.0038	12.63	13.61

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Hecla Mining Company
Grouse Creek Unit

Water Quality Monitoring Data
Site S-7

Report Date: 9/7/99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Chromium, D (mg/l)	Chromium, TR (mg/l)	Copper, D (mg/l)	Copper, TR (mg/l)	Iron, D (mg/l)	Iron, TR (mg/l)	Lead, D (mg/l)	Lead, TR (mg/l)	Magnesium, D (mg/l)	Magnesium, TR (mg/l)	Manganese, D (mg/l)	Manganese, TR (mg/l)
S-7	5/20/99	NO DATA												
S-7	8/16/99													
S-7	8/23/99	CALCULATIUON (GPM) .24												
Statistical Summary: Mean & Standard Deviation Using All Analyses														
Mean			0.005	0.005	0.0029	0.0038	0.0198	0.0846	0.0016	0.0045	0.4	0.4	0.0025	0.0025
Std Dev			0.005	0.005	0.0022	0.0028	0.0082	0.0714	0.002	0.0075	0.126	0.173	0.0025	0.0025
Mean + 2X Std Dev			0.015	0.015	0.0073	0.0094	0.038	0.2273	0.0056	0.0195	0.652	0.746	0.0075	0.0075

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Hecla Mining Company
Crouse Creek Unit

Water Quality Monitoring Data
Site S-7

Report Date: 9/7/99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Mercury, D (mg/l)	Mercury, TR (mg/l)	Nickel, D (mg/l)	Nickel, TR (mg/l)	Potassium, D (mg/l)	Potassium, TR (mg/l)	Selenium, D (mg/l)	Selenium, TR (mg/l)	Silver, D (mg/l)	Silver, TR (mg/l)	Silica, D (mg/l)	Silica, T (mg/l)	Sodium, D (mg/l)
S-7	5/26/99	NO DATA													
S-7	8/16/99														
S-7	8/23/99	CALCULATIUON (GPM) .24													

Statistical Summary: Mean & Standard Deviation Using All Analyses

Mean			0.00014	0.00012	0.005	0.005	0.5	0.45	0.0014	0.0016	0.0013	0.0016	12.2	12.3	2.5
Std Dev			0.00026	0.000071	0.005	0.005	0.141	0.0707	0.00098	0.001	0.0013	0.0013	12.2	12.3	0.424
Mean + 2X Std Dev			0.00066	0.000262	0.015	0.015	0.782	0.5914	0.00332	0.0036	0.0039	0.0042	36.6	36.9	3.348

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Hecla Mining Company
Grouse Creek Unit

Water Quality Monitoring Data
Site S-7

Report Date: 9/7/99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Sodium, TR (mg/l)	Zinc, D (mg/l)	Zinc, TR (mg/l)	Temperature (Cent)	Conductivity @ 25 C (micromho)	Conductivity, Field (micromho)	pH, Lab (su)	pH, Field (su)	Turbidity, Lab (NTU)	Turbidity, Fld (NTU)	DO, Field (mg/l)
S-7	5/26/99	NO DATA											
S-7	8/16/99												
S-7	8/23/99	CALCULATIUON (GPM) .24											

Statistical Summary: Mean & Standard Deviation Using All Analyses

Mean			2	0.0089	0.0181	4.58	53.3	41.5	6.72	7.14	1.1	2.61	11.3
Std Dev			0.89	0.0151	0.0204	3.08	20.2	24.1	6.72	7.05	1.26	2.31	3.13
Mean + 2X Std Dev			3.98	0.0391	0.0589	10.74	93.7	89.7	6.24	6.60	3.62	7.23	17.56

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Water Quality Monitoring Data
Site S-7

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Staff Gage Height (feet)	Flow (gpm)	Flow (cfs)
S-7	5/20/99	NO DATA			
S-7	8/18/99		0.28		
S-7	8/23/99	CALCULATIUON (GPM) .24			

Statistical Summary: Mean & Standard Deviation Using All Analyses

Mean			0.295	604.2	1.35
Std Dev			0.0495	981	2.14
Mean + 2X Std Dev			0.394	2526.2	5.63

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Hecla Mining Company
Grouse Creek Unit

Water Quality Monitoring Data
Site S-8

Report Date: 9/7/99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	()	Alkalinity (mg/l)	Bicarbonate (mg/l)	Carbonate (mg/l)	Hydroxide (mg/l)	Hardness (mg/l)	Chloride (mg/l)	Nitrate + Nitrite, D (mg/l)	Nitrate, D (mg/l)	Nitrite, D (mg/l)	Ammonia (mg/l)	Sulfate (mg/l)	Sulfide (mg/l)	CN, Total (mg/l)
Statistical Summary: Mean & Standard Deviation Using All Analyses																
Mean			2.14	20.8	20.8	1	1	21	0.508	0.0192	0.0355	0.005	0.0283	3.25	0.01	0.0029
Std Dev			2.14	5.76	5.76	0	0	8.3	0.151	0.0225	0.0261	6E-11	0.0195	3.32	0	0.002
Mean + 2X Std Dev			6.42	32.32	32.42	1	1	37.6	0.81	0.0642	0.0877	0.005	0.0673	9.89	0.01	0.0069

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Hecla Mining Company
Grouse Creek Unit

Water Quality Monitoring Data
Site S-8

Report Date: 7/99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	CN, WAD (mg/l)	Thiocyanate (mg/l)	TSS (mg/l)	TDS (mg/l)	SAR (Ratio)	Aluminum, D (mg/l)	Aluminum, TR (mg/l)	Arsenic, D (mg/l)	Arsenic, TR (mg/l)	Cadmium, D (mg/l)	Cadmium, TR (mg/l)	Calcium, D (mg/l)	Calcium, TR (mg/l)
S-8	5/25/89		<0.002		<2					0.004	0.004	<0.0001	<0.0001		
S-8	8/17/89		<0.002		2					0.002	0.003	<0.0001	<0.0001		
S-8	10/24/89		<0.002		4					0.002	0.002	<0.0001	<0.0001		
S-8	3/12/90		<0.002		<2					0.002	0.003	<0.0001	<0.0001		
S-8	5/31/90		<0.002		6					0.001	0.002	<0.0001	<0.0001		
S-8	8/29/90		<0.002		<2					0.002	0.002		0.0002		
S-8	10/24/90		0.002		6						0.002		0.0005		
S-8	3/28/91		<0.002		<2					<0.001	0.002	<0.0001	<0.0001		
S-8	6/17/91		<0.002		<2					0.001	0.001	<0.0001	<0.0001		
S-8	8/23/91		<0.002		<2					0.001	0.003	<0.0001	<0.0001		
S-8	9/15/91		<0.002		<2						0.003		<0.0002		
S-8	10/1/91														
S-8	12/30/91														
S-8	6/17/92		<0.005		<1	40				<0.002	<0.002	<0.0001	0.0036		
S-8	9/15/92		<0.005		1	58				<0.002	<0.002	<0.0001	<0.0001		
S-8	12/3/92		<0.01		<1	50				0.002	<0.002	<0.0001	0.0001		
S-8	5/27/93		<0.005		2	26				0.001	0.001	<0.0001	0.0004		
S-8	8/25/93		<0.005		2	52				<0.005	<0.005	<0.0005	<0.0005		
S-8	12/2/93		<0.005		1					<0.005	<0.005	<0.005	<0.005		
S-8	5/4/94		<0.005		<2						0.005		<0.005		
S-8	6/23/94		<0.005		<1						<0.005		<0.005		
S-8	8/10/94		<0.005		1						<0.005		<0.005		
S-8	5/25/95		<0.005		2						0.006		<0.005		
S-8	6/14/95		<0.005		1						<0.005		<0.005		
S-8	9/8/95		<0.005		<1						0.008		<0.005		
S-8	11/18/95		<0.005		<1								<0.005		
S-8	2/10/96														
S-8	6/25/96		<0.005		<1						0.008		<0.005		
S-8	8/20/96		<0.005		<1					<0.005	<0.005	<0.005	<0.005		
S-8	10/2/96		<0.01	<0.1	<5	50	0.25	<0.03	<0.03	0.002	0.002	<0.003	<0.003	9.6	8.8
S-8	11/19/96		<0.005							<0.005	<0.005	<0.005	<0.005		
S-8	3/24/97									<0.005		<0.005			
S-8	5/1/97									<0.005		<0.005			
S-8	6/24/97		<0.01		<5					0.001	0.001	<0.003	<0.003	3.7	
S-8	6/25/97														
S-8	8/24/97		<0.005		<2					<0.005	<0.005	<0.005	<0.005		
S-8	10/14/97				3	50				0.002	0.002			9.6	9.4
S-8	12/18/97									<0.005		<0.005			
S-8	7/20/98	NO DATA													
S-8	8/6/98														
S-8	8/19/98		<0.005		<2					<0.005	<0.005	<0.005	<0.005		
S-8	8/19/98	Duplicate	<0.005		<2						<0.005		<0.005		
S-8	10/1/98														
S-8	10/21/98		<0.01		<5					0.002	0.002	<0.0005	<0.0005	9.3	
S-8	3/29/99	Unsafe Access													
S-8	6/7/99	Unsafe Access													
S-8	7/13/99	No Data													
S-8	7/19/99														
S-8	7/28/99														
S-8	8/16/99														
S-8	8/23/99	CALCULATION (GPM) .32													

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Hecla Mining Company
Grouse Creek Unit

Water Quality Monitoring Data
Site S-8

Report Date: 5/7/99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Chromium, D (mg/l)	Chromium, TR (mg/l)	Copper, D (mg/l)	Copper, TR (mg/l)	Iron, D (mg/l)	Iron, TR (mg/l)	Lead, D (mg/l)	Lead, TR (mg/l)	Magnesium, D (mg/l)	Magnesium, TR (mg/l)	Manganese, D (mg/l)	Manganese, TR (mg/l)
S-8	5/25/89				<0.001	<0.001			<0.001	<0.001				
S-8	8/17/89				<0.001	0.01			<0.001	0.002				
S-8	10/24/89				<0.001	<0.001			<0.001	0.003				
S-8	3/12/90				<0.001	<0.001			<0.001	0.003				
S-8	5/31/90				<0.001	<0.001			<0.001	<0.001				
S-8	8/29/90				0.001	0.009			<0.001	0.004				
S-8	10/24/90					0.004				0.001				
S-8	3/28/91				<0.001	0.002			<0.001	0.001				
S-8	6/17/91				<0.001	<0.001			<0.001	<0.001				
S-8	8/23/91				<0.001	<0.001			0.002	0.054				
S-8	9/15/91					<0.002								
S-8	10/1/91													
S-8	12/30/91													
S-8	6/17/92				<0.001	<0.001			<0.001	0.002				
S-8	9/15/92				<0.001	0.001			0.001	<0.001				
S-8	12/3/92				0.002	0.004			0.001	0.001				
S-8	5/27/93				<0.001	<0.001	<0.05	0.14	0.001	0.003				
S-8	8/25/93				0.004	0.001			0.006	0.005				
S-8	12/2/93				<0.01	<0.01	<0.05	0.08	<0.001	0.004				
S-8	5/4/94					<0.01		0.07		<0.005				
S-8	6/23/94					<0.01		0.07		<0.005				
S-8	8/10/94					0.01		<0.05		0.007				
S-8	5/25/95					<0.01		0.14		<0.005				
S-8	8/14/95					<0.01		0.09		<0.005				
S-8	9/8/95					<0.01		<0.06		<0.005				
S-8	11/18/95					<0.01		<0.06		<0.005				
S-8	2/10/96													
S-8	6/25/96					0.01				<0.005				
S-8	8/20/96				<0.01	<0.01	<0.05	<0.05	<0.005	<0.005				
S-8	10/2/96		<0.01	<0.01	<0.01	<0.01	0.01	0.01	<0.02	<0.02	0.4	0.4	<0.005	<0.005
S-8	11/19/96				<0.01	<0.01	<0.05	0.44	<0.005	<0.005				
S-8	3/24/97				<0.01		<0.05		<0.005					
S-8	5/1/97				<0.01		<0.05		<0.005					
S-8	6/24/97				0.01	<0.01	<0.01	0.03		<0.04	<0.2			
S-8	6/25/97													
S-8	8/24/97				<0.1	<0.01	<0.05	<0.05	<0.005	0.025				
S-8	10/14/97				0.005	0.005	0.005	0.02			0.5	0.5		
S-8	12/18/97				<0.01		<0.05		<0.005					
S-8	7/20/98	NO DATA												
S-8	8/6/98													
S-8	8/10/98				<0.01	<0.01	<0.05	<0.05	<0.005	<0.005				
S-8	8/10/98	Duplicate				<0.01		<0.05		<0.005				
S-8	10/1/98													
S-8	10/21/98				<0.01	<0.01	<0.01	<0.01	<0.001	<0.001	0.4			
S-8	3/29/99	Unsafe Access												
S-8	6/7/99	Unsafe Access												
S-8	7/13/99	No Data												
S-8	7/19/99													
S-8	7/28/99													
S-8	8/16/99													
S-8	8/23/99	CALCULATION (GPM) .02												

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Hecla Mining Company
Grouse Creek Unit

Water Quality Monitoring Data
Site S-8

Report Date: 7/99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Mercury, D (mg/l)	Mercury, TR (mg/l)	Nickel, D (mg/l)	Nickel, TR (mg/l)	Potassium, D (mg/l)	Potassium, TR (mg/l)	Selenium, D (mg/l)	Selenium, TR (mg/l)	Silver, D (mg/l)	Silver, TR (mg/l)	Silica, D (mg/l)	Silica, T (mg/l)	Sodium, D (mg/l)
S-8	5/25/89		<0.0001	<0.001							<0.0001	<0.0001			
S-8	8/17/89		<0.0001	<0.0001							<0.0001	<0.0001			
S-8	10/24/89		<0.0001	<0.0001							<0.0001	0.0003			
S-8	3/12/90		<0.0001	0.0003					<0.001	<0.001	0.0003	0.0003			
S-8	5/31/90		<0.0001	<0.0001					<0.001	<0.001	0.0001	0.0001			
S-8	8/29/90		<0.0001	<0.0002					<0.001	<0.001	0.0005	<0.005			
S-8	10/24/90			<0.0002						0.001		<0.005			
S-8	3/28/91		<0.0001	<0.0001					<0.001	0.001	<0.0005	<0.005			
S-8	6/17/91		<0.0001	<0.0001					<0.001	0.001	<0.0005	<0.005			
S-8	8/23/91		<0.0001	<0.0001					<0.001	<0.001	<0.0005	<0.0005			
S-8	9/15/91			<0.0002						<0.002		<0.005			
S-8	10/1/91														
S-8	12/30/91														
S-8	6/17/92		<0.0002	<0.0002					<0.005	<0.005	<0.0005	<0.005			
S-8	9/15/92		0.0002	0.0002					<0.005	<0.005	<0.0005	<0.0005			
S-8	12/3/92		<0.0002	<0.0002					<0.002	<0.002	<0.0005	0.0016			
S-8	5/27/93		<0.0002	<0.0002					<0.002	<0.002	<0.0001	0.0003			
S-8	8/25/93		0.0003	0.0004					<0.005	<0.005	0.0009	0.001			
S-8	12/2/93		0.0006	<0.0005					<0.005	<0.005	<0.005	<0.005			
S-8	5/4/94			<0.0005						<0.005		<0.005			
S-8	6/23/94			<0.0005						<0.005		<0.005			
S-8	8/10/94			<0.0005						<0.005		<0.005			
S-8	5/25/95			<0.0002						<0.005		<0.005			
S-8	6/14/95			<0.0002						<0.005		0.01			
S-8	9/8/95			<0.0005						<0.005		<0.005			
S-8	11/18/95			<0.0005						<0.005		<0.005			
S-8	2/10/96														
S-8	6/25/96			<0.0002						<0.005		<0.005			
S-8	8/20/96		<0.0002	<0.0002					<0.005	<0.005	<0.006	<0.005			
S-8	10/2/96		<0.0002	<0.0002	<0.01	<0.01	0.4	0.6	<0.001	<0.001		<0.005	13.3	13.5	2.9
S-8	11/19/96		<0.0002	<0.0002					<0.005	0.003	<0.006	0.008			
S-8	3/24/97		<0.0002						<0.005		<0.006				
S-8	5/1/97		<0.0002						<0.005		<0.006				
S-8	6/24/97		<0.0002	<0.0002					<0.001	<0.001	0.006	<0.005			
S-8	8/25/97														
S-8	8/24/97		0.0002	<0.0002					<0.005	<0.005	<0.005	<0.005			
S-8	10/14/97		0.0001	0.0001					0.0005	0.0005	0.006	0.0025			
S-8	12/18/97		<0.0002						<0.005		<0.006				
S-8	7/20/98	NO DATA													
S-8	8/6/98														
S-8	8/19/98		<0.0002	<0.0002					<0.005	<0.005	<0.005	<0.005			
S-8	8/19/98	Duplicate		<0.0002						<0.005		<0.005			
S-8	10/1/98														
S-8	10/21/98		<0.0002	<0.0002					<0.001	<0.001	<0.005	<0.005			
S-8	3/29/99	Unsafe Access													
S-8	6/7/99	Unsafe Access													
S-8	7/13/99	No Data													
S-8	7/19/99														
S-8	7/28/99														
S-8	8/16/99														
S-8	8/23/99	CALCULATION (GPM) .32													

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Hecla Mining Company
Grouse Creek Unit

Water Quality Monitoring Data
Site S-8

Report Date: 8/7/99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Sodium, TR (mg/l)	Zinc, D (mg/l)	Zinc, TR (mg/l)	Temperature (Cent)	Conductivity @ 25 C (micromho)	Conductivity, Field (micromho)	pH, Lab (su)	pH, Field (su)	Turbidity, Lab (NTU)	Turbidity, Fld (NTU)	DO, Field (mg/l)
S-8	5/25/89			0.01	<0.01	0.8	23		6.7		1.7		
S-8	8/17/89			<0.01	0.02	5.8	70		6.7		0.3		
S-8	10/24/89			<0.01	0.02	2.7	83		7.4		0.3		
S-8	3/12/90			0.03	0.03	2.5			7	5.8	1.5		7.3
S-8	5/31/90			<0.01	<0.01	2.1	30		6.8	7.2	1.3		11.82
S-8	8/29/90			0.02	0.04	7.7		65	7.2	8	0.1		9.49
S-8	10/24/90				0.03			77		7.3			
S-8	3/28/91			0.02	0.03	2.9	82		7.3		0.2		
S-8	6/17/91			<0.01	<0.01	4.4	26	26	6.9	6.9	1.2		
S-8	8/23/91			<0.01	<0.01		53		7.2	7.5	0.14		
S-8	9/15/91				<0.02	7.8		53		7.2			
S-8	10/1/91												
S-8	12/30/91												
S-8	6/17/92			0.011	0.038	8.5		41	7.2	7.2	<0.05		
S-8	9/15/92			0.004	0.004	6.3	63		7.5		1.7		
S-8	12/3/92			0.005	0.008	<0.06	71		7.3		1.1		
S-8	5/27/93			0.019	0.027	3.8	24		6.9	9.6	2.7	3.02	
S-8	8/25/93			<0.005	<0.005	3.5	57.9		7.3	7.5	2.6	1.25	
S-8	12/2/93			<0.005	0.034		77		6.9	6.9			
S-8	5/4/94				0.007	1.7	44	68	7.4	7.8		1.34	
S-8	8/23/94				0.058	4.4	58	44	7.1	7.8		0.77	
S-8	8/10/94				0.014	8.8	61	67	7.3	7.6		1.38	
S-8	5/25/95				0.008	3.5		37		8		5.49	
S-8	6/14/95				0.013	3.5		23		8		3.66	
S-8	9/8/95				<0.005	8.5		55		7.8		0.3	
S-8	11/18/95				0.013	1.6		30		7.4		0.92	
S-8	2/10/96							70		7.4		2.15	
S-8	6/25/96							23		7.3			
S-8	8/20/96			<0.005		6.6		30		7.0		1.11	11.4
S-8	10/2/96		2.7	<0.01	0.02	2.5	65		6.2				
S-8	11/19/96			0.007	0.067	1.6		70		7.4		2.15	
S-8	3/24/97			<0.005									
S-8	5/1/97			<0.005									
S-8	6/24/97			0.01	<0.01	3.5	25	10	6.8	7.5			
S-8	6/25/97												
S-8	8/24/97			<0.005	<0.005	8.6		50		7.3			
S-8	10/14/97			0.005	0.02		66		6.6				
S-8	12/18/97			<0.005									
S-8	7/20/98	NO DATA											
S-8	8/6/98							50		6.6			
S-8	8/19/98			<0.005	<0.005	11.7		50		7.5			
S-8	8/19/98	Duplicate			<0.005								
S-8	10/1/98							60		7.0			
S-8	10/21/98			<0.01	<0.01		68	68	6.5	6.5		0.82	
S-8	3/29/99	Unsafe Access											
S-8	6/7/99	Unsafe Access											
S-8	7/13/99	No Data											
S-8	7/19/99												
S-8	7/28/99												
S-8	8/16/99												
S-8	8/23/99	CALCULATION (GPM) .32											

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Water Quality Monitoring Data
Site S-8

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Staff Gage Height (feet)	Flow (gpm)	Flow (cfs)
S-8	5/25/89			2306	5.14
S-8	8/17/89			71	0.16
S-8	10/24/89			58	0.13
S-8	3/12/90				
S-8	5/31/90			1929	4.3
S-8	8/29/90			89	0.2
S-8	10/24/90				
S-8	3/28/91				
S-8	6/17/91			3177	7.08
S-8	8/23/91				
S-8	9/15/91				
S-8	10/1/91			94	0.21
S-8	12/30/91			13	0.03
S-8	6/17/92				
S-8	9/15/92				
S-8	12/3/92				
S-8	5/27/93				
S-8	8/25/93				
S-8	12/2/93				
S-8	5/4/94				
S-8	6/23/94				
S-8	8/10/94				
S-8	5/25/95				
S-8	6/14/95				
S-8	9/8/95				
S-8	11/18/95				
S-8	2/10/96				
S-8	6/25/96			2145	4.78
S-8	8/20/96				
S-8	10/2/96			30	0.0668
S-8	11/19/96				
S-8	3/24/97				
S-8	5/1/97				
S-8	6/24/97				
S-8	6/25/97			296	0.66
S-8	8/24/97			31	0.07
S-8	10/14/97			10	0.0223
S-8	12/18/97				
S-8	7/20/98	NO DATA			
S-8	8/6/98				
S-8	8/19/98				
S-8	8/19/98	Duplicate			
S-8	10/1/98				
S-8	10/21/98				
S-8	3/29/99	Unsafe Access			
S-8	6/7/99	Unsafe Access			
S-8	7/13/99	No Data			
S-8	7/19/99		0.48		
S-8	7/28/99		0.44		
S-8	8/16/99		0.36		
S-8	8/23/99	CALCULATION (GPM) .32			

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Hecla Mining Company
Grouse Creek Unit

Water Quality Monitoring Data
Site S-9

Report Date: 9/7/99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	()	Alkalinity (mg/l)	Bicarbonate (mg/l)	Carbonate (mg/l)	Hydroxide (mg/l)	Hardness (mg/l)	Chloride (mg/l)	Nitrate + Nitrite, D (mg/l)	Nitrate, D (mg/l)	Nitrite, D (mg/l)	Ammonia (mg/l)	Sulfate (mg/l)	Sulfide (mg/l)	CN, Total (mg/l)	CN, WAD (mg/l)
S-9	8/19/98			27.1				17.3	<1		<0.1		<0.04			<0.005	<0.005
S-9	8/21/98																
S-9	8/27/98																
S-9	9/3/98																
S-9	9/10/98																
S-9	9/17/98																
S-9	9/24/98																
S-9	10/1/98																
S-9	10/15/98																
S-9	10/21/98			30	30	<2	<2	18	<1	<0.02	<0.02	<0.01	<0.05			<0.01	<0.01
S-9	10/31/98																
S-9	11/5/98																
S-9	11/12/98																
S-9	11/26/98	Unsafe Access															
S-9	3/29/99	Unsafe Access															
S-9	5/13/99			27	27	<1	<1		0.4				<0.1	2.9		0.17	<0.005
S-9	5/13/99	5/13/99														<0.005	<0.005
S-9	6/2/99															<0.01	<0.01
S-9	6/7/99			23	23	<2	<2		<0.5	<0.02		<0.01	0.11	<10		<0.01	<0.01
S-9	6/15/99																
S-9	6/29/99																
S-9	7/8/99																
S-9	7/14/99																
S-9	7/19/99																
S-9	7/20/99																
S-9	7/28/99																
S-9	8/5/99																
S-9	8/9/99																
S-9	8/10/99																
S-9	8/16/99																
S-9	8/19/99																
S-9	8/23/99																

Statistical Summary: Mean & Standard Deviation Using All Analyses

Mean			2.55	29.4	26.9	7.17	12.3	19	0.51	0.0123	0.0721	0.0053	0.0246	4.76	0.01	0.0064	0.0027
Std Dev			2.55	16	3.44	13.5	32.2	2.96	0.157	0.0083	0.205	0.0012	0.0152	3.42	0	0.0247	0.0014
Mean + 2X Std Dev			7.65	61.4	33.78	34.17	76.7	24.92	0.824	0.0289	0.4821	0.0077	0.055	11.6	0.01	0.0558	0.0055

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Hecla Mining Company
Crouse Creek Unit

Water Quality Monitoring Data
Site S-9

Report Date: 9/7/99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Thiocyanate (mg/l)	TSS (mg/l)	TDS (mg/l)	SAR (Ratio)	Sum of Anions (meq/l)	Cation & Anion Sum (meq/l)	Aluminum, D (mg/l)	Aluminum, TR (mg/l)	Arsenic, D (mg/l)	Arsenic, TR (mg/l)	Cadmium, D (mg/l)	Cadmium, TR (mg/l)
S-9	10/28/98			<2							<0.005	<0.005	<0.005	<0.005
S-9	8/21/98													
S-9	8/27/98													
S-9	9/3/98													
S-9	9/10/98													
S-9	9/17/98													
S-9	9/24/98													
S-9	10/1/98													
S-9	10/15/98													
S-9	10/21/98			<5							<0.001	<0.001	<0.0005	<0.0005
S-9	10/31/98													
S-9	11/5/98													
S-9	11/12/98													
S-9	11/26/98	Unsafe Access												
S-9	3/29/99	Unsafe Access												
S-9	5/13/99			0.8	38		0.61	0.56			0.001		<0.0004	
S-9	5/13/99	5/13/99												
S-9	6/2/99													
S-9	6/7/99			12	40						0.001	0.001	<0.0005	<0.0005
S-9	6/15/99													
S-9	6/29/99													
S-9	7/8/99													
S-9	7/14/99													
S-9	7/19/99													
S-9	7/20/99													
S-9	7/28/99													
S-9	8/5/99													
S-9	8/9/99													
S-9	8/10/99													
S-9	8/16/99													
S-9	8/19/99													
S-9	8/23/99													

Statistical Summary: Mean & Standard Deviation Using All An

Mean			0.05	4.25	73.8	0.57	0.61	0.56	0.05	0.12	0.0015	0.0019	0.00097	0.0015
Std Dev			0.05	5.16	65.4	0.57	0.61	0.56	0.05	0.12	0.0008	0.0011	0.0011	0.0014
Mean + 2X Std Dev			0.15	14.57	204.6	1.71	1.83	1.68	0.15	0.36	0.0031	0.0041	0.00317	0.0043

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Hecla Mining Company
Grouse Creek Unit

Water Quality Monitoring Data
Site S-9

Report Date: 9/7/99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Calcium, D (mg/l)	Calcium, TR (mg/l)	Chromium, D (mg/l)	Chromium, TR (mg/l)	Copper, D (mg/l)	Copper, TR (mg/l)	Iron, D (mg/l)	Iron, TR (mg/l)	Lead, D (mg/l)	Lead, TR (mg/l)	Magnesium, D (mg/l)	Magnesium, TR (mg/l)	Manganese, D (mg/l)
S-9	10/25/98						<0.01	<0.01	<0.05	0.86	<0.005	0.007			
S-9	8/21/98														
S-9	8/27/98														
S-9	9/3/98														
S-9	9/10/98														
S-9	9/17/98														
S-9	9/24/98														
S-9	10/1/98														
S-9	10/15/98														
S-9	10/21/98		5.9				<0.01	<0.01	<0.01	0.15	<0.001	<0.001	0.9		
S-9	10/31/98														
S-9	11/5/98														
S-9	11/12/98														
S-9	11/20/98	Unsafe Access													
S-9	3/29/99	Unsafe Access													
S-9	5/13/99		<0.0004	5.71			<0.003	<0.003			<0.001	<0.001		0.903	
S-9	5/13/99	5/13/99													
S-9	6/2/99														
S-9	6/7/99		4.9	4.8			<0.01	<0.01			<0.001	<0.001	0.8	0.8	
S-9	6/15/99														
S-9	6/29/99														
S-9	7/8/99														
S-9	7/14/99														
S-9	7/19/99														
S-9	7/20/99														
S-9	7/28/99														
S-9	8/5/99														
S-9	8/9/99														
S-9	8/10/99														
S-9	8/18/99														
S-9	8/19/99														
S-9	8/23/99														

Statistical Summary: Mean & Standard Deviation Using All An

Mean			4.93	5.58	0.005	0.005	0.0032	0.0044	0.0289	0.347	0.0017	0.0042	0.867	0.901	0.0025
Std Dev			2.26	0.686	0.005	0.005	0.0024	0.0034	0.0155	0.281	0.0019	0.0057	0.0816	0.0817	0.0025
Mean + 2X Std Dev			9.45	6.952	0.015	0.015	0.008	0.0112	0.0599	0.909	0.0055	0.0156	1.0302	1.0644	0.0075

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Hecla Mining Company
Grouse Creek Unit

Water Quality Monitoring Data
Site S-9

Report Date: 9/7/99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Manganese, TR (mg/l)	Mercury, D (mg/l)	Mercury, TR (mg/l)	Nickel, D (mg/l)	Nickel, TR (mg/l)	Potassium, D (mg/l)	Potassium, TR (mg/l)	Selenium, D (mg/l)	Selenium, TR (mg/l)	Silver, D (mg/l)	Silver, TR (mg/l)	Silica, D (mg/l)	Silica, T (mg/l)
S-9	10/28/98			<0.0002	<0.0002					<0.005	<0.005	<0.005	<0.005		
S-9	8/21/98														
S-9	8/27/98														
S-9	9/3/98														
S-9	9/10/98														
S-9	9/17/98														
S-9	9/24/98														
S-9	10/1/98														
S-9	10/15/98														
S-9	10/21/98			<0.0002	<0.0002					<0.001	<0.001	<0.005	<0.005		
S-9	10/31/98														
S-9	11/5/98														
S-9	11/12/98														
S-9	11/20/98	Unsafe Access													
S-9	3/29/99	Unsafe Access													
S-9	5/13/99			<0.0002	<0.0002				<1.7	<0.002	<0.002		<0.0004		
S-9	5/13/99	5/13/99													
S-9	6/2/99														
S-9	6/7/99			<0.0002	<0.0002			0.5	0.6	<0.001	<0.001	<0.0005	<0.0005		
S-9	6/15/99														
S-9	6/29/99														
S-9	7/8/99														
S-9	7/14/99														
S-9	7/19/99														
S-9	7/20/99														
S-9	7/28/99														
S-9	8/5/99														
S-9	8/9/99														
S-9	8/10/99														
S-9	8/16/99														
S-9	8/19/99														
S-9	8/23/99														

Statistical Summary: Mean & Standard Deviation Using All An

Mean			0.0025	0.0001	0.00014	0.005	0.005	0.5	0.717	0.0014	0.0017	0.0015	0.0017	27.9	27
Std Dev			0.0025	0.00008	0.0001	0.005	0.005	0	0.126	0.00094	0.0011	0.0014	0.0014	27.9	27
Mean + 2X Std Dev			0.0075	0.00026	0.00034	0.015	0.015	0.5	0.969	0.00328	0.0039	0.0043	0.0045	83.7	81

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Hecla Mining Company
Crouse Creek Unit

Water Quality Monitoring Data
Site S-9

Report Date: 9/7/99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Sodium, D (mg/l)	Sodium, TR (mg/l)	Zinc, D (mg/l)	Zinc, TR (mg/l)	Temperature (Cent)	Conductivity @ 25 C (micromho)	Conductivity, Field (micromho)	pH, Lab (su)	pH, Field (su)	Turbidity, Lab (NTU)	Turbidity, Fld (NTU)	DO, Field (mg/l)
S-9	18/18/98				<0.005	<0.005	8.6		60		7.5			
S-9	8/21/98						20.4		50		7.02			
S-9	8/27/98						12.2		50		7.09			
S-9	9/3/98						13.4		50		7.69			
S-9	9/10/98						15.7		50		7.25			
S-9	9/17/98						13.4		50		7.2			
S-9	9/24/98						13.6		50		7.85			
S-9	10/1/98						8.9		50		7.7			
S-9	10/15/98						4.1		60		7.68			
S-9	10/21/98				<0.01	<0.01		64	84	8.7	8.7		0.82	
S-9	10/31/98						0.1		50		8.9			
S-9	11/5/98						9.3		60		7.3			
S-9	11/12/98						14.3		70		7.46			
S-9	11/26/98	Unsafe Access												
S-9	3/29/99	Unsafe Access												
S-9	5/13/99			4.77	<0.003	<0.003	4	58	40	7.7	7.9	3.67	5.2	2.9
S-9	5/13/99	5/13/99												
S-9	6/2/99						4		30		7.9			
S-9	6/7/99		4.8	4.1	<0.01	<0.01	3.4	49	40	6.5	8.3	7.5		12.7
S-9	6/15/99						4		30		7.7			16.5
S-9	6/29/99													
S-9	7/8/99													
S-9	7/14/99													
S-9	7/19/99													
S-9	7/20/99													
S-9	7/28/99													
S-9	8/5/99													
S-9	8/9/99													
S-9	8/10/99													
S-9	8/16/99													
S-9	8/19/99													
S-9	8/23/99													

Statistical Summary: Mean & Standard Deviation Using All An

Mean			5.35	4.78	0.0046	0.0131	7.06	68.5	50.3	7.00	7.17	3.47	5.73	11.6
Std Dev			0.778	0.65	0.0039	0.0109	5.46	61.5	13.8	0.85	7.05	3.07	6	4.51
Mean + 2X Std Dev			6.906	6.08	0.0124	0.0349	17.98	191.5	77.9	8.42	6.81	9.61	17.73	20.62

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Water Quality Monitoring Data
Site S-9

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Staff Gage Height (feet)	Flow (gpm)	Flow (cfs)
S-9	18/21/98				
S-9	8/21/98				
S-9	8/27/98				
S-9	9/3/98				
S-9	9/10/98				
S-9	9/17/98				
S-9	9/24/98				
S-9	10/1/98				
S-9	10/15/98				
S-9	10/21/98				
S-9	10/31/98				
S-9	11/5/98				
S-9	11/12/98				
S-9	11/26/98	Unsafe Access			
S-9	3/29/99	Unsafe Access			
S-9	5/13/99				
S-9	5/13/99	5/13/99			
S-9	6/2/99				
S-9	6/7/99				
S-9	6/15/99				
S-9	6/29/99		5		
S-9	7/8/99		1.1		
S-9	7/14/99		0.82	74096	165.1
S-9	7/19/99		0.78		
S-9	7/20/99		0.74	55296	123.21
S-9	7/28/99		0.64	41334	92.1
S-9	8/5/99		0.6	34723	77.37
S-9	8/9/99		0.54		
S-9	8/10/99		0.5	30244	67.39
S-9	8/16/99		0.46		
S-9	8/19/99		0.46	67050	149.4
S-9	8/23/99		0.42		

Statistical Summary: Mean & Standard Deviation Using All An

Mean			1.01	50457.2	112.4
Std Dev			1.27	17871.2	39.8
Mean + 2X Std Dev			3.55	86199.6	192

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Hecla Mining Company
Grouse Creek Unit

Water Quality Monitoring Data
Site S-10

Report Date: 9/7/99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	()	Alkalinity (mg/l)	Bicarbonate (mg/l)	Carbonate (mg/l)	Hydroxide (mg/l)	Hardness (mg/l)	Chloride (mg/l)	Nitrate + Nitrite, D (mg/l)	Nitrate + Nitrite, T (mg/l)	Nitrate, D (mg/l)	Nitrite, D (mg/l)	Ammonia (mg/l)	Sulfate (mg/l)	Sulfide (mg/l)
S-10	8/19/98			30.7				25.1	<1			<0.1		<0.04		
S-10	8/21/98															
S-10	8/27/98															
S-10	9/3/98															
S-10	9/10/98															
S-10	9/17/98															
S-10	9/24/98															
S-10	10/1/98															
S-10	10/15/98															
S-10	10/21/98			34	34	<2	<2	27	<1	0.06		0.06	<0.01	<0.05		
S-10	10/31/98															
S-10	11/5/98															
S-10	11/12/98															
S-10	11/26/98															
S-10	3/29/99			34	34	<2	<2		<1	0.07			<0.01	<0.05		
S-10	5/13/99			30.8	30.8	<1	<1		0.6					<0.1	11.8	
S-10	5/13/99	5/13/99														
S-10	6/2/99									0.05		0.05	<0.05			
S-10	6/7/99			24	24	<2	<2		0.9	0.03			<0.01	<0.05	<10	
S-10	6/15/99										<0.02			<0.1		
S-10	6/22/99										0.03			<0.1		
S-10	6/29/99										<0.02			<0.1		
S-10	7/8/99										<0.02			<0.1		
S-10	7/13/99										0.02			<0.1		
S-10	7/13/99	Rerun														
S-10	7/14/99															
S-10	7/19/99										0.02			<0.1		
S-10	7/19/99	Rerun														
S-10	7/20/99															
S-10	7/28/99										<0.02			<0.1		
S-10	8/3/99										0.04			<0.1		
S-10	8/5/99															
S-10	8/9/99										<0.02			<0.1		
S-10	8/10/99															
S-10	8/16/99															
S-10	8/19/99															
S-10	8/23/99															

Statistical Summary: Mean & Standard Deviation Using All Analyses

Mean			12.8	29.4	28.7	105.3	0.938	25.6	0.609	0.0253	0.0178	0.0344	0.006	0.032	5.42	0.01
Std Dev			12.8	4.07	3.6	313	0.177	4.76	0.315	0.0213	0.0109	0.031	0.0045	0.0278	3.84	0
Mean + 2X Std Dev			38.4	37.54	35.9	731.3	1.282	35.12	1.239	0.0679	0.0396	0.0984	0.015	0.0876	12.7	0.01

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Site Number	Sample Date	Duplicate/ Rerun/No Sample	CN, Total (mg/l)	CN, WAD (mg/l)	Thiocyanate (mg/l)	TSS (mg/l)	TDS (mg/l)	SAR (Ratio)	Sum of Anions (meq/l)	Cation & Anion Sum (meq/l)	Aluminum, D (mg/l)	Aluminum, TR (mg/l)	Arsenic, D (mg/l)	Arsenic, TR (mg/l)	Cadmium, D (mg/l)
S-10	10/28/98		<0.005	<0.005		<2							<0.005	<0.005	<0.005
S-10	8/21/98														
S-10	8/27/98														
S-10	9/3/98														
S-10	9/10/98														
S-10	9/17/98														
S-10	9/24/98														
S-10	10/1/98														
S-10	10/15/98														
S-10	10/21/98		<0.01	<0.01		<5							0.001	0.001	<0.0005
S-10	10/31/98														
S-10	11/5/98														
S-10	11/12/98														
S-10	11/26/98														
S-10	3/29/99		<0.01	<0.01		<5							0.001	0.001	<0.003
S-10	5/13/99		0.06	<0.01		4.7	73		0.80	0.82			0.001		<0.0004
S-10	5/13/99	5/13/99	0.006	0.009											
S-10	6/2/99		<0.01	<0.01											
S-10	6/7/99		<0.01	<0.01		16	50						<0.001	0.001	<0.0005
S-10	6/15/99		<0.01	<0.01											
S-10	6/22/99		0.02	<0.01											
S-10	6/29/99		<0.005	<0.005											
S-10	7/8/99		0.011	0.008											
S-10	7/13/99		0.009	<0.005											
S-10	7/13/99	Rerun	0.005	<0.005											
S-10	7/14/99														
S-10	7/19/99		0.009	<0.005											
S-10	7/19/99	Rerun	0.005												
S-10	7/20/99														
S-10	7/28/99		<0.005	<0.005											
S-10	8/3/99		0.005	<0.005											
S-10	8/5/99														
S-10	8/9/99		0.007	<0.005											
S-10	8/10/99														
S-10	8/16/99														
S-10	8/19/99														
S-10	8/23/99														

Statistical Summary: Mean & Standard Deviation Using All An

Mean			0.0054	0.0031	0.05	3.83	60.5	0.47	0.89	20.4	0.04	0.14	0.0014	0.002	0.0018
Std Dev			0.0091	0.0018	0.05	4.41	8.1	0.47	0.89	27.7	0.04	0.14	0.00079	0.0013	0.0043
Mean + 2X Std Dev			0.0236	0.0067	0.15	12.65	76.7	1.41	2.67	75.8	0.12	0.42	0.00298	0.0046	0.0104

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Silica, D (mg/l)	Silica, T (mg/l)	Sodium, D (mg/l)	Sodium, TR (mg/l)	Zinc, D (mg/l)	Zinc, TR (mg/l)	Temperature (Cent)	Conductivity @ 25 C (micromho)	Conductivity, Field (micromho)	pH, Lab (su)	pH, Field (su)	Turbidity, Lab (NTU)
S-10	18/28/98						<0.005	<0.005	10.9		90		7.6	
S-10	8/21/98								20.4		00		7.05	
S-10	8/27/98								12.1		60		7.06	
S-10	9/3/98								11.9		60		7.18	
S-10	9/10/98								15		50		7.24	
S-10	9/17/98								13.3		60		7.23	
S-10	9/24/98								7.8		60		7.66	
S-10	10/1/98								8.9		60		7.9	
S-10	10/15/98								5		60		7.59	
S-10	10/21/98						<0.01	<0.01	4	83	83	6.8	6.8	
S-10	10/31/98								1.8		60		6.79	
S-10	11/5/98								8.7		70		7.31	
S-10	11/12/98								14		50		7.48	
S-10	11/28/98								0.8		70		7.3	
S-10	3/29/99						<0.01	<0.01	1.9	91	180	6.7	8.47	3.9
S-10	5/13/99					4.37	<0.003	<0.003	4	88	70	7.78	8.1	2.46
S-10	5/13/99	5/13/99												
S-10	6/2/99								4		40		7.8	
S-10	6/7/99				4.4	3.8	0.01	<0.05	2.7	59	50	6.6	8.2	6.4
S-10	6/15/99								4.1		30		7.5	
S-10	6/22/99								4.6		30		8.4	
S-10	6/29/99								5.3		40		8.2	
S-10	7/8/99								11.5		50		8	
S-10	7/13/99								9.6		50		8.8	
S-10	7/13/99	Rerun												
S-10	7/14/99													
S-10	7/19/99								7.5		60		8.4	
S-10	7/19/99	Rerun												
S-10	7/20/99													
S-10	7/28/99								10		80		6.05	
S-10	8/3/99								9.5		60		7.44	
S-10	8/5/99													
S-10	8/9/99								9		60		7.62	
S-10	8/10/99													
S-10	8/16/99								7.7		70		7.68	
S-10	8/19/99													
S-10	8/23/99								9.9		70		6.09	

Statistical Summary: Mean & Standard Deviation Using All An

Mean			25.5	25.8	4.95	4.56	0.0043	0.0127	7.02	65.2	60.8	7.00	7.06	2.68
Std Dev			25.5	25.8	0.778	0.865	0.0029	0.0104	4.98	13.9	21.6	0.96	6.82	2.07
Mean + 2X Std Dev			76.5	77.4	6.506	6.29	0.0101	0.0335	16.98	93	104	6.50	6.41	6.82

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Hecla Mining Company
Grouse Creek Unit

Water Quality Monitoring Data
Site S-11

Report Date: 9/7/99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	()	Alkalinity (mg/l)	Bicarbonate (mg/l)	Carbonate (mg/l)	Hydroxide (mg/l)	Hardness (mg/l)	Chloride (mg/l)	Nitrate + Nitrite, D (mg/l)	Nitrate + Nitrite, T (mg/l)	Nitrate, D (mg/l)	Nitrite, D (mg/l)	Ammonia (mg/l)	Sulfate (mg/l)
S-11	5/12/99														
S-11	5/13/99			34.2	34.2	<1	<1		0.6					<0.1	31.9
S-11	5/13/99	5/13/99													
S-11	5/15/99														
S-11	5/17/99														
S-11	5/21/99														
S-11	5/23/99														
S-11	5/25/99														
S-11	5/28/99														
S-11	5/30/99														
S-11	6/2/99									0.08		0.08	<0.05		
S-11	6/2/99	Duplicate								0.08		0.08	<0.05		
S-11	6/6/99														
S-11	6/7/99			23	23	<2	<2		<0.5	0.07			<0.01	0.15	20
S-11	6/13/99														
S-11	6/15/99										0.03			<0.1	
S-11	6/16/99														
S-11	6/20/99														
S-11	6/22/99										<0.02			<0.1	
S-11	6/22/99	Duplicate									0.05			<0.1	
S-11	6/26/99														
S-11	6/29/99										0.02			<0.1	
S-11	7/8/99										0.05			0.2	
S-11	7/13/99										<0.02			<0.1	
S-11	7/13/99	Rerun													
S-11	7/19/99										<0.02			<0.1	
S-11	7/19/99	Rerun													
S-11	7/28/99										0.04			<0.1	
S-11	8/3/99										0.04			<0.1	
S-11	8/3/99	Rerun													
S-11	8/5/99														
S-11	8/9/99										0.05			<0.1	
S-11	8/10/99														
S-11	8/16/99														
S-11	8/18/99														
S-11	8/23/99														

Statistical Summary: Mean & Standard Deviation Using All Analyses

Mean			59.6	38.3	36.4	0.938	0.938	43.4	0.804	0.13	0.0289	0.0962	0.0086	0.04	15.2
Std Dev			59.6	9.7	9	0.177	0.177	14.1	0.513	0.0731	0.0169	0.0931	0.0075	0.0374	11
Mean + 2X Std Dev			178.8	57.7	54.4	1.292	1.292	71.6	1.83	0.2762	0.0627	0.2824	0.0236	0.1148	37.2

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Hecla Mining Company
Grouse Creek Unit

Water Quality Monitoring Data
Site S-11

Report Date: 9/7/99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Sulfide (mg/l)	CN, Total (mg/l)	CN, WAD (mg/l)	Thiocyanate (mg/l)	TSS (mg/l)	TDS (mg/l)	SAR (Ratio)	Sum of Anions (meq/l)	Cation & Anion Sum (meq/l)	Aluminum, D (mg/l)	Aluminum, TR (mg/l)	Arsenic, D (mg/l)
S-11	7/2/98													
S-11	7/30/98													
S-11	8/6/98													
S-11	8/13/98													
S-11	8/19/98													
S-11	8/21/98													
S-11	8/25/98													
S-11	8/27/98													
S-11	9/3/98													
S-11	9/10/98													
S-11	9/17/98													
S-11	9/24/98													
S-11	10/1/98													
S-11	10/15/98													
S-11	10/21/98			<0.01	<0.01		<5							<0.001
S-11	10/21/98	Duplicate		<0.01	<0.01		<5							0.001
S-11	10/22/98													
S-11	10/31/98													
S-11	11/5/98													
S-11	11/12/98													
S-11	11/28/98													
S-11	12/6/98													
S-11	12/13/98													
S-11	12/27/98													
S-11	1/3/99													
S-11	1/7/99													
S-11	1/31/99													
S-11	2/7/99													
S-11	2/16/99													
S-11	2/21/99													
S-11	2/20/99													
S-11	3/4/99	Unsafe Access												
S-11	3/13/99	ob- carbon transfer												
S-11	3/28/99													
S-11	3/29/99			0.03	0.02		<5							0.001
S-11	4/4/99													
S-11	4/11/99													
S-11	4/27/99			0.02	0.02									
S-11	4/30/99				0.01									
S-11	5/1/99				<0.01									
S-11	5/2/99				0.01									
S-11	5/3/99				0.01									
S-11	5/3/99	Duplicate			0.01									
S-11	5/4/99				<0.01									
S-11	5/5/99				<0.01									
S-11	5/6/99				0.01									
S-11	5/7/99													
S-11	5/11/99				0.01									

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Hecla Mining Company
Grouse Creek Unit

Water Quality Monitoring Data
Site S-11

Report Date: 9/7/99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Arsenic, TR (mg/l)	Cadmium, D (mg/l)	Cadmium, TR (mg/l)	Calcium, D (mg/l)	Calcium, TR (mg/l)	Chromium, D (mg/l)	Chromium, TR (mg/l)	Copper, D (mg/l)	Copper, TR (mg/l)	Iron, D (mg/l)	Iron, TR (mg/l)	Lead, D (mg/l)
S-11	5/12/99													
S-11	5/13/99			<0.0004		<0.0004	19.1			<0.003	<0.003			<0.001
S-11	5/13/99	5/13/99												
S-11	5/15/99													
S-11	5/17/99													
S-11	5/21/99													
S-11	5/23/99													
S-11	5/25/99													
S-11	5/26/99													
S-11	5/30/99													
S-11	6/2/99													
S-11	6/2/99	Duplicate												
S-11	6/6/99													
S-11	6/7/99		0.002	<0.0005	<0.0005	13.5	12.8			<0.01	<0.01			<0.001
S-11	6/13/99													
S-11	6/15/99													
S-11	6/16/99													
S-11	6/20/99													
S-11	6/22/99													
S-11	6/22/99	Duplicate												
S-11	6/26/99													
S-11	6/29/99													
S-11	7/8/99													
S-11	7/13/99													
S-11	7/13/99	Rerun												
S-11	7/19/99													
S-11	7/19/99	Rerun												
S-11	7/28/99													
S-11	8/3/99													
S-11	8/3/99	Rerun												
S-11	8/5/99													
S-11	8/9/99													
S-11	8/10/99													
S-11	8/16/99													
S-11	8/19/99													
S-11	8/23/99													

Statistical Summary: Mean & Standard Deviation Using All An

Mean			0.0028	0.0017	0.0023	14.5	17.2	0.005	0.005	0.006	0.0056	0.0246	0.109	0.0035
Std Dev			0.0016	0.00098	0.00094	7.99	3.5	0.005	0.005	0.0039	0.003	0.0134	0.102	0.0051
Mean + 2X Std Dev			0.006	0.00366	0.00418	30.48	24.2	0.015	0.015	0.0138	0.0116	0.0514	0.313	0.0137

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Hecla Mining Company
Grouse Creek Unit

Water Quality Monitoring Data
Site S-11

Report Date: 9/7/99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Lead, TR (mg/l)	Magnesium, D (mg/l)	Magnesium, TR (mg/l)	Manganese, D (mg/l)	Manganese, TR (mg/l)	Mercury, D (mg/l)	Mercury, TR (mg/l)	Nickel, D (mg/l)	Nickel, TR (mg/l)	Potassium, D (mg/l)	Potassium, TR (mg/l)
S-11	7/26/98												
S-11	7/30/98												
S-11	8/6/98												
S-11	8/13/98												
S-11	8/19/98												
S-11	8/21/98												
S-11	8/25/98												
S-11	8/27/98												
S-11	9/3/98												
S-11	9/10/98												
S-11	9/17/98												
S-11	9/24/98												
S-11	10/1/98												
S-11	10/15/98												
S-11	10/21/98		<0.001	2.7				<0.0002	<0.0002				
S-11	10/21/98	Duplicate	<0.001	2.7				<0.0002	<0.0002				
S-11	10/22/98												
S-11	10/31/98												
S-11	11/5/98												
S-11	11/12/98												
S-11	11/26/98												
S-11	12/6/98												
S-11	12/13/98												
S-11	12/27/98												
S-11	1/3/99												
S-11	1/7/99												
S-11	1/31/99												
S-11	2/7/99												
S-11	2/16/99												
S-11	2/21/99												
S-11	2/26/99												
S-11	3/4/99	Unsafe Access											
S-11	3/13/99	ob- carbon transfer											
S-11	3/28/99												
S-11	3/29/99		<0.04					<0.0002	<0.0002				
S-11	4/4/99												
S-11	4/11/99												
S-11	4/27/99												
S-11	4/30/99												
S-11	5/1/99												
S-11	5/2/99												
S-11	5/3/99												
S-11	5/3/99	Duplicate											
S-11	5/4/99												
S-11	5/5/99												
S-11	5/6/99												
S-11	5/7/99												
S-11	5/11/99												

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Hecla Mining Company
Grouse Creek Unit

Water Quality Monitoring Data
Site S-11

Report Date: 9/7/99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Selenium, D (mg/l)	Selenium, TR (mg/l)	Silver, D (mg/l)	Silver, TR (mg/l)	Silica, D (mg/l)	Silica, T (mg/l)	Sodium, D (mg/l)	Sodium, TR (mg/l)	Zinc, D (mg/l)	Zinc, TR (mg/l)	Temperature (Cent)	Conductivity @ 25 C (micromho)
S-11	5/12/99												6	
S-11	5/13/99		<0.002	<0.002		<0.0004				3.02	0.004	0.005	4	140
S-11	5/13/99	5/13/99												
S-11	5/15/99													
S-11	5/17/99												1	
S-11	5/21/99												3	
S-11	5/23/99												6.6	
S-11	5/25/99													
S-11	5/26/99												3	
S-11	5/30/99												8.7	
S-11	6/2/99												4	
S-11	6/2/99	Duplicate											4	
S-11	6/6/99												9	
S-11	6/7/99		<0.001	<0.001	<0.0005	<0.0005			3.1	2.5	<0.01	0.01	4.4	97
S-11	6/13/99												4.6	
S-11	6/15/99												4.1	
S-11	6/16/99													
S-11	6/20/99												7.7	
S-11	6/22/99												5.1	
S-11	6/22/99	Duplicate											5.1	
S-11	6/26/99												7.7	
S-11	6/29/99												5.8	
S-11	7/8/99												14.7	
S-11	7/13/99												9.2	
S-11	7/13/99	Rerun												
S-11	7/19/99												7.5	
S-11	7/19/99	Rerun												
S-11	7/28/99												8.1	
S-11	8/3/99												9.6	
S-11	8/3/99	Rerun												
S-11	8/5/99													
S-11	8/9/99												8.7	
S-11	8/10/99													
S-11	8/16/99												6.5	
S-11	8/19/99													
S-11	8/23/99												9.4	
Statistical Summary: Mean & Standard Deviation Using All An														
Mean			0.0016	0.0021	0.0027	0.0023	10.9	10.8	3.75	3.21	0.0039	0.014	6.74	121
Std Dev			0.00098	0.0015	0.0009	0.0006	10.9	10.8	0.919	0.816	0.0015	0.0103	5.05	31.7
Mean + 2X Std Dev			0.00356	0.0051	0.0045	0.0035	32.7	32.4	5.588	4.842	0.0069	0.0346	16.84	184.4

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Water Quality Monitoring Data
Site S-11

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Conductivity, Field (micromho)	pH, Lab (su)	pH, Field (su)	Turbidity, Lab (NTU)	Turbidity, Fld (NTU)	DO, Field (mg/l)	Staff Gage Height (feet)	Flow (gpm)	Flow (cfs)
S-11	7/26/98		70		6.76						
S-11	7/30/98		90		7.6						
S-11	8/6/98		100		8.7						
S-11	8/13/98		120		8.98						
S-11	8/19/98		130		7.57						
S-11	8/21/98		120		7.02						
S-11	8/25/98									1737	3.87
S-11	8/27/98		130		7.06						
S-11	9/3/98		120		8.02						
S-11	9/10/98		110		7.08						
S-11	9/17/98		120		7.27						
S-11	9/24/98		120		7.93						
S-11	10/1/98		130		8.6						
S-11	10/15/98		130		7.59						
S-11	10/21/98		171	6.9	6.9		1.04			1427	3.18
S-11	10/21/98	Duplicate		6.9							
S-11	10/22/98									1427	3.18
S-11	10/31/98		130		6.8						
S-11	11/5/98		150		7.26						
S-11	11/12/98		150		7.5						
S-11	11/26/98		140		7.3						
S-11	12/6/98		130		7.87						
S-11	12/13/98		110		7.83						
S-11	12/27/98		100		7.09						
S-11	1/3/99		130		6.09						
S-11	1/7/99		110		7.48						
S-11	1/31/99		150		7.1						
S-11	2/7/99		150		7.08						
S-11	2/18/99		150		7.39						
S-11	2/21/99		150		7.34						
S-11	2/26/99		150		7.1						
S-11	3/4/99	Unsafe Access									
S-11	3/13/99	ob- carbon transfer									
S-11	3/28/99		140		7						
S-11	3/29/99		70	6.5	7.82	3.5	3.32	8.3			
S-11	4/4/99		160		7.42						
S-11	4/11/99		160		7.57						
S-11	4/27/99										
S-11	4/30/99		150		8.2			8.97			
S-11	5/1/99		110		8.2						
S-11	5/2/99		120		6.2						
S-11	5/3/99		120		8.38						
S-11	5/3/99	Duplicate									
S-11	5/4/99										
S-11	5/5/99										
S-11	5/6/99										
S-11	5/7/99		110		6.9			5.9	4.85		
S-11	5/11/99								4.75		

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Hecla M... ...g Company
Grouse Creek Unit

Water Quality ... ...nitoring Data
Site S-12

Report Date: ... /99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	()	Alkalinity (mg/l)	Bicarbonate (mg/l)	Carbonate (mg/l)	Hydroxide (mg/l)	Chloride (mg/l)	Nitrate + Nitrite, D (mg/l)	Nitrate + Nitrite, T (mg/l)	Nitrite, D (mg/l)	Ammonia (mg/l)	Sulfate (mg/l)	CN, Total (mg/l)
S-12	6/7/99			18	18	<2	<2	<0.5	0.11		<0.01	0.05	20	0.02
S-12	6/15/99													
S-12	6/22/99									<0.02		<0.1		0.03
S-12	6/29/99									0.07		<0.1		0.017
S-12	7/8/99									<0.02		<0.1		0.034
S-12	7/13/99									0.08		<0.1		0.063
S-12	7/13/99	Rerun												0.039
S-12	7/19/99									0.11		<0.1		0.053
S-12	7/19/99	Rerun												0.052
S-12	7/20/99													
S-12	7/28/99									0.07		<0.1		0.06
S-12	8/3/99									0.18		<0.1		0.036
S-12	8/3/99	Rerun												0.035
S-12	8/5/99													
S-12	8/9/99									0.17		<0.1		0.033
S-12	8/10/99													
S-12	8/16/99													
S-12	8/19/99													
S-12	8/23/99													

Statistical Summary: Mean & Standard Deviation Using All Analyses

Mean			48.4	18	18	1	1	0.25	0.11	0.0875	0.005	0.05	20	0.0393
Std Dev			48.4	18	18	1	1	0.25	0.11	0.0639	0.005	1.1E-09	20	0.0147
Mean + 2X Std Dev			145.2	54	54	3	3	0.75	0.33	0.2153	0.015	0.050000002	60	0.0687

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Hecla M..ng Company
Grouse Creek Unit

Water Quality ..nitoring Data
Site S-12

Report Date: ../99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Magnesium, D (mg/l)	Magnesium, TR (mg/l)	Mercury, D (mg/l)	Mercury, TR (mg/l)	Potassium, D (mg/l)	Potassium, TR (mg/l)	Selenium, D (mg/l)	Selenium, TR (mg/l)	Silver, D (mg/l)	Silver, TR (mg/l)	Sodium, D (mg/l)
S-12	6/7/99		1.3	1.1	<0.0002	<0.0002	0.8	0.7	<0.001	<0.001	<0.0005	<0.0005	2.7
S-12	6/15/99												
S-12	6/22/99												
S-12	6/29/99												
S-12	7/8/99												
S-12	7/13/99												
S-12	7/13/99	Rerun											
S-12	7/19/99												
S-12	7/19/99	Rerun											
S-12	7/20/99												
S-12	7/28/99												
S-12	8/3/99												
S-12	8/3/99	Rerun											
S-12	8/5/99												
S-12	8/9/99												
S-12	8/10/99												
S-12	8/16/99												
S-12	8/19/99												
S-12	8/23/99												

Statistical Summary: Mean & Standard Deviation Using All An

Mean			1.3	1.1	0.0001	0.0001	0.8	0.7	0.0005	0.0005	0.00025	0.00025	2.7
Std Dev			1.3	1.1	0.0001	0.0001	0.8	0.7	0.0005	0.0005	0.00025	0.00025	2.7
Mean + 2X Std Dev			3.9	3.3	0.0003	0.0003	2.4	2.1	0.0015	0.0015	0.00075	0.00075	8.1

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Water Quality [illegible]nitoring Data
Site S-12

Site Number	Sample Date	Duplicate/ Rerun/No Sample	DO, Field (mg/l)	Staff Gage Height (feet)	Flow (gpm)	Flow (cfs)
S-12	6/7/99		13.5			
S-12	6/15/99		16.8			
S-12	6/22/99		17.2			
S-12	6/29/99		15.2			
S-12	7/8/99		17.2			
S-12	7/13/99					
S-12	7/13/99	Rerun				
S-12	7/19/99		14.5	0.68		
S-12	7/19/99	Rerun				
S-12	7/20/99			0.68	10219	22.77
S-12	7/28/99		15.1	0.58	6121	13.64
S-12	8/3/99		17.7			
S-12	8/3/99	Rerun				
S-12	8/5/99			0.56	4950	11.03
S-12	8/9/99		21.7	0.52		
S-12	8/10/99			0.52	3805	8.48
S-12	8/16/99		30	0.5		
S-12	8/19/99			0.46	5726	12.76
S-12	8/23/99		22.7	0.48		

Statistical Summary: Mean & Standard Deviation Using All An

Mean			18.3	0.553	6164.2	13.7
Std Dev			4.8	0.0806	2432.9	5.42
Mean + 2X Std Dev			27.9	0.7142	11030	24.54

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Hecla Min... Company
Grouse Creek Unit

Water Quality ...toring Data
Site S-13

Report Date: ...99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	()	Alkalinity (mg/l)	Bicarbonate (mg/l)	Carbonate (mg/l)	Hydroxide (mg/l)	Hardness (mg/l)	Chloride (mg/l)	Nitrate + Nitrite, D (mg/l)	Nitrate + Nitrite, T (mg/l)	Nitrate, D (mg/l)	Nitrite, D (mg/l)	Ammonia (mg/l)	Sulfate (mg/l)	Sulfide (mg/l)	CN, Total (mg/l)	CN, WAD (mg/l)
S-13	5/24/99																<0.01	<0.01
S-13	5/25/99																<0.01	<0.01
S-13	5/26/99																0.01	<0.01
S-13	5/27/99																<0.01	<0.01
S-13	5/28/99																<0.01	<0.01
S-13	5/31/99																<0.01	<0.01
S-13	6/1/99																<0.01	<0.01
S-13	6/2/99																<0.01	<0.01
S-13	6/3/99																<0.01	<0.01
S-13	6/4/99																<0.01	<0.01
S-13	6/5/99																<0.01	<0.01
S-13	6/6/99																<0.01	<0.01
S-13	6/7/99			10	10	<2	<2		<0.5	<0.02			<0.01	<0.05	<10		<0.01	<0.01
S-13	6/8/99																<0.01	<0.01
S-13	6/9/99																<0.01	<0.01
S-13	6/15/99										<0.02			<0.1			<0.01	<0.01
S-13	6/22/99										0.04			<0.1			0.02	<0.01
S-13	6/29/99										<0.02			<0.1			<0.005	<0.005
S-13	7/8/99										<0.02			<0.1			0.01	<0.005
S-13	7/8/99	Duplicate									<0.02			<0.1			0.034	0.005
S-13	7/13/99										<0.02			<0.1			0.106	0.009
S-13	7/13/99	Rerun															0.019	0.009
S-13	7/14/99	NO DATA																
S-13	7/19/99										<0.02			<0.1			0.01	0.005
S-13	7/19/99	Rerun															0.006	
S-13	7/28/99										<0.02			<0.1			<0.005	<0.005
S-13	8/3/99										<0.02			<0.1			0.031	0.009
S-13	8/3/99	Rerun															<0.005	<0.005
S-13	8/9/99										<0.02			<0.1			0.009	<0.005
S-13	8/16/99																	
S-13	8/23/99																	

Statistical Summary: Mean & Standard Deviation Using All Analyses

Mean			5.42	9.83	10	1	0.834	15.7	0.3	0.045	0.0133	0.15	0.005	0.0437	5.2	6.67	0.0337	0.008
Std Dev			5.42	6.24	5.93	0	0.407	15.6	0.209	0.0332	0.01	0.149	0	0.0113	2.82	11.5	0.0336	0.0109
Mean + 2X Std Dev			16.26	22.31	21.86	1	1.648	46.9	0.718	0.1114	0.0333	0.448	0.005	0.0663	10.84	29.67	0.1009	0.0298

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Thiocyanate (mg/l)	TSS (mg/l)	TDS (mg/l)	SAR (Ratio)	Sum of Cations (meq/l)	Sum of Anions (meq/l)	Cation & Anion Sum (meq/l)	Aluminum, D (mg/l)	Aluminum, T (mg/l)	Arsenic, D (mg/l)	Arsenic, TR (mg/l)	Cadmium, D (mg/l)	Cadmium, TR (mg/l)	Calcium, D (mg/l)
S-13	5/24/99															
S-13	5/25/99															
S-13	5/26/99															
S-13	5/27/99															
S-13	5/28/99															
S-13	5/31/99															
S-13	6/1/99															
S-13	6/2/99															
S-13	6/3/99															
S-13	6/4/99															
S-13	6/5/99															
S-13	6/6/99															
S-13	6/7/99			<5	20							0.002	0.003	<0.0005	<0.0005	2.1
S-13	6/8/99															
S-13	6/9/99															
S-13	6/15/99															
S-13	6/22/99															
S-13	6/29/99															
S-13	7/8/99															
S-13	7/8/99	Duplicate														
S-13	7/13/99															
S-13	7/13/99	Rerun														
S-13	7/14/99	NO DATA														
S-13	7/19/99															
S-13	7/19/99	Rerun														
S-13	7/28/99															
S-13	8/3/99															
S-13	8/3/99	Rerun														
S-13	8/9/99															
S-13	8/16/99															
S-13	8/23/99															

Statistical Summary: Mean & Standard Deviation Using All A

Mean			0.0667	3.48	47.5	0.375	0.09	8.6	0.361	0.0283	0.287	0.0024	0.0036	0.0013	0.0013	4.58
Std Dev			0.0289	2.19	25	0.0778	0.113	11.9	0.361	0.0126	0.165	0.00049	0.00092	0.00087	0.00087	4.96
Mean + 2X Std Dev			0.1245	7.86	97.5	0.5306	0.316	32.4	1.083	0.0535	0.617	0.00338	0.00544	0.00304	0.00304	14.5

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Hecla Mining Company
Grouse Creek Unit

Water Quality Monitoring Data
Site S-13

Report Date: 9/7/99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Calcium, TR (mg/l)	Chromium, D (mg/l)	Chromium, TR (mg/l)	Chromium, T (mg/l)	Copper, D (mg/l)	Copper, TR (mg/l)	Copper, T (mg/l)	Iron, D (mg/l)	Iron, TR (mg/l)	Lead, D (mg/l)	Lead, TR (mg/l)	Magnesium, D (mg/l)	Magnesium, TR (mg/l)	Manganese, D (mg/l)
S-13	5/24/99															
S-13	5/25/99															
S-13	5/26/99															
S-13	5/27/99															
S-13	5/28/99															
S-13	5/31/99															
S-13	6/1/99															
S-13	6/2/99															
S-13	6/3/99															
S-13	6/4/99															
S-13	6/5/99															
S-13	6/6/99															
S-13	6/7/99		1.9				<0.01	<0.01				<0.001	<0.001	0.3	0.3	
S-13	6/8/99															
S-13	6/9/99															
S-13	6/15/99															
S-13	6/22/99															
S-13	6/29/99															
S-13	7/6/99															
S-13	7/6/99	Duplicate														
S-13	7/13/99															
S-13	7/13/99	Rerun														
S-13	7/14/99	NO DATA														
S-13	7/19/99															
S-13	7/19/99	Rerun														
S-13	7/28/99															
S-13	8/3/99															
S-13	8/3/99	Rerun														
S-13	8/9/99															
S-13	8/16/99															
S-13	8/23/99															

Statistical Summary: Mean & Standard Deviation Using All A

Mean			4.26	0.0044	0.0025	0.0133	0.0107	0.005	0.005	0.0292	0.25	0.0086	0.0086	0.64	0.65	0.0025
Std Dev			4.73	0.0013	0.0025	0.0144	0.0102	0	0	0.0253	0.114	0.0077	0.0077	0.564	0.551	0
Mean + 2X Std Dev			13.72	0.007	0.0075	0.0421	0.0311	0.005	0.005	0.0798	0.478	0.024	0.024	1.768	1.752	0.0025

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Manganese, T (mg/l)	Mercury, D (mg/l)	Mercury, TR (mg/l)	Nickel, D (mg/l)	Nickel, TR (mg/l)	Nickel, T (mg/l)	Potassium, D (mg/l)	Potassium, TR (mg/l)	Selenium, D (mg/l)	Selenium, TR (mg/l)	Silver, D (mg/l)	Silver, TR (mg/l)	Silica, D (mg/l)	Silica, T (mg/l)	Sodium, D (mg/l)
S-13	5/24/99																
S-13	5/25/99																
S-13	5/26/99																
S-13	5/27/99																
S-13	5/28/99																
S-13	5/31/99																
S-13	6/1/99																
S-13	6/2/99																
S-13	6/3/99																
S-13	6/4/99																
S-13	6/5/99																
S-13	6/6/99																
S-13	6/7/99			<0.0002	<0.0002				0.5	0.5	<0.001	<0.001	<0.0005	<0.0005			2.7
S-13	6/8/99																
S-13	6/9/99																
S-13	6/15/99																
S-13	6/22/99																
S-13	6/29/99																
S-13	7/8/99																
S-13	7/8/99	Duplicate															
S-13	7/13/99																
S-13	7/13/99	Rerun															
S-13	7/14/99	NO DATA															
S-13	7/19/99																
S-13	7/19/99	Rerun															
S-13	7/28/99																
S-13	8/3/99																
S-13	8/3/99	Rerun															
S-13	8/9/99																
S-13	8/16/99																
S-13	8/23/99																

Statistical Summary: Mean & Standard Deviation Using All A

Mean			0.0043	0.0001	0.0001	0.0067	0.01	0.005	0.533	0.7	0.0005	0.0005	0.0025	0.0021	17.5	17.6	2.67
Std Dev			0.0025	0	0	0.0029	0.01	0	0.153	0.265	0	0	0.0015	0.00092	0.283	0.354	0.751
Mean + 2X Std Dev			0.0093	0.0001	0.0001	0.0125	0.03	0.005	0.839	1.23	0.0005	0.0005	0.0055	0.00394	18.066	18.308	4.172

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Hecla Mi[illegible] Company
Grouse Creek Unit

Water Quality [illegible]itoring Data
Site S-13

Report Date: [illegible]99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Sodium, TR (mg/l)	Zinc, D (mg/l)	Zinc, TR (mg/l)	Temperature (Cent)	Conductivity @ 25 C (micromho)	Conductivity, Field (micromho)	pH, Lab (su)	pH, Field (su)	Turbidity, Lab (NTU)	Turbidity, Fld (NTU)	DO, Field (mg/l)	Staff Gage Height (feet)	Flow (gpm)	Flow (cfs)
S-13	5/24/99															
S-13	5/25/99															
S-13	5/26/99															
S-13	5/27/99															
S-13	5/28/99															
S-13	5/31/99															
S-13	6/1/99															
S-13	6/2/99															
S-13	6/3/99															
S-13	6/4/99															
S-13	6/5/99															
S-13	6/6/99															
S-13	6/7/99		1.9	<0.01	<0.01	6	22	10	6.3	7.9	2.8		11.8			
S-13	6/8/99															
S-13	6/9/99															
S-13	6/15/99					7.5		10		7.7			13.8			
S-13	6/22/99					7.2		10		7.9		3.7	16.3			
S-13	6/29/99					10.8		10		8		8.1	10.6			
S-13	7/8/99					23		10		7.7		6.7	13.7	4.9		
S-13	7/8/99	Duplicate				23		10		7.7			13.7			
S-13	7/13/99					8.8		10		8.1		3		4.8		
S-13	7/13/99	Rerun														
S-13	7/14/99	NO DATA														
S-13	7/19/99					9.2		10		8		3.6	13	4.64		
S-13	7/19/99	Rerun														
S-13	7/28/99					6.9		30		7.32		61.9	14.7			
S-13	8/3/99					8.5		20		7.24		3.9	18.2			
S-13	8/3/99	Rerun														
S-13	8/9/99					9.2		20		7.3		3.7	21.5	4.28		
S-13	8/16/99					6.9		30		7.56		3.4	32.2			
S-13	8/23/99					9.8		30		7.67		3.7	22.4	4.22		

Statistical Summary: Mean & Standard Deviation Using All A

Mean			2.3	0.015	0.0635	9.48	41.2	16.7	6.19	7.60	2.8	10.2	17.1	4.57	607.8	1.35
Std Dev			0.693	0.0106	0.0713	4.48	41.2	8.88	6.70	7.77	2.8	18.3	6.27	0.305	694	1.55
Mean + 2X Std Dev			3.686	0.0362	0.2061	18.44	123.6	34.46	5.98	7.23	8.4	46.8	29.64	5.18	1995.8	4.45

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Hecla Mining Company
Grouse Creek Unit

Water Quality Monitoring Data
Site JC-35

Report Date. .../99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	()	Alkalinity (mg/l)	Bicarbonate (mg/l)	Carbonate (mg/l)	Hydroxide (mg/l)	Chloride (mg/l)	Nitrate + Nitrite, D (mg/l)	Nitrate + Nitrite, T (mg/l)	Nitrite, D (mg/l)	Ammonia (mg/l)	Sulfate (mg/l)	Sulfide (mg/l)	CN, Free (mg/l)	CN, Total (mg/l)
JC-35	5/18/99			86.4	86.4	<1		7.3					329			
JC-35	5/18/99	no sample														
JC-35	6/7/99			71	71	<2	<2	5.1	2.33		0.34	<0.05	270	2	0.4	4.9
JC-35	6/7/99	Duplicate		69	69	<2	<2	5.2	2.33		0.34	<0.05	270	2	1	4.7
JC-35	7/7/99									0.78		<0.1				2.14
JC-35	8/5/99	Dry														

Statistical Summary: Mean & Standard Deviation Using All Analyses

Mean			0.0066	78.7	78.7	0.75	1	6.2	2.33	0.78	0.34	0.0375	299.5	2	0.4	3.52
Std Dev			0.0066	10.9	10.9	0.354	1	1.56	2.33	0.78	0.34	0.0177	41.7	2	0.4	1.95
Mean + 1X Std Dev			0.0132	89.6	89.6	1.104	2	7.76	4.66	1.56	0.68	0.0552	341.2	4	0.8	5.47

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Hecla Mining Company
Grouse Creek Unit

Water Quality Monitoring Data
Site JC-35

Report Date: 9/7/99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	CN, WAD (mg/l)	Thiocyanate (mg/l)	TSS (mg/l)	TDS (mg/l)	Aluminum, D (mg/l)	Aluminum, TR (mg/l)	Arsenic, D (mg/l)	Arsenic, TR (mg/l)	Cadmium, D (mg/l)	Cadmium, TR (mg/l)	Calcium, D (mg/l)	Calcium, TR (mg/l)	Copper, D (mg/l)
JC-35	5/18/99														
JC-35	5/18/99	no sample													
JC-35	6/7/99		1.6	<0.1	18	540	<0.03	0.48	0.002	0.004	<0.0005	<0.0005	102	103	<0.01
JC-35	6/7/99	Duplicate	1.9	<0.1	12	550	<0.03	0.19	0.002	0.004	<0.0005	<0.0005	106	98.9	<0.01
JC-35	7/7/99		0.37												
JC-35	8/5/99	Dry													

Statistical Summary: Mean & Standard Deviation Using All An

Mean			0.985	0.05	18	540	0.015	0.48	0.002	0.004	0.00025	0.00025	102	103	0.005
Std Dev			0.87	0.05	18	540	0.015	0.48	0.002	0.004	0.00025	0.00025	102	103	0.005
Mean + 1X Std Dev			1.855	0.1	36	1080	0.03	0.96	0.004	0.008	0.0005	0.0005	204	206	0.01

Less th[illegible] 'ectable data assumed as one-half the detection limit in Mean and S[illegible] d Deviation calculations.

Hecla Mining Company
Grouse Creek Unit

Water Quality Monitoring Data
Site JC-35

Report Date: 8/7/99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Copper, TR (mg/l)	Iron, D (mg/l)	Iron, TR (mg/l)	Lead, D (mg/l)	Lead, TR (mg/l)	Magnesium, D (mg/l)	Magnesium, TR (mg/l)	Manganese, D (mg/l)	Manganese, TR (mg/l)	Mercury, TR (mg/l)	Mercury, T (mg/l)	Nickel, D (mg/l)	Nickel, TR (mg/l)
JC-35	5/18/99														
JC-35	5/18/99	no sample													
JC-35	6/7/99		<0.01	1.68	1.92	<0.001	<0.001	9.7	9.4	1	1.06	<0.0002	<0.0002	<0.01	<0.01
JC-35	6/7/99	Duplicate	<0.01	1.73	1.81	<0.001	<0.001	9.7	9.3	1.03	1.02	<0.0002	<0.0002	0.01	<0.01
JC-35	7/7/99														
JC-35	8/5/99	Dry													

Statistical Summary: Mean & Standard Deviation Using All An

Mean			0.005	1.68	1.92	0.0005	0.0005	9.7	9.4	1	1.06	0.0001	0.0001	0.005	0.005
Std Dev			0.005	1.68	1.92	0.0005	0.0005	9.7	9.4	1	1.06	0.0001	0.0001	0.005	0.005
Mean + 1X Std Dev			0.01	3.36	3.84	0.001	0.001	19.4	18.8	2	2.12	0.0002	0.0002	0.01	0.01

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Hecla Mining Company
Grouse Creek Unit

Water Quality Monitoring Data
Site JC-35

Report Date: 9/7/99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Potassium, D (mg/l)	Potassium, TR (mg/l)	Selenium, D (mg/l)	Selenium, TR (mg/l)	Silver, D (mg/l)	Silver, TR (mg/l)	Sodium, D (mg/l)	Sodium, TR (mg/l)	Zinc, D (mg/l)	Zinc, TR (mg/l)	Temperature (Cent)	Conductivity @ 25 C (micromho)
JC-35	5/18/99													
JC-35	5/18/99	no sample												
JC-35	6/7/99		3.8	3.6	0.011	0.009	<0.0005	<0.0005	37.5	35.3	<0.01	0.01		734
JC-35	6/7/99	Duplicate	3.9	3.5	0.011	0.009	<0.0005	<0.0005	37.9	34.4	0.01	0.01		735
JC-35	7/7/99												10.5	
JC-35	8/5/99	Dry												

Statistical Summary: Mean & Standard Deviation Using All An

Mean			3.8	3.6	0.011	0.009	0.00025	0.00025	37.5	35.3	0.005	0.01	10.5	734
Std Dev			3.8	3.6	0.011	0.009	0.00025	0.00025	37.5	35.3	0.005	0.01	10.5	734
Mean + 1X Std Dev			7.6	7.2	0.022	0.018	0.0005	0.0005	75	70.6	0.01	0.02	21	1468

Less th: ectable data assumed as one-half the detection limit in Mean and S' d Deviation calculations.

Water Quality [illegible]nitoring Data
Site JC-35

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Conductivity, Field (micromho)	pH, Lab (su)	pH, Field (su)	Turbidity, Lab (NTU)	Flow (gpm)	Flow (cfs)
JC-35	5/18/99							
JC-35	5/18/99	no sample						
JC-35	6/7/99		580	6.2	6.3	1.9	5	0.0111
JC-35	6/7/99	Duplicate		6.2		2.1		
JC-35	7/7/99		310		6.6			
JC-35	8/5/99	Dry						

Statistical Summary: Mean & Standard Deviation Using All An

Mean			445	6.20	6.42	1.9	5	0.0111
Std Dev			190.9	6.20	6.74	1.9	5	0.0111
Mean + 1X Std Dev			635.9	5.90	6.25	3.8	10	0.0222

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Hecla Mining Company
Grouse Creek Unit

Water Quality Monitoring Data
Site JC-35a

Report Date: 5/ /99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	()
JC-35a	5/18/99	no sample	
JC-35a	6/7/99	Under Water	
JC-35a	7/7/99	Dry	
JC-35a	8/5/99	NO DATA	

Statistical Summary: Mean & Standard Deviation Using All Analyses

Mean			0.0111
Std Dev			0.0111
Mean + 1X Std Dev			0.0222

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Hecla Mining Company
Grouse Creek Unit

Water Quality Monitoring Data
Site JC-26

Report Date: 9/7/99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Thiocyanate (mg/l)	TSS (mg/l)	TDS (mg/l)	Aluminum, D (mg/l)	Aluminum, TR (mg/l)	Arsenic, D (mg/l)	Arsenic, TR (mg/l)	Cadmium, D (mg/l)	Cadmium, TR (mg/l)	Calcium, D (mg/l)	Calcium, TR (mg/l)	Calcium, T (mg/l)	Copper, D (mg/l)
JC-26	8/17/98													40.1	
JC-26	8/21/98														
JC-26	9/2/98														
JC-26	11/11/98														
JC-26	5/18/99														
JC-26	6/7/99		<0.1	28	330	<0.03	0.24	<0.001	0.003	<0.0005	<0.0005	74.8	72.1		<0.01
JC-26	7/7/99														
JC-26	8/5/99														
JC-26	8/19/99														

Statistical Summary: Mean & Standard Deviation Using All An

Mean			0.05	28	330	0.015	0.24	0.0005	0.003	0.00025	0.00025	74.8	72.1	40.1	0.005
Std Dev			0.05	28	330	0.015	0.24	0.0005	0.003	0.00025	0.00025	74.8	72.1	40.1	0.005
Mean + 1X Std Dev			0.1	56	660	0.03	0.48	0.001	0.006	0.0005	0.0005	149.6	144.2	80.2	0.01

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Hecla Mining Company
Grouse Creek Unit

Water Quality Monitoring Data
Site JC-26

Report Date: 9/7/99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Alkalinity (mg/l)	Bicarbonate (mg/l)	Carbonate (mg/l)	Hydroxide (mg/l)	Chloride (mg/l)	Nitrate + Nitrite, D (mg/l)	Nitrate + Nitrite, T (mg/l)	Nitrite, D (mg/l)	Ammonia (mg/l)	Sulfate (mg/l)	Sulfide (mg/l)	CN, Free (mg/l)	CN, Total (mg/l)	CN, WAD (mg/l)
JC-26	8/17/98														0.26	0.2
JC-26	8/21/98														0.28	0.13
JC-26	9/2/98														0.25	0.13
JC-26	11/11/98														0.1	0.03
JC-26	5/18/99		71.8	71.8	<1		5.8					242				
JC-26	6/7/99		57	57	<2	<2	3	1.46		0.07	<0.05	170	2	0.2	3.3	0.35
JC-26	7/7/99								0.55		<0.1				2	0.89
JC-26	8/5/99								0.16		<0.1				1.08	0.11
JC-26	8/19/99															

Statistical Summary: Mean & Standard Deviation Using All Analyses

Mean			64.4	64.4	0.75	1	4.3	1.46	0.355	0.07	0.0417	206	2	0.2	1.04	0.203
Std Dev			10.5	10.5	0.354	1	1.84	1.46	0.276	0.07	0.0144	50.9	2	0.2	1.21	0.294
Mean + 1X Std Dev			74.9	74.9	1.104	2	6.14	2.92	0.631	0.14	0.0561	256.9	4	0.4	2.25	0.497

Less [illegible] tectable data assumed as one-half the detection limit in Mean and Star[illegible]viation calculations.

Hecla Mining Company
Grouse Creek Unit

Water Quality Monitoring Data
Site JC-26

Report Date: 9/7/99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Copper, TR (mg/l)	Copper, T (mg/l)	Iron, D (mg/l)	Iron, TR (mg/l)	Iron, T (mg/l)	Lead, D (mg/l)	Lead, TR (mg/l)	Magnesium, D (mg/l)	Magnesium, TR (mg/l)	Manganese, D (mg/l)	Manganese, TR (mg/l)	Mercury, TR (mg/l)	Mercury, T (mg/l)	Nickel, D (mg/l)
JC-26	8/17/98			<0.004			0.499									
JC-26	8/21/98															
JC-26	9/2/98															
JC-26	11/11/98															
JC-26	5/18/99															
JC-26	6/7/99		<0.01		1.2	1.44		<0.001	<0.001	6.2	6	<0.005	0.014	<0.0002	<0.0002	<0.01
JC-26	7/7/99															
JC-26	8/5/99															
JC-26	8/19/99															

Statistical Summary: Mean & Standard Deviation Using All An

Mean			0.005	0.002	1.2	1.44	0.499	0.0005	0.0005	6.2	6	0.0025	0.014	0.0001	0.0001	0.005
Std Dev			0.005	0.002	1.2	1.44	0.499	0.0005	0.0005	6.2	6	0.0025	0.014	0.0001	0.0001	0.005
Mean + 1X Std Dev			0.01	0.004	2.4	2.88	0.998	0.001	0.001	12.4	12	0.005	0.028	0.0002	0.0002	0.01

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Hecla Mining Company
Grouse Creek Unit

Water Quality Monitoring Data
Site JC-26

Report Date: 9/7/99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Nickel, TR (mg/l)	Potassium, D (mg/l)	Potassium, TR (mg/l)	Selenium, D (mg/l)	Selenium, TR (mg/l)	Silver, D (mg/l)	Silver, TR (mg/l)	Silver, T (mg/l)	Sodium, D (mg/l)	Sodium, TR (mg/l)	Zinc, D (mg/l)	Zinc, TR (mg/l)	Temperature (Cent)
JC-26	8/17/98									<0.005					
JC-26	8/21/98														
JC-26	9/2/98														
JC-26	11/11/98														
JC-26	5/18/99														
JC-26	6/7/99		<0.01	2	1.9	0.006	0.006	<0.0005	<0.0005		20.1	16.8	<0.01	0.02	
JC-26	7/7/99														20.6
JC-26	8/5/99														15
JC-26	8/19/99														17

Statistical Summary: Mean & Standard Deviation Using All An

Mean			0.005	2	1.9	0.006	0.006	0.00025	0.00025	0.0025	20.1	16.8	0.005	0.02	17.5
Std Dev			0.005	2	1.9	0.006	0.006	0.00025	0.00025	0.0025	20.1	16.8	0.005	0.02	2.84
Mean + 1X Std Dev			0.01	4	3.8	0.012	0.012	0.0005	0.0005	0.005	40.2	33.6	0.01	0.04	20.34

Le Detectable data assumed as one-half the detection limit in Mean Jard Deviation calculations.

Hecla Mining Company
Grouse Creek Unit

Water Quality Monitoring Data
Site JC-26

Report Date: 9/7/99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Conductivity @ 25 C (micromho)	Conductivity, Field (micromho)	pH, Lab (su)	pH, Field (su)	Turbidity, Lab (NTU)	Turbidity, Field (NTU)
JC-26	8/17/98							
JC-26	8/21/98							
JC-26	9/2/98							
JC-26	11/11/98							
JC-26	5/18/99							
JC-26	6/7/99		505	400	6.3	6.9	3.5	
JC-26	7/7/99			250		6.6		
JC-26	8/5/99			210		7.59		2.5
JC-26	8/19/99			130				1.8

Statistical Summary: Mean & Standard Deviation Using All An

Mean			505	247.5	6.30	6.89	3.5	2.15
Std Dev			505	113.2	6.30	6.96	3.5	0.495
Mean + 1X Std Dev			1010	360.7	6.00	6.62	7	2.645

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Hecla Mining Company
Grouse Creek Unit

Water Quality Monitoring Data
Site JC-27

Report Date: 9/7/99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	()	Alkalinity (mg/l)	Bicarbonate (mg/l)	Carbonate (mg/l)	Chloride (mg/l)	Nitrate + Nitrite, T (mg/l)	Ammonia (mg/l)	Sulfate (mg/l)	CN, Total (mg/l)	CN, WAD (mg/l)
JC-27	5/18/99			62.5	62.5	<1	5.4			226		
JC-27	6/7/99	under water										
JC-27	7/7/99							0.14	<0.1		0.455	0.126
JC-27	8/5/99	NO DATA										
JC-27	8/19/99	Dry										

Statistical Summary: Mean & Standard Deviation Using All Analyses

Mean			0.495	62.5	62.5	0.5	5.4	0.14	0.05	226	0.455	0.126
Std Dev			0.495	62.5	62.5	0.5	5.4	0.14	0.05	226	0.455	0.126
Mean + 1X Std Dev			0.99	125	125	1	10.8	0.28	0.1	452	0.91	0.252

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Hecla Mining Company
Grouse Creek Unit

Water Quality Monitoring Data
Site JC-27

Report Date: 9/7/99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Temperature (Cent)	Conductivity, Field (micromho)	pH, Field (su)
JC-27	5/18/99				
JC-27	6/7/99	under water			
JC-27	7/7/99		14.5	100	6.9
JC-27	8/5/99	NO DATA			
JC-27	8/19/99	Dry			

Statistical Summary: Mean & Standard Deviation Using All

Mean			14.5	100	6.89
Std Dev			14.5	100	6.89
Mean + 1X Std Dev			29	200	6.59

Les[illegible]n detectable data assumed as one-half the detect[illegible]nit in Mean and Standard Deviation calculations.

Hecla Mining Company
Grouse Creek Unit

Water Quality Monitoring Data
Site JC-28

Report Date: 9/7/99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	()	Alkalinity (mg/l)	Bicarbonate (mg/l)	Carbonate (mg/l)	Hydroxide (mg/l)	Chloride (mg/l)	Nitrate + Nitrite, D (mg/l)	Nitrate + Nitrite, T (mg/l)	Nitrite, D (mg/l)	Ammonia (mg/l)	Sulfate (mg/l)	Sulfide (mg/l)	CN, Free (mg/l)	CN, Total (mg/l)
JC-28	8/17/98															0.08
JC-28	8/21/98															0.07
JC-28	5/18/99	no sample														
JC-28	6/7/99			20	20	<2	<2	1.1	0.41		0.02	<0.05	70	2	<0.1	1
JC-28	7/7/99									0.13		<0.1				0.446
JC-28	7/7/99	Duplicate								0.13		<0.1				0.458
JC-28	8/5/99															
JC-28	8/5/99	Duplicate								0.11		<0.1				0.4
JC-28	8/19/99															

Statistical Summary: Mean & Standard Deviation Using All Analyses

Mean			0.00000013	20	20	1	1	1.1	0.41	0.13	0.02	0.0375	70	2	0.05	0.399
Std Dev			0.00000013	20	20	1	1	1.1	0.41	0.13	0.02	0.0177	70	2	0.05	0.437
Mean + 1X Std Dev			0.00000026	40	40	2	2	2.2	0.82	0.26	0.04	0.0552	140	4	0.1	0.836

Les [illegible] etectable data assumed as one-half the detection limit in Mean and Sta. [illegible] eviation calculations.

Hecla Mining Company
Grouse Creek Unit

Water Quality Monitoring Data
Site JC-28

Report Date: 9/7/99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	CN, WAD (mg/l)	Thiocyanate (mg/l)	TSS (mg/l)	TDS (mg/l)	Aluminum, D (mg/l)	Aluminum, TR (mg/l)	Arsenic, D (mg/l)	Arsenic, TR (mg/l)	Cadmium, D (mg/l)	Cadmium, TR (mg/l)	Calcium, D (mg/l)	Calcium, TR (mg/l)	Calcium, T (mg/l)	Copper, D (mg/l)
JC-28	8/17/98		0.04												20.8	
JC-28	8/21/98		0.04													
JC-28	5/18/99	no sample														
JC-28	6/7/99		0.17	<0.1	<5	140	<0.03	0.27	0.001	0.002	<0.0005	<0.0005	31.8	27.6		<0.01
JC-28	7/7/99		0.14													
JC-28	7/7/99	Duplicate	0.156													
JC-28	8/5/99															
JC-28	8/5/99	Duplicate	0.11													
JC-28	8/19/99															

Statistical Summary: Mean & Standard Deviation Using All An

Mean			0.0975	0.05	2.5	140	0.015	0.27	0.001	0.002	0.00025	0.00025	31.8	27.6	20.8	0.005
Std Dev			0.0675	0.05	2.5	140	0.015	0.27	0.001	0.002	0.00025	0.00025	31.8	27.6	20.8	0.005
Mean + 1X Std Dev			0.165	0.1	5	280	0.03	0.54	0.002	0.004	0.0005	0.0005	63.6	55.2	41.6	0.01

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Hecla Mining Company
Grouse Creek Unit

Water Quality Monitoring Data
Site JC-30

Report Date: 9/7/99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Potassium, D (mg/l)	Potassium, TR (mg/l)	Selenium, D (mg/l)	Selenium, TR (mg/l)	Silver, D (mg/l)	Silver, TR (mg/l)	Sodium, D (mg/l)	Sodium, TR (mg/l)	Zinc, D (mg/l)	Zinc, TR (mg/l)	Temperature (Cent)	Conductivity @ 25 C (micromho)
JC-30	5/18/99	no sample												
JC-30	6/7/99		2.2	2.3	0.006	0.006	<0.0005	<0.0005	22.6	17.7	<0.01	0.03		508
JC-30	7/7/99												16.2	
JC-30	6/5/99	Dry												
JC-30	8/19/99	Dry												

Statistical Summary: Mean & Standard Deviation Using All An

Mean			2.2	2.3	0.006	0.006	0.00025	0.00025	22.6	17.7	0.005	0.03	16.2	508
Std Dev			2.2	2.3	0.006	0.006	0.00025	0.00025	22.6	17.7	0.005	0.03	16.2	508
Mean + 1X Std Dev			4.4	4.6	0.012	0.012	0.0005	0.0005	45.2	35.4	0.01	0.06	32.4	1016

Less than ·' ·table data assumed as one-half the detection limit in Mean and Sta·)eviation calculations.

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Hecla Mining Company
Grouse Creek Unit

Water Quality Monitoring Data
Site JC-30

Report Date: 9/7/99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Copper, TR (mg/l)	Iron, D (mg/l)	Iron, TR (mg/l)	Lead, D (mg/l)	Lead, TR (mg/l)	Magnesium, D (mg/l)	Magnesium, TR (mg/l)	Manganese, D (mg/l)	Manganese, TR (mg/l)	Mercury, TR (mg/l)	Mercury, T (mg/l)	Nickel, D (mg/l)	Nickel, TR (mg/l)
JC-30	5/18/99	no sample													
JC-30	6/7/99		<0.01	1.26	1.86	<0.001	0.001	6.5	5.7	0.011	0.027	<0.0002	<0.0002	<0.01	<0.01
JC-30	7/7/99														
JC-30	8/5/99	Dry													
JC-30	8/19/99	Dry													

Statistical Summary: Mean & Standard Deviation Using All An

Mean			0.005	1.26	1.86	0.0005	0.001	6.5	5.7	0.011	0.027	0.0001	0.0001	0.005	0.005
Std Dev			0.005	1.26	1.86	0.0005	0.001	6.5	5.7	0.011	0.027	0.0001	0.0001	0.005	0.005
Mean + 1X Std Dev			0.01	2.52	3.72	0.001	0.002	13	11.4	0.022	0.054	0.0002	0.0002	0.01	0.01

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Hecla M...ng Company
Grouse Creek Unit

Water Quality Monitoring Data
Site JC-28

Report Date: 9/7/99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Copper, TR (mg/l)	Copper, T (mg/l)	Iron, D (mg/l)	Iron, TR (mg/l)	Iron, T (mg/l)	Lead, D (mg/l)	Lead, TR (mg/l)	Magnesium, D (mg/l)	Magnesium, TR (mg/l)	Manganese, D (mg/l)	Manganese, TR (mg/l)	Mercury, TR (mg/l)	Mercury, T (mg/l)	Nickel, D (mg/l)
JC-28	8/17/98			<0.004			0.271									
JC-28	8/21/98															
JC-28	5/18/99	no sample														
JC-28	6/7/99		<0.01		0.34	0.4		<0.001	<0.001	2.7	2.3	0.017	0.023	<0.0002	<0.0002	<0.01
JC-28	7/7/99															
JC-28	7/7/99	Duplicate														
JC-28	8/5/99															
JC-28	8/5/99	Duplicate														
JC-28	8/19/99															

Statistical Summary: Mean & Standard Deviation Using All An

Mean			0.005	0.002	0.34	0.4	0.271	0.0005	0.0005	2.7	2.3	0.017	0.023	0.0001	0.0001	0.005
Std Dev			0.005	0.002	0.34	0.4	0.271	0.0005	0.0005	2.7	2.3	0.017	0.023	0.0001	0.0001	0.005
Mean + 1X Std Dev			0.01	0.004	0.68	0.8	0.542	0.001	0.001	5.4	4.6	0.034	0.046	0.0002	0.0002	0.01

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Hecla Mining Company
Grouse Creek Unit

Water Quality Monitoring Data
Site JC-28

Report Date: 9/7/99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Nickel, TR (mg/l)	Potassium, D (mg/l)	Potassium, TR (mg/l)	Selenium, D (mg/l)	Selenium, TR (mg/l)	Silver, D (mg/l)	Silver, TR (mg/l)	Silver, T (mg/l)	Sodium, D (mg/l)	Sodium, TR (mg/l)	Zinc, D (mg/l)	Zinc, TR (mg/l)	Temperature (Cent)
JC-28	8/17/98									<0.005					
JC-28	8/21/98														
JC-28	5/18/99	no sample													
JC-28	6/7/99		<0.01	1.2	1.1	0.002	0.002	<0.0005	<0.0005		7.6	5.9	<0.01	0.01	
JC-28	7/7/99														13.7
JC-28	7/7/99	Duplicate													13.7
JC-28	8/5/99														12.5
JC-28	8/5/99	Duplicate													
JC-28	8/19/99														16.5

Statistical Summary: Mean & Standard Deviation Using All An

Mean			0.005	1.2	1.1	0.002	0.002	0.00025	0.00025	0.0025	7.6	5.9	0.005	0.01	14.2
Std Dev			0.005	1.2	1.1	0.002	0.002	0.00025	0.00025	0.0025	7.6	5.9	0.005	0.01	2.05
Mean + 1X Std Dev			0.01	2.4	2.2	0.004	0.004	0.0005	0.0005	0.005	15.2	11.8	0.01	0.02	16.25

Less th ectable data assumed as one-half the detection limit in Mean and S d Deviation calculations.

Water Quality Monitoring Data
Site JC-28

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Conductivity @ 25 C (micromho)	Conductivity, Field (micromho)	pH, Lab (su)	pH, Field (su)	Turbidity, Lab (NTU)	Turbidity, Field (NTU)	Flow (gpm)	Flow (cfs)
JC-28	8/17/98									
JC-28	8/21/98									
JC-28	5/18/99	no sample								
JC-28	6/7/99		228	180	6.2	7.2	2.1		1	0.0022
JC-28	7/7/99			110		6.9				
JC-28	7/7/99	Duplicate		110		6.9				
JC-28	8/5/99			150		7.43		1.03		
JC-28	8/5/99	Duplicate								
JC-28	8/18/99			140		7.5		4.8		

Statistical Summary: Mean & Standard Deviation Using All An

Mean			226	145	6.20	7.19	2.1	3.36	1	0.0022
Std Dev			226	28.9	6.20	7.37	2.1	2.03	1	0.0022
Mean + 1X Std Dev			452	173.9	5.90	6.97	4.2	5.39	2	0.0044

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Hecla Mining Company
Grouse Creek Unit

Water Quality Monitoring Data
Site JC-30

Report Date: 9/7/99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	CN, WAD (mg/l)	Thiocyanate (mg/l)	TSS (mg/l)	TDS (mg/l)	Aluminum, D (mg/l)	Aluminum, TR (mg/l)	Arsenic, D (mg/l)	Arsenic, TR (mg/l)	Cadmium, D (mg/l)	Cadmium, TR (mg/l)	Calcium, D (mg/l)	Calcium, TR (mg/l)	Copper, D (mg/l)
JC-30	5/18/99	no sample													
JC-30	6/7/99		0.6	<0.1	112	350	<0.03	1.11	0.004	0.023	<0.0005	<0.0005	73.5	66.6	<0.01
JC-30	7/7/99		0.122												
JC-30	8/5/99	Dry													
JC-30	8/19/99	Dry													

Statistical Summary: Mean & Standard Deviation Using All An

Mean			0.361	0.05	112	350	0.015	1.11	0.004	0.023	0.00025	0.00025	73.5	66.6	0.005
Std Dev			0.338	0.05	112	350	0.015	1.11	0.004	0.023	0.00025	0.00025	73.5	66.6	0.005
Mean + 1X Std Dev			0.699	0.1	224	700	0.03	2.22	0.008	0.046	0.0005	0.0005	147	133.2	0.01

Hecla Mining Company
Grouse Creek Unit

Water Quality Monitoring Data
Site JC-30

Report Date: 9/7/99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	()	Alkalinity (mg/l)	Bicarbonate (mg/l)	Carbonate (mg/l)	Hydroxide (mg/l)	Chloride (mg/l)	Nitrate + Nitrite, D (mg/l)	Nitrate + Nitrite, T (mg/l)	Nitrite, D (mg/l)	Ammonia (mg/l)	Sulfate (mg/l)	Sulfide (mg/l)	CN, Free (mg/l)	CN, Total (mg/l)
JC-30	5/16/99	no sample														
JC-30	6/7/99			56	56	<2	<2	3	1.46		0.06	<0.05	160	2	0.4	3.5
JC-30	7/7/99									0.37		<0.1				2.03
JC-30	8/5/99	Dry														
JC-30	8/19/99	Dry														

Statistical Summary: Mean & Standard Deviation Using All Analyses

Mean			0.0022	56	56	1	1	3	1.46	0.37	0.06	0.0375	160	2	0.4	2.76
Std Dev			0.0022	56	56	1	1	3	1.46	0.37	0.06	0.0177	160	2	0.4	1.04
Mean + 1X Std Dev			0.0044	112	112	2	2	6	2.92	0.74	0.12	0.0552	320	4	0.8	3.8

Le: [illegible] etectable data assumed as one-half the detection limit in Mean and St: [illegible] eviation calculations.

Water Quality Monitoring Data
Site JC-30

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Conductivity, Field (micromho)	pH, Lab (su)	pH, Field (su)	Turbidity, Lab (NTU)	Flow (gpm)	Flow (cfs)
JC-30	5/18/99	no sample						
JC-30	6/7/99		440	6.3	6.9	95	3	0.0066
JC-30	7/7/99		260		6.7			
JC-30	8/5/99	Dry						
JC-30	8/19/99	Dry						

Statistical Summary: Mean & Standard Deviation Using All An

Mean			350	6.30	6.80	95	3	0.0066
Std Dev			127.3	6.30	7.28	95	3	0.0066
Mean + 1X Std Dev			477.3	6.00	6.67	190	6	0.0132

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Hecla Mining Company
Grouse Creek Unit

Water Quality Monitoring Data
Site JC-31

Report Date: 9/7/99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	()
JC-31	5/18/99	no sample	
JC-31	6/7/99	Under water	
JC-31	7/7/99	Dry	
JC-31	8/5/99	Dry	

Statistical Summary: Mean & Standard Deviation Using All Analyses

Mean			0.0066
Std Dev			0.0066
Mean + 1X Std Dev			0.0132

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Hecla Mining Company
Grouse Creek Unit

Water Quality Monitoring Data
Site JC-34

Report Date: 9/7/99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	()
JC-34	5/18/99	no sample	
JC-34	6/7/99	Under Water	
JC-34	7/7/99	No Flag	
JC-34	8/5/99	NO DATA	
JC-34	8/19/99	Dry	

Statistical Summary: Mean & Standard Deviation Using All Analyses

Mean			0.0066
Std Dev			0.0066
Mean + 1X Std Dev			0.0132

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Hecla Mining Company
Grouse Creek Unit

Water Quality Monitoring Data
Site JC-38

Report Date: 9/7/99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Potassium, D (mg/l)	Potassium, TR (mg/l)	Selenium, D (mg/l)	Selenium, TR (mg/l)	Silver, D (mg/l)	Silver, TR (mg/l)	Sodium, D (mg/l)	Sodium, TR (mg/l)	Zinc, D (mg/l)	Zinc, TR (mg/l)	Temperature (Cent)	Conductivity @ 25 C (micromho)
JC-38	5/18/99													
JC-38	6/7/99		3.7	3.5	0.008	0.007	<0.0005	<0.0005	30.1	26.9	0.01	0.02		648
JC-38	7/7/99												15	
JC-38	8/5/99	Dry												
JC-38	8/19/99	Dry												

Statistical Summary: Mean & Standard Deviation Using All An

Mean			3.7	3.5	0.008	0.007	0.00025	0.00025	30.1	26.9	0.01	0.02	15	648
Std Dev			3.7	3.5	0.008	0.007	0.00025	0.00025	30.1	26.9	0.01	0.02	15	648
Mean + 1X Std Dev			7.4	7	0.016	0.014	0.0005	0.0005	60.2	53.8	0.02	0.04	30	1296

Less than de' 'e data assumed as one-half the detection limit in Mean and Standa 'iation calculations.

Hecla Mining Company
Grouse Creek Unit

Water Quality Monitoring Data
Site JC-38

Report Date: 9/7/99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Copper, TR (mg/l)	Iron, D (mg/l)	Iron, TR (mg/l)	Lead, D (mg/l)	Lead, TR (mg/l)	Magnesium, D (mg/l)	Magnesium, TR (mg/l)	Manganese, D (mg/l)	Manganese, TR (mg/l)	Mercury, TR (mg/l)	Mercury, T (mg/l)	Nickel, D (mg/l)	Nickel, TR (mg/l)
JC-38	5/18/99														
JC-38	6/7/99		<0.01	1.02	1.48	<0.001	<0.001	9.3	8.9	1.12	1.08	<0.0002	<0.0002	<0.01	<0.01
JC-38	7/7/99														
JC-38	8/5/99	Dry													
JC-38	8/19/99	Dry													

Statistical Summary: Mean & Standard Deviation Using All An

Mean			0.005	1.02	1.48	0.0005	0.0005	9.3	8.9	1.12	1.08	0.0001	0.0001	0.005	0.005
Std Dev			0.005	1.02	1.48	0.0005	0.0005	9.3	8.9	1.12	1.08	0.0001	0.0001	0.005	0.005
Mean + 1X Std Dev			0.01	2.04	2.96	0.001	0.001	18.6	17.8	2.24	2.16	0.0002	0.0002	0.01	0.01

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Hecla Mining Company
Grouse Creek Unit

Water Quality Monitoring Data
Site JC-38

Report Date: 9/7/99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	CN, WAD (mg/l)	Thiocyanate (mg/l)	TSS (mg/l)	TDS (mg/l)	Aluminum, D (mg/l)	Aluminum, TR (mg/l)	Arsenic, D (mg/l)	Arsenic, TR (mg/l)	Cadmium, D (mg/l)	Cadmium, TR (mg/l)	Calcium, D (mg/l)	Calcium, TR (mg/l)	Copper, D (mg/l)
JC-38	5/18/99														
JC-38	6/7/99		0.7	<0.1	194	450	<0.03	1.17	0.001	0.005	<0.0005	<0.0005	94.3	88	<0.01
JC-38	7/7/99		0.2												
JC-38	8/5/99	Dry													
JC-38	8/19/99	Dry													
Statistical Summary: Mean & Standard Deviation Using All An															
Mean			0.45	0.05	194	450	0.015	1.17	0.001	0.005	0.00025	0.00025	94.3	88	0.005
Std Dev			0.354	0.05	194	450	0.015	1.17	0.001	0.005	0.00025	0.00025	94.3	88	0.005
Mean + 1X Std Dev			0.804	0.1	388	900	0.03	2.34	0.002	0.01	0.0005	0.0005	188.6	176	0.01

Less than [illegible] 'able data assumed as one-half the detection limit in Mean and Sta[illegible] Deviation calculations.

Hecla Mining Company
Grouse Creek Unit

Water Quality Monitoring Data
Site JC-38

Report Date: [illegible]99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	()	Alkalinity (mg/l)	Bicarbonate (mg/l)	Carbonate (mg/l)	Hydroxide (mg/l)	Chloride (mg/l)	Nitrate + Nitrite, D (mg/l)	Nitrate + Nitrite, T (mg/l)	Nitrite, D (mg/l)	Ammonia (mg/l)	Sulfate (mg/l)	Sulfide (mg/l)	CN, Free (mg/l)	CN, Total (mg/l)
JC-38	5/18/99			77.9	77.9	<1		6.8					254			
JC-38	6/7/99			71	71	<2	<2	5.5	1.62		0.11	<0.05	230	2	0.4	3.7
JC-38	7/7/99									1.08		<0.1				2.91
JC-38	8/5/99	Dry														
JC-38	8/19/99	Dry														

Statistical Summary: Mean & Standard Deviation Using All Analyses

Mean			0.0111	74.5	74.5	0.75	1	6.15	1.62	1.08	0.11	0.0375	242	2	0.4	3.31
Std Dev			0.0111	4.88	4.88	0.354	1	0.919	1.62	1.08	0.11	0.0177	17	2	0.4	0.559
Mean + 1X Std Dev			0.0222	79.38	79.38	1.104	2	7.069	3.24	2.16	0.22	0.0552	259	4	0.8	3.869

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Hecla Mining Company
Grouse Creek Unit

Water Quality Monitoring Data
Site JC-38

Report Date: 9/7/99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Conductivity, Field (micromho)	pH, Lab (su)	pH, Field (su)	Turbidity, Lab (NTU)	Flow (gpm)	Flow (cfs)
JC-38	5/18/99							
JC-38	6/7/99		580	6.2	6.4	52	2	0.0044
JC-38	7/7/99		420		6.4			
JC-38	8/5/99	Dry						
JC-38	8/19/99	Dry						

Statistical Summary: Mean & Standard Deviation Using All An

Mean			500	6.20	6.40	52	2	0.0044
Std Dev			113.1	8.20	#NUM!	52	2	0.0044
Mean + 1X Std Dev			613.1	5.90	6.40	104	4	0.0088

Less, [illegible]etectable data assumed as one-half the detection limit in Mean and Stan[illegible]eviation calculations.

Hecla Mining Company
Grouse Creek Unit

Water Quality Monitoring Data
Site JC-38I

Report Date: ,99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	()	Alkalinity (mg/l)	Bicarbonate (mg/l)	Carbonate (mg/l)	Hydroxide (mg/l)	Chloride (mg/l)	Nitrate + Nitrite, D (mg/l)	Nitrite, D (mg/l)	Ammonia (mg/l)	Sulfate (mg/l)	Sulfide (mg/l)	CN, Free (mg/l)	CN, Total (mg/l)	CN, WAD (mg/l)
JC-38I	5/18/99	no sample														
JC-38I	6/7/99			69	69	<2	<2	5.5	1.66	0.08	0.06	230	2	0.3	3.8	0.36
JC-38I	7/7/99	Dry														
JC-38I	8/5/99	Dry														
JC-38I	8/19/99	Dry														

Statistical Summary: Mean & Standard Deviation Using All Analyses

Mean			0.0044	69	69	1	1	5.5	1.66	0.08	0.06	230	2	0.3	3.8	0.36
Std Dev			0.0044	69	69	1	1	5.5	1.66	0.08	0.06	230	2	0.3	3.8	0.36
Mean + 1X Std Dev			0.0088	138	138	2	2	11	3.32	0.16	0.12	460	4	0.6	7.6	0.72

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Hecla Mining Company
Grouse Creek Unit

Water Quality Monitoring Data
Site JC-38I

Report Date: 9/7/99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Thiocyanate (mg/l)	TSS (mg/l)	TDS (mg/l)	Aluminum, D (mg/l)	Aluminum, TR (mg/l)	Arsenic, D (mg/l)	Arsenic, TR (mg/l)	Cadmium, D (mg/l)	Cadmium, TR (mg/l)	Calcium, D (mg/l)	Calcium, TR (mg/l)	Copper, D (mg/l)
JC-38I	5/18/99	no sample												
JC-38I	6/7/99		<0.1	212	450	<0.03	11.3	0.002	0.041	<0.0005	0.0007	93.5	94.7	<0.01
JC-38I	7/7/99	Dry												
JC-38I	8/5/99	Dry												
JC-38I	8/19/99	Dry												

Statistical Summary: Mean & Standard Deviation Using All An

Mean			0.05	212	450	0.015	11.3	0.002	0.041	0.00025	0.0007	93.5	94.7	0.005
Std Dev			0.05	212	450	0.015	11.3	0.002	0.041	0.00025	0.0007	93.5	94.7	0.005
Mean + 1X Std Dev			0.1	424	900	0.03	22.6	0.004	0.082	0.0005	0.0014	187	189.4	0.01

Less than detectable data assumed as one-half the detection limit in Mean + 1 Standard Deviation calculations.

Hecla ...ng Company
Grouse Creek Unit

Water Quality ...onitoring Data
Site JC-38I

Report Date. 7/7/99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Copper, TR (mg/l)	Iron, D (mg/l)	Iron, TR (mg/l)	Lead, D (mg/l)	Lead, TR (mg/l)	Magnesium, D (mg/l)	Magnesium, TR (mg/l)	Manganese, D (mg/l)	Manganese, TR (mg/l)	Mercury, TR (mg/l)	Mercury, T (mg/l)	Nickel, D (mg/l)
JC-38I	5/18/99	no sample												
JC-38I	6/7/99		<0.01	1.02	7.22	<0.001	0.025	9.4	10.2	1.03	2.09	0.002	<0.0002	<0.01
JC-38I	7/7/99	Dry												
JC-38I	8/5/99	Dry												
JC-38I	8/19/99	Dry												

Statistical Summary: Mean & Standard Deviation Using All An

Mean			0.005	1.02	7.22	0.0005	0.025	9.4	10.2	1.03	2.09	0.002	0.0001	0.005
Std Dev			0.005	1.02	7.22	0.0005	0.025	9.4	10.2	1.03	2.09	0.002	0.0001	0.005
Mean + 1X Std Dev			0.01	2.04	14.44	0.001	0.05	18.8	20.4	2.06	4.18	0.004	0.0002	0.01

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Hecla Mining Company
Grouse Creek Unit

Water Quality Monitoring Data
Site JC-38I

Report Date: 9/7/99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Nickel, TR (mg/l)	Potassium, D (mg/l)	Potassium, TR (mg/l)	Selenium, D (mg/l)	Selenium, TR (mg/l)	Silver, D (mg/l)	Silver, TR (mg/l)	Sodium, D (mg/l)	Sodium, TR (mg/l)	Zinc, D (mg/l)	Zinc, TR (mg/l)
JC-38I	5/18/99	no sample											
JC-38I	6/7/99		0.01	4.1	5.2	0.008	0.008	<0.0005	0.002	30.9	26.9	<0.01	0.12
JC-38I	7/7/99	Dry											
JC-38I	8/5/99	Dry											
JC-38I	8/19/99	Dry											

Statistical Summary: Mean & Standard Deviation Using All An

Mean			0.01	4.1	5.2	0.008	0.008	0.00025	0.002	30.9	26.9	0.005	0.12
Std Dev			0.01	4.1	5.2	0.008	0.008	0.00025	0.002	30.9	26.9	0.005	0.12
Mean + 1X Std Dev			0.02	8.2	10.4	0.016	0.016	0.0005	0.004	61.8	53.8	0.01	0.24

Less etectable data assumed as one-half the detection limit in Mea Standard Deviation calculations.

Water Quality Monitoring Data
Site JC-38I

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Conductivity @ 25 C (micromho)	Conductivity, Field (micromho)	pH, Lab (su)	pH, Field (su)	Turbidity, Lab (NTU)	Flow (gpm)	Flow (cfs)
JC-38I	5/18/99	no sample							
JC-38I	6/7/99		649	590	6.1	6.4	100	0.1	0.0002
JC-38I	7/7/99	Dry							
JC-38I	8/5/99	Dry							
JC-38I	8/19/99	Dry							

Statistical Summary: Mean & Standard Deviation Using All An

Mean			649	590	6.10	6.40	100	0.1	0.0002
Std Dev			649	590	6.10	6.40	100	0.1	0.0002
Mean + 1X Std Dev			1298	1180	5.80	6.10	200	0.2	0.0004

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Hecla Mining Company
Grouse Creek Unit

Water Quality Monitoring Data
Site JC-43

Report Date: 9/7/99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	()	Alkalinity (mg/l)	Bicarbonate (mg/l)	Carbonate (mg/l)	Hydroxide (mg/l)	Chloride (mg/l)	Nitrate + Nitrite, D (mg/l)	Nitrate + Nitrite, T (mg/l)	Nitrite, D (mg/l)	Ammonia (mg/l)	Sulfate (mg/l)	Sulfide (mg/l)	CN, Free (mg/l)	CN, Total (mg/l)
JC-43	5/18/99	no sample														
JC-43	6/7/99			40	40	<2	<2	3.5	0.14		<0.01	<0.05	40	2	<0.1	0.02
JC-43	7/7/99									0.02		<0.1				0.005
JC-43	8/5/99									<0.02		<0.1				0.00
JC-43	8/19/99	Dry														

Statistical Summary: Mean & Standard Deviation Using All Analyses

Mean			0.0002	40	40	1	1	3.5	0.14	0.015	0.005	0.0417	40	2	0.05	0.0383
Std Dev			0.0002	40	40	1	1	3.5	0.14	0.0071	0.005	0.0144	40	2	0.05	0.0454
Mean + 1X Std Dev			0.0004	80	80	2	2	7	0.28	0.0221	0.01	0.0561	80	4	0.1	0.0837

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Hecla Mining Company
Grouse Creek Unit

Water Quality Monitoring Data
Site JC-43

Report Date: 9/7/99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	CN, WAD (mg/l)	Thiocyanate (mg/l)	TSS (mg/l)	TDS (mg/l)	Aluminum, D (mg/l)	Aluminum, TR (mg/l)	Arsenic, D (mg/l)	Arsenic, TR (mg/l)	Cadmium, D (mg/l)	Cadmium, TR (mg/l)	Calcium, D (mg/l)	Calcium, TR (mg/l)	Copper, D (mg/l)
JC-43	5/18/99	no sample													
JC-43	6/7/99		<0.01	<0.1	<5	110	<0.03	<0.03	0.001	0.001	<0.0005	<0.0005	27.9	23.5	<0.01
JC-43	7/7/99		<0.005												
JC-43	8/5/99		<0.005												
JC-43	8/19/99	Dry													

Statistical Summary: Mean & Standard Deviation Using All An

Mean			0.0033	0.05	2.5	110	0.015	0.015	0.001	0.001	0.00025	0.00025	27.9	23.5	0.005
Std Dev			0.0014	0.05	2.5	110	0.016	0.015	0.001	0.001	0.00025	0.00025	27.9	23.5	0.005
Mean + 1X Std Dev			0.0047	0.1	5	220	0.03	0.03	0.002	0.002	0.0005	0.0005	55.8	47	0.01

Less th[illegible] tectable data assumed as one-half the detection limit in Mean and [illegible] ard Deviation calculations.

Hecla M. .g Company
Grouse Creek Unit

Water Quality . nitoring Data
Site JC-43

Report Date. /99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Copper, TR (mg/l)	Iron, D (mg/l)	Iron, TR (mg/l)	Lead, D (mg/l)	Lead, TR (mg/l)	Magnesium, D (mg/l)	Magnesium, TR (mg/l)	Manganese, D (mg/l)	Manganese, TR (mg/l)	Mercury, TR (mg/l)	Mercury, T (mg/l)	Nickel, D (mg/l)	Nickel, TR (mg/l)
JC-43	5/18/99	no sample													
JC-43	6/7/99		<0.01	0.01	0.03	<0.001	<0.001	2.1	1.7	<0.005	0.006	<0.0002	<0.0002	<0.01	<0.01
JC-43	7/7/99														
JC-43	8/5/99														
JC-43	8/19/99	Dry													

Statistical Summary: Mean & Standard Deviation Using All An

Mean			0.005	0.01	0.03	0.0005	0.0005	2.1	1.7	0.0025	0.006	0.0001	0.0001	0.005	0.005
Std Dev			0.005	0.01	0.03	0.0005	0.0005	2.1	1.7	0.0025	0.006	0.0001	0.0001	0.005	0.005
Mean + 1X Std Dev			0.01	0.02	0.06	0.001	0.001	4.2	3.4	0.005	0.012	0.0002	0.0002	0.01	0.01

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Hecla Mining Company
Grouse Creek Unit

Water Quality Monitoring Data
Site JC-43

Report Date: 9/7/99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Potassium, D (mg/l)	Potassium, TR (mg/l)	Selenium, D (mg/l)	Selenium, TR (mg/l)	Silver, D (mg/l)	Silver, TR (mg/l)	Sodium, D (mg/l)	Sodium, TR (mg/l)	Zinc, D (mg/l)	Zinc, TR (mg/l)	Temperature (Cent)	Conductivity @ 25 C (micromho)
JC-43	5/18/99	no sample												
JC-43	6/7/99		0.9	0.7	<0.001	<0.001	<0.0005	<0.0005	2.5	1.6	<0.01	<0.01		195
JC-43	7/7/99												17.9	
JC-43	8/5/99													
JC-43	8/19/99	Dry												

Statistical Summary: Mean & Standard Deviation Using All An

Mean			0.9	0.7	0.0005	0.0005	0.00025	0.00025	2.5	1.6	0.005	0.005	17.9	195
Std Dev			0.9	0.7	0.0005	0.0005	0.00025	0.00025	2.5	1.6	0.005	0.005	17.9	195
Mean + 1X Std Dev			1.8	1.4	0.001	0.001	0.0005	0.0005	5	3.2	0.01	0.01	35.8	390

Less t ectable data assumed as one-half the detection limit in Mean and rd Deviation calculations.

Hecla Min. Company
Grouse Creek Unit

Water Quality Monitoring Data
Site JC-43

Report Date: 9/7/99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Conductivity, Field (micromho)	pH, Lab (su)	pH, Field (su)	Turbidity, Lab (NTU)
JC-43	5/18/99	no sample				
JC-43	6/7/99		150	6.3	7.2	0.6
JC-43	7/7/99		70		6.8	
JC-43	8/5/99					
JC-43	8/19/99	Dry				

Statistical Summary: Mean & Standard Deviation Using All An

Mean			110	6.30	6.96	0.6
Std Dev			56.6	6.30	7.17	0.6
Mean + 1X Std Dev			166.6	6.00	6.75	1.2

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Water Quai onitoring Data
Site JC-44

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Nickel, TR (mg/l)	Potassium, D (mg/l)	Potassium, TR (mg/l)	Selenium, D (mg/l)	Selenium, TR (mg/l)	Silver, D (mg/l)	Silver, TR (mg/l)	Silver, T (mg/l)	Sodium, D (mg/l)	Sodium, TR (mg/l)	Zinc, D (mg/l)	Zinc, TR (mg/l)	Temperature (Cent)
JC-44	8/17/98									0.01					
JC-44	8/21/98														
JC-44	5/18/99	no sample													
JC-44	6/7/99		<0.01	1.1	0.8	<0.001	0.001	<0.0005	<0.0005		4.2	3.2	<0.01	<0.01	
JC-44	7/7/99														15.7
JC-44	8/5/99														24.6
JC-44	8/19/99														20.1

Statistical Summary: Mean & Standard Deviation Using All An

Mean			0.005	1.1	0.8	0.0005	0.001	0.00025	0.00025	0.01	4.2	3.2	0.005	0.005	20.1
Std Dev			0.005	1.1	0.8	0.0005	0.001	0.00025	0.00025	0.01	4.2	3.2	0.005	0.005	4.45
Mean + 1X Std Dev			0.01	2.2	1.6	0.001	0.002	0.0005	0.0005	0.02	8.4	6.4	0.01	0.01	24.55

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Hecla Mining Company
Grouse Creek Unit

Water Quality Monitoring Data
Site JC-44

Report Date: 9/7/99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Copper, TR (mg/l)	Copper, T (mg/l)	Iron, D (mg/l)	Iron, TR (mg/l)	Iron, T (mg/l)	Lead, D (mg/l)	Lead, TR (mg/l)	Magnesium, D (mg/l)	Magnesium, TR (mg/l)	Manganese, D (mg/l)	Manganese, TR (mg/l)	Mercury, TR (mg/l)	Mercury, T (mg/l)	Nickel, D (mg/l)
JC-44	8/17/98			<0.004			2.88									
JC-44	8/21/98															
JC-44	5/18/99	no sample														
JC-44	6/7/99		<0.01		0.04	0.08		<0.001	<0.001	3.4	3.1	<0.005	0.005	<0.0002	<0.0002	<0.01
JC-44	7/7/99															
JC-44	8/5/99															
JC-44	8/19/99															

Statistical Summary: Mean & Standard Deviation Using All An

Mean			0.005	0.002	0.04	0.08	2.88	0.0005	0.0005	3.4	3.1	0.0025	0.005	0.0001	0.0001	0.005
Std Dev			0.005	0.002	0.04	0.08	2.88	0.0005	0.0005	3.4	3.1	0.0025	0.005	0.0001	0.0001	0.005
Mean + 1X Std Dev			0.01	0.004	0.08	0.16	5.76	0.001	0.001	6.8	6.2	0.005	0.01	0.0002	0.0002	0.01

Les etectable data assumed as one-half the detection limit in Mean and Sta eviation calculations.

ecla Mining Company
Grouse Creek Unit

Water Quality Monitoring Data
Site JC-44

Report Date: 9/7/99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Thiocyanate (mg/l)	TSS (mg/l)	TDS (mg/l)	Aluminum, D (mg/l)	Aluminum, TR (mg/l)	Arsenic, D (mg/l)	Arsenic, TR (mg/l)	Cadmium, D (mg/l)	Cadmium, TR (mg/l)	Calcium, D (mg/l)	Calcium, TR (mg/l)	Calcium, T (mg/l)	Copper, D (mg/l)
JC-44	8/17/98													47.8	
JC-44	8/21/98														
JC-44	5/18/99	no sample													
JC-44	6/7/99		<0.1	<5	160	<0.03	0.04	0.001	0.002	<0.0005	<0.0005	37.7	35.7		<0.01
JC-44	7/7/99														
JC-44	8/5/99														
JC-44	8/18/99														

Statistical Summary: Mean & Standard Deviation Using All An

Mean			0.05	2.5	160	0.015	0.04	0.001	0.002	0.00025	0.00025	37.7	35.7	47.8	0.005
Std Dev			0.05	2.5	160	0.015	0.04	0.001	0.002	0.00025	0.00025	37.7	35.7	47.0	0.005
Mean + 1X Std Dev			0.1	5	320	0.03	0.08	0.002	0.004	0.0005	0.0005	75.4	71.4	95.6	0.01

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Hecla Mining Company
Grouse Creek Unit

Water Quality Monitoring Data
Site JC-44

Report Date: 9/7/99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	()	Alkalinity (mg/l)	Bicarbonate (mg/l)	Carbonate (mg/l)	Hydroxide (mg/l)	Chloride (mg/l)	Nitrate + Nitrite, D (mg/l)	Nitrate + Nitrite, T (mg/l)	Nitrite, D (mg/l)	Ammonia (mg/l)	Sulfate (mg/l)	Sulfide (mg/l)	CN, Free (mg/l)	CN, Total (mg/l)	CN, WAD (mg/l)
JC-44	8/17/98															0.03	0.01
JC-44	8/21/98															0.03	0.02
JC-44	5/18/99	no sample															
JC-44	6/7/99			34	34	<2	<2	4	1.46		<0.01	0.05	60	2	<0.1	0.13	0.11
JC-44	7/7/99									0.23		<0.1				0.037	0.023
JC-44	8/5/99									0.07		<0.1				0.03	0.02
JC-44	8/19/99																

Statistical Summary: Mean & Standard Deviation Using All Analyses

Mean			0.6	34	34	1	1	4	1.46	0.15	0.005	0.05	60	2	0.05	0.0514	0.0366
Std Dev			0.6	34	34	1	1	4	1.46	0.113	0.005	0	60	2	0.05	0.044	0.0413
Mean + 1X Std Dev			1.2	68	68	2	2	8	2.92	0.263	0.01	0.05	120	4	0.1	0.0954	0.0779

Les [illegible]etectable data assumed as one-half the detection limit in Mean and Sta[illegible]eviation calculations.

Hecla Mining Company
Grouse Creek Unit

Water Quality Monitoring Data
Site JC-44

Report Date: 9/7/99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Conductivity @ 25 C (micromho)	Conductivity, Field (micromho)	pH, Lab (su)	pH, Field (su)	Turbidity, Lab (NTU)	Turbidity, Field (NTU)
JC-44	8/17/98							
JC-44	8/21/98							
JC-44	5/18/99	no sample						
JC-44	6/7/99		243		6.3		1.5	
JC-44	7/7/99			190		6.8		
JC-44	8/5/99			240		8.47		6.9
JC-44	8/19/99			230		8.37		3

Statistical Summary: Mean & Standard Deviation Using All An

Mean			243	220	6.30	7.26	1.5	4.95
Std Dev			243	28.5	6.30	7.05	1.5	2.76
Mean + 1X Std Dev			486	246.5	6.00	6.84	3	7.71

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Hecla M. ..ng Company
Grouse Creek Unit

Water Quality ...onitoring Data
Site JC-48

Report Date. .7/99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	()	Alkalinity (mg/l)	Bicarbonate (mg/l)	Carbonate (mg/l)	Hydroxide (mg/l)	Chloride (mg/l)	Nitrate + Nitrite, D (mg/l)	Nitrite, D (mg/l)	Ammonia (mg/l)	Sulfate (mg/l)	Sulfide (mg/l)	CN, Free (mg/l)	CN, Total (mg/l)	CN, WAD (mg/l)
JC-48	5/18/99	no sample														
JC-48	6/7/99			42	42	<2	<2	5.9	0.7	<0.01	<0.05	70	2	<0.1	0.03	<0.01
JC-48	7/7/99	Dry														
JC-48	8/19/99	Dry														

Statistical Summary: Mean & Standard Deviation Using All Analyses

Mean			2.76	42	42	1	1	5.9	0.7	0.005	0.025	70	2	0.05	0.03	0.005
Std Dev			2.76	42	42	1	1	5.9	0.7	0.005	0.025	70	2	0.05	0.03	0.005
Mean + 1X Std Dev			5.52	84	84	2	2	11.8	1.4	0.01	0.05	140	4	0.1	0.06	0.01

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Hecla Mining Company
Grouse Creek Unit

Water Quality Monitoring Data
Site JC-48

Report Date: 9/7/99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Thiocyanate (mg/l)	TSS (mg/l)	TDS (mg/l)	Aluminum, D (mg/l)	Aluminum, TR (mg/l)	Arsenic, D (mg/l)	Arsenic, TR (mg/l)	Cadmium, D (mg/l)	Cadmium, TR (mg/l)	Calcium, D (mg/l)	Calcium, TR (mg/l)	Copper, D (mg/l)
JC-48	5/18/99	no sample												
JC-48	6/7/99		<0.1	48	160	<0.03	0.55	0.002	0.006	<0.0005	<0.0005	44.6	39.3	<0.01
JC-48	7/7/99	Dry												
JC-48	8/18/99	Dry												

Statistical Summary: Mean & Standard Deviation Using All An

Mean			0.05	40	160	0.015	0.55	0.002	0.006	0.00025	0.00025	44.6	39.3	0.005
Std Dev			0.05	46	160	0.015	0.55	0.002	0.006	0.00025	0.00025	44.6	39.3	0.005
Mean + 1X Std Dev			0.1	92	320	0.03	1.1	0.004	0.012	0.0005	0.0005	89.2	78.6	0.01

Les detectable data assumed as one-half the detection limit in Me 1 Standard Deviation calculations.

Hecla ... ng Company
Grouse Creek Unit

Water Quality ...onitoring Data
Site JC-48

Report Date. ..7/99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Copper, TR (mg/l)	Iron, D (mg/l)	Iron, TR (mg/l)	Lead, D (mg/l)	Lead, TR (mg/l)	Magnesium, D (mg/l)	Magnesium, TR (mg/l)	Manganese, D (mg/l)	Manganese, TR (mg/l)	Mercury, TR (mg/l)	Mercury, T (mg/l)	Nickel, D (mg/l)
JC-48	5/18/99	no sample												
JC-48	6/7/99		<0.01	0.02	0.47	<0.001	0.001	3.3	2.8	<0.005	0.022	<0.0002	<0.0002	<0.01
JC-48	7/7/99	Dry												
JC-48	8/19/99	Dry												

Statistical Summary: Mean & Standard Deviation Using All An

Mean			0.005	0.02	0.47	0.0005	0.001	3.3	2.8	0.0025	0.022	0.0001	0.0001	0.005
Std Dev			0.005	0.02	0.47	0.0005	0.001	3.3	2.8	0.0025	0.022	0.0001	0.0001	0.005
Mean + 1X Std Dev			0.01	0.04	0.94	0.001	0.002	6.6	5.6	0.005	0.044	0.0002	0.0002	0.01

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

ecla Mining Company
Grouse Creek Unit

Water Quality Monitoring Data
Site JC-48

Report Date: 9/7/99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Nickel, TR (mg/l)	Potassium, D (mg/l)	Potassium, TR (mg/l)	Selenium, D (mg/l)	Selenium, TR (mg/l)	Silver, D (mg/l)	Silver, TR (mg/l)	Sodium, D (mg/l)	Sodium, TR (mg/l)	Zinc, D (mg/l)	Zinc, TR (mg/l)
JC-48	5/18/99	no sample											
JC-48	6/7/99		<0.01	1	1	<0.001	0.001	<0.0005	<0.0005	4.1	2.6	0.07	0.01
JC-48	7/7/99	Dry											
JC-48	8/10/99	Dry											

Statistical Summary: Mean & Standard Deviation Using All An

Mean			0.005	1	1	0.0005	0.001	0.00025	0.00025	4.1	2.6	0.07	0.01
Std Dev			0.005	1	1	0.0005	0.001	0.00025	0.00025	4.1	2.6	0.07	0.01
Mean + 1X Std Dev			0.01	2	2	0.001	0.002	0.0005	0.0005	8.2	5.2	0.14	0.02

L han detectable data assumed as one-half the detection limit in and Standard Deviation calculations.

Hecla Mining Company
Grouse Creek Unit

Water Quality Monitoring Data
Site JC-48

Report Date: 9/7/99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Conductivity @ 25 C (micromho)	Conductivity, Field (micromho)	pH, Lab (su)	pH, Field (su)	Turbidity, Lab (NTU)	Flow (gpm)	Flow (cfs)
JC-48	5/18/99	no sample							
JC-48	6/7/99		270	230	6.3	7.4	16.5	0.1	0.0002
JC-48	7/7/99	Dry							
JC-48	8/19/99	Dry							

Statistical Summary: Mean & Standard Deviation Using All An

Mean			270	230	6.30	7.40	16.5	0.1	0.0002
Std Dev			270	230	6.30	7.40	16.5	0.1	0.0002
Mean + 1X Std Dev			540	460	6.00	7.10	33	0.2	0.0004

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Hecla ... ...ing Company
Grouse Creek Unit

Water Quality ...onitoring Data
Site MW-1

Report Date: ...7/99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	(i)	Alkalinity (mg/l)	Bicarbonate (mg/l)	Carbonate (mg/l)	Hydroxide (mg/l)	Hardness (mg/l)	Chloride (mg/l)	Nitrate + Nitrite, D (mg/l)	Nitrate + Nitrite, T (mg/l)	Nitrate, D (mg/l)	Nitrate, T (mg/l)	Nitrite, D (mg/l)	Ammonia (mg/l)
MW-1	7/6/99										0.08				0.33
MW-1	7/13/99														
MW-1	7/19/99														
MW-1	7/28/99														
MW-1	8/4/99														
MW-1	8/9/99														
MW-1	8/16/99														
MW-1	8/18/99														
MW-1	8/23/99														

Statistical Summary: Mean & Standard Deviation Using All Analyses

Mean			0	78.5	79.3	1	1	133.5	0.7	0.277	0.08	0.3	0.085	0.0117	0.49
Std Dev			0	13	14.2	0	0	20.6	0.283	0.252	0.08	0.3	0.0632	0.0076	0.226
Mean + 1X Std Dev			0	91.5	93.5	1	1	154.1	0.983	0.529	0.16	0.6	0.1482	0.0193	0.716

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Water Quali..monitoring Data
Site MW-1

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Sulfate (mg/l)	Sulfite (mg/l)	CN, Free (mg/l)	CN, Total (mg/l)	CN, WAD (mg/l)	Thiocyanate (mg/l)	TSS (mg/l)	TDS (mg/l)	Cation & Anion Sum (meq/l)	Aluminum, D (mg/l)	Aluminum, TR (mg/l)	Arsenic, D (mg/l)	Arsenic, TR (mg/l)
MW-1	11/18/98					<0.005	<0.005								
MW-1	7/13/99														
MW-1	7/19/99														
MW-1	7/28/99														
MW-1	8/4/99														
MW-1	8/9/99														
MW-1	8/16/99														
MW-1	8/18/99														
MW-1	8/23/99														

Statistical Summary: Mean & Standard Deviation Using All Analyses

Mean			242.5	1	0.3	0.0022	0.0021	0.05	251.9	179	235	0.015	164	0.0153	0.0981
Std Dev			279.3	1	0.3	0.0012	0.0011	0.05	1428.4	93.3	235	0.015	164	0.0139	0.516
Mean + 1X Std Dev			521.8	2	0.6	0.0034	0.0032	0.1	1680.3	272.3	470	0.03	328	0.0292	0.6121

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Hecla Mining Company
Grouse Creek Unit

Water Quality Monitoring Data
Site MW-1

Report Date: 9/7/99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Cadmium, D (mg/l)	Cadmium, TR (mg/l)	Calcium, D (mg/l)	Calcium, TR (mg/l)	Copper, D (mg/l)	Copper, TR (mg/l)	Iron, D (mg/l)	Iron, TR (mg/l)	Lead, D (mg/l)	Lead, TR (mg/l)	Magnesium, D (mg/l)	Magnesium, TR (mg/l)
MW-1	11/10/98													
MW-1	7/13/99													
MW-1	7/19/99													
MW-1	7/28/99													
MW-1	8/4/99													
MW-1	8/9/99													
MW-1	8/16/99													
MW-1	8/18/99													
MW-1	8/23/99													

Statistical Summary: Mean & Standard Deviation Using All Analyses

Mean			0.00025	0.0043	96.8	139.5	0.005	0.12	0.005	255	0.0049	0.0373	5.33	30.3
Std Dev			0.00025	0.0043	77.4	145	0.005	0.12	0.005	255	0.0171	0.134	4.65	40.2
Mean + 1X Std Dev			0.0005	0.0086	174.2	284.5	0.01	0.24	0.01	510	0.022	0.1713	9.98	70.5

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Water Quality Monitoring Data
Site MW-1

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Manganese, D (mg/l)	Manganese, TR (mg/l)	Mercury, D (mg/l)	Mercury, TR (mg/l)	Mercury, T (mg/l)	Nickel, D (mg/l)	Nickel, TR (mg/l)	Potassium, D (mg/l)	Potassium, TR (mg/l)	Selenium, D (mg/l)	Selenium, TR (mg/l)
MW-1	11/19/99												
MW-1	7/13/99												
MW-1	7/19/99												
MW-1	7/28/99												
MW-1	8/4/99												
MW-1	8/9/99												
MW-1	8/16/99												
MW-1	8/18/99												
MW-1	8/23/99												

Statistical Summary: Mean & Standard Deviation Using All Analyses

Mean			0.105	9.99	0.00013	0.0005	0.00013	0.005	0.08	3.9	16.8	0.003	0.013
Std Dev			0.105	9.99	0.000057	0.00057	0.000059	0.005	0.08	3.9	19.1	0.003	0.013
Mean + 1X Std Dev			0.21	19.98	0.000187	0.00107	0.000189	0.01	0.16	7.8	35.9	0.006	0.026

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Hecla Mining Company
Grouse Creek Unit

Water Quality Monitoring Data
Site MW-1

Report Date. 9/7/99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Silver, D (mg/l)	Silver, TR (mg/l)	Sodium, D (mg/l)	Sodium, TR (mg/l)	Zinc, D (mg/l)	Zinc, TR (mg/l)	Temperature (Cent)	Conductivity @ 25 C (micromho)	Conductivity, Field (micromho)	pH, Lab (su)	pH, Field (su)
MW-1	11/18/98								13.3		570		7.4
MW-1	7/13/99												
MW-1	7/19/99												
MW-1	7/28/99												
MW-1	8/4/99												
MW-1	8/9/99										500		
MW-1	8/16/99												
MW-1	8/18/99								10.6		550		7.56
MW-1	8/23/99												

Statistical Summary: Mean & Standard Deviation Using All Analyses

Mean			0.0034	0.004	6.6	4.36	0.0084	0.0456	5.44	395.6	342.7	7.167491087	7.026872146
Std Dev			0.0017	0.0027	6.6	0.771	0.0127	0.151	2.19	309.8	195.1	6.920618754	6.886056648
Mean + 1X Std Dev			0.0051	0.0067	13.2	5.131	0.0211	0.1966	7.63	705.4	537.8	6.725842151	6.649751982

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Water Quality ..onitoring Data
Site MW-1

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Turbidity, Lab (NTU)	Turbidity, Field (NTU)	Purge Volume (gallons)	Depth to Water (ft)
MW-1	11/18/98					14.01
MW-1	7/13/99					15.15
MW-1	7/19/99					15.75
MW-1	7/28/99					18.85
MW-1	8/4/99					19
MW-1	8/9/99					19.26
MW-1	8/16/99					19.49
MW-1	8/18/99					19.81
MW-1	8/23/99					21.24

Statistical Summary: Mean & Standard Deviation Using All Analyses

Mean			5100	15.8	75	22.8
Std Dev			5100	17.2	75	6.51
Mean + 1X Std Dev			10200	33	150	29.31

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Hecla Mining Company
Grouse Creek Unit

Water Quality Monitoring Data
Site MW-3

Report Date: 9/7/99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	()	Alkalinity (mg/l)	Bicarbonate (mg/l)	Carbonate (mg/l)	Hydroxide (mg/l)	Hardness (mg/l)	Chloride (mg/l)	Nitrate + Nitrite, D (mg/l)	Nitrate + Nitrite, T (mg/l)	Nitrate, D (mg/l)	Nitrate, T (mg/l)	Nitrite, D (mg/l)	Ammonia (mg/l)
MW-3	6/14/99														
MW-3	6/22/99														
MW-3	6/29/99														
MW-3	7/6/99										0.21				<0.1
MW-3	7/13/99														
MW-3	7/19/99														
MW-3	7/28/99														
MW-3	8/4/99										0.19				<0.1
MW-3	8/9/99														
MW-3	8/16/99														
MW-3	8/18/99														
MW-3	8/23/99														

Statistical Summary: Mean & Standard Deviation Using All Analyses

Mean			4.86	87.5	89.8	1	1	107.7	0.85	0.153	0.2	0.05	0.134	0.0267	0.207
Std Dev			4.86	20.4	23.1	0	0	22.3	0.212	0.105	0.0141	0.05	0.0703	0.0375	0.271
Mean + 1X Std Dev			9.72	107.9	112.7	1	1	130	0.862	0.258	0.2141	0.1	0.2043	0.0642	0.478

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Water Quali...onitoring Data
Site MW-3

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Sulfate (mg/l)	Sulfite (mg/l)	CN, Free (mg/l)	CN, Total (mg/l)	CN, WAD (mg/l)	Thiocyanate (mg/l)	TSS (mg/l)	TDS (mg/l)	Aluminum, D (mg/l)	Aluminum, TR (mg/l)	Arsenic, D (mg/l)	Arsenic, TR (mg/l)	Cadmium, D (mg/l)
MW-3	10/10/98														
MW-3	6/22/99														
MW-3	6/29/99														
MW-3	7/6/99					<0.005	<0.005								
MW-3	7/13/99														
MW-3	7/19/99														
MW-3	7/28/99														
MW-3	8/4/99					<0.005	<0.005								
MW-3	8/9/99														
MW-3	8/16/99														
MW-3	8/18/99														
MW-3	8/23/99														

Statistical Summary: Mean & Standard Deviation Using All Analyses

Mean			88	2	0.6	0.0028	0.0024	0.05	88.7	162.6	0.015	52.1	0.0023	0.0083	0.00025
Std Dev			59.4	2	0.6	0.0024	0.0017	0.05	268.2	44.7	0.015	52.1	0.0015	0.018	0.00025
Mean + 1X Std Dev			127.4	4	1.2	0.0052	0.0041	0.1	356.9	207.3	0.03	104.2	0.0038	0.0263	0.0005

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Hecla Mining Company
Grouse Creek Unit

Water Quality Monitoring Data
Site MW-3

Report Date: 9/7/99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Cadmium, TR (mg/l)	Calcium, D (mg/l)	Calcium, TR (mg/l)	Copper, D (mg/l)	Copper, TR (mg/l)	Iron, D (mg/l)	Iron, TR (mg/l)	Lead, D (mg/l)	Lead, TR (mg/l)	Magnesium, D (mg/l)	Magnesium, TR (mg/l)	Manganese, D (mg/l)
MW-3	16/16/99													
MW-3	6/22/99													
MW-3	6/29/99													
MW-3	7/6/99													
MW-3	7/13/99													
MW-3	7/19/99													
MW-3	7/28/99													
MW-3	8/4/99													
MW-3	8/9/99													
MW-3	8/16/99													
MW-3	8/18/99													
MW-3	8/23/99													

Statistical Summary: Mean & Standard Deviation Using All Analyses

Mean			0.0005	50.4	43.9	0.005	0.09	0.005	51.6	0.0033	0.0196	3.1	10.2	0.01
Std Dev			0.0005	1.78	17.7	0.005	0.09	0.005	51.6	0.0043	0.037	0.985	10.8	0.01
Mean + 1X Std Dev			0.001	52.18	61.6	0.01	0.18	0.01	103.2	0.0076	0.0566	4.085	21	0.02

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Water Quality Monitoring Data
Site MW-3

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Manganese, TR (mg/l)	Mercury, D (mg/l)	Mercury, TR (mg/l)	Mercury, T (mg/l)	Nickel, D (mg/l)	Nickel, TR (mg/l)	Potassium, D (mg/l)	Potassium, TR (mg/l)	Selenium, D (mg/l)	Selenium, TR (mg/l)	Silver, D (mg/l)
MW-3	1[illegible]/1[illegible]/[illegible]												
MW-3	6/22/99												
MW-3	6/29/99												
MW-3	7/6/99												
MW-3	7/13/99												
MW-3	7/19/99												
MW-3	7/28/99												
MW-3	8/4/99												
MW-3	8/9/99												
MW-3	8/16/99												
MW-3	8/18/99												
MW-3	8/23/99												

Statistical Summary: Mean & Standard Deviation Using All Analyses

Mean			1.34	0.00015	0.001	0.00021	0.005	0.05	1.7	4.37	0.002	0.004	0.0035
Std Dev			1.34	0.00011	0.001	0.00028	0.005	0.05	1.7	2.45	0.002	0.004	0.0017
Mean + 1X Std Dev			2.68	0.00026	0.002	0.00049	0.01	0.1	3.4	6.82	0.004	0.008	0.0052

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Water Quali, .onitoring Data
Site MW-3

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Silver, TR (mg/l)	Sodium, D (mg/l)	Sodium, TR (mg/l)	Zinc, D (mg/l)	Zinc, TR (mg/l)	Temperature (Cent)	Conductivity @ 25 C (micromho)	Conductivity, Field (micromho)	pH, Lab (su)	pH, Field (su)	Turbidity, Lab (NTU)
MW-3	16/16/99												
MW-3	6/22/99												
MW-3	6/29/99												
MW-3	7/6/99							12.4		180		7.8	
MW-3	7/13/99												
MW-3	7/19/99												
MW-3	7/28/99												
MW-3	8/4/99							12.5		210		7.65	
MW-3	8/9/99												
MW-3	8/16/99												
MW-3	8/18/99							10.5		280		7.59	
MW-3	8/23/99												

Statistical Summary: Mean & Standard Deviation Using All Analyses

Mean			0.0036	2.7	2.8	0.0353	0.0601	5.55	269.8	199.7	7.09	7.12	1250
Std Dev			0.002	2.7	0.283	0.15	0.235	2.36	48	53.9	6.92	6.89	1250
Mean + 1X Std Dev			0.0056	5.4	3.083	0.1853	0.2951	7.91	317.8	253.6	6.70	6.69	2500

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Water Quality Monitoring Data
Site MW-3

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Turbidity, Field (NTU)	Purge Volume (gallons)	Depth to Water (ft)
MW-3	16/18/99				19.15
MW-3	6/22/99				27.97
MW-3	6/29/99				32.72
MW-3	7/6/99			25	34.12
MW-3	7/13/99				35.63
MW-3	7/19/99				35.97
MW-3	7/28/99				36.29
MW-3	8/4/99				36.55
MW-3	8/9/99				37.99
MW-3	8/16/99				38.01
MW-3	8/18/99				37.91
MW-3	8/23/99				38.51

Statistical Summary: Mean & Standard Deviation Using All Analyses

Mean			122.1	52.5	34.7
Std Dev			279.3	38.9	11.2
Mean + 1X Std Dev			401.4	91.4	45.9

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Hecla Mining Company
Grouse Creek Unit

Water Quality Monitoring Data
Site MW-7

Report Date: 9/7/99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	()	Alkalinity (mg/l)	Bicarbonate (mg/l)	Carbonate (mg/l)	Hydroxide (mg/l)	Hardness (mg/l)	Chloride (mg/l)	Nitrate + Nitrite, D (mg/l)	Nitrate + Nitrite, T (mg/l)	Nitrate, D (mg/l)
MW-7	9/28/90			58	58							
MW-7	10/24/90			55								
MW-7	6/19/91			60	60							
MW-7	9/26/91			62	62							
MW-7	6/30/92			58	58							
MW-7	9/15/92			63	63							
MW-7	12/3/92			60	60							
MW-7	12/1/93			63								
MW-7	2/24/94			60								
MW-7	5/18/94			62	62							
MW-7	8/23/94			64	64				<1			
MW-7	11/17/94			60.8	60.8							
MW-7	2/25/95							112				
MW-7	9/30/95			64.2								
MW-7	11/16/95			62.2				109				
MW-7	2/18/96	Unsafe Access										
MW-7	6/6/96			63.4				109				
MW-7	8/18/96			65.2				108				
MW-7	8/18/96	Rerun										
MW-7	12/17/96			63.7				108				
MW-7	12/17/96	Duplicate		63.7				107				<0.1
MW-7	3/17/97	Unsafe Access										
MW-7	8/24/97			63.1				108				
MW-7	11/11/97			64.6				107				
MW-7	3/24/98	Unsafe Access										
MW-7	8/19/98			61.8				106				
MW-7	10/21/98			67	67			108		<0.02		
MW-7	3/29/99	Unsafe Access										
MW-7	5/26/99	Unsafe Access										
MW-7	6/7/99	Unsafe Access										
MW-7	6/14/99	Unsafe Access										
MW-7	6/22/99	Unsafe Access										
MW-7	7/6/99	Unsafe Access										
MW-7	7/19/99											
MW-7	7/28/99											
MW-7	8/4/99										0.05	
MW-7	8/9/99											
MW-7	8/23/99											
MW-7	8/30/99											

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Hecla Mining Company
Grouse Creek Unit

Water Quality Monitoring Data
Site MW-7

Report Date: 9/7/99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Nitrate, T (mg/l)	Nitrite, D (mg/l)	Ammonia (mg/l)	Sulfate (mg/l)	CN, Total (mg/l)	CN, WAD (mg/l)	TSS (mg/l)	TDS (mg/l)	Arsenic, D (mg/l)	Arsenic, TR (mg/l)	Calcium, D (mg/l)	Calcium, TR (mg/l)
MW-7	9/28/90						<0.002	<0.002		164	0.044	0.1		
MW-7	10/24/90						<0.002	<0.002	2	156		0.108		
MW-7	6/19/91						<0.002	<0.002	<2	162	0.1	0.104		
MW-7	9/26/91						<0.002	<0.002	6	160	0.095	0.095		
MW-7	6/30/92						<0.005	<0.005	<1	160	0.099	0.074		
MW-7	9/15/92						<0.005	<0.005	<1	152	0.1	0.1		
MW-7	12/3/92						<0.005	<0.005	<1	154	0.086	0.086		
MW-7	12/1/93						<0.005	<0.005	3	162		0.079		
MW-7	2/24/94						0.008	<0.005	1	162		0.06		
MW-7	5/18/94						<0.005	<0.005	4	162		0.065		
MW-7	8/23/94					54	<0.005	<0.005	1	168		0.08		33.4
MW-7	11/17/94						<0.005	<0.005	<1	154		0.075		
MW-7	2/25/95		<0.1				<0.005	<0.005	<1	152		0.067		
MW-7	9/30/95		<0.1				<0.005	<0.005	1	120		0.083		
MW-7	11/16/95		<0.1				<0.005	<0.005	2	142		0.051		
MW-7	2/18/96	Unsafe Access												
MW-7	6/6/96		<0.1				<0.005	<0.005	1	136		0.044		
MW-7	8/18/96		<0.1				0.025	<0.005	<1	172	0.07	0.07		
MW-7	8/18/96	Rerun					0.006							
MW-7	12/17/96		<0.1				<0.005	<0.005	<1	158	0.069	0.095		
MW-7	12/17/96	Duplicate					<0.005	<0.005	<1	148	0.069	0.088		
MW-7	3/17/97	Unsafe Access												
MW-7	8/24/97		<0.1				<0.005	<0.005	<2	160	0.056	0.065		
MW-7	11/11/97		<0.1					<0.005	11	170	0.067	0.12		
MW-7	3/24/98	Unsafe Access												
MW-7	8/19/98		0.1				<0.005	<0.005	<2		0.065	0.069		
MW-7	10/21/98			<0.01			<0.01			150	0.049	0.049	41.4	
MW-7	3/29/99	Unsafe Access												
MW-7	5/26/99	Unsafe Access												
MW-7	6/7/99	Unsafe Access												
MW-7	6/14/99	Unsafe Access												
MW-7	6/22/99	Unsafe Access												
MW-7	7/6/99	Unsafe Access												
MW-7	7/19/99													
MW-7	7/28/99													
MW-7	8/4/99				<0.1		<0.005	<0.005						
MW-7	8/9/99													
MW-7	8/23/99													
MW-7	8/30/99													

Less detectable data assumed as one-half the detection li Mean and Standard Deviation calculations.

Hecla Mining Company
Grouse Creek Unit

Water Quality Monitoring Data
Site MW-7

Report Date: 9/7/99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Lead, D (mg/l)	Lead, TR (mg/l)	Magnesium, D (mg/l)	Magnesium, TR (mg/l)	Mercury, D (mg/l)	Mercury, T (mg/l)	Potassium, TR (mg/l)	Silver, D (mg/l)	Silver, TR (mg/l)
MW-7	9/28/90		0.007	0.042						<0.01	<0.01
MW-7	10/24/90			0.003							<0.01
MW-7	6/19/91		0.001	0.001						<0.01	<0.01
MW-7	9/26/91		<0.001	0.001						<0.01	<0.01
MW-7	6/30/92		0.001	0.026						<0.0005	<0.0005
MW-7	9/15/92		0.004	0.005						0.0005	0.0005
MW-7	12/3/92		0.002	0.003						<0.005	<0.005
MW-7	12/1/93			0.005							<0.005
MW-7	2/24/94			<0.05							0.011
MW-7	5/18/94			0.008							<0.005
MW-7	8/23/94			0.006		0.041			2.18		<0.005
MW-7	11/17/94			<0.05							<0.005
MW-7	2/25/95			<0.005							<0.005
MW-7	9/30/95			<0.005							<0.005
MW-7	11/16/95			<0.005							<0.005
MW-7	2/18/96	Unsafe Access									
MW-7	6/6/96			<0.005				<0.0002			<0.005
MW-7	8/18/96		<0.005	<0.005			<0.0002	<0.0002		<0.005	<0.005
MW-7	8/18/96	Rerun									
MW-7	12/17/96		<0.005	<0.005			<0.0002	<0.0002		<0.005	<0.005
MW-7	12/17/96	Duplicate	<0.005	0.009			<0.0002	<0.0002		<0.005	<0.005
MW-7	3/17/97	Unsafe Access									
MW-7	8/24/97		<0.005	0.011				<0.0005		<0.005	<0.005
MW-7	11/11/97		<0.005	0.011			<0.0002	<0.0005		<0.005	<0.005
MW-7	3/24/98	Unsafe Access									
MW-7	8/19/98		0.007	0.013			<0.0002	<0.0002		<0.005	<0.005
MW-7	10/21/98		<0.001	0.005	1.2		<0.0002	<0.0002		<0.005	<0.005
MW-7	3/29/99	Unsafe Access									
MW-7	5/26/99	Unsafe Access									
MW-7	6/7/99	Unsafe Access									
MW-7	6/14/99	Unsafe Access									
MW-7	6/22/99	Unsafe Access									
MW-7	7/6/99	Unsafe Access									
MW-7	7/19/99										
MW-7	7/28/99										
MW-7	8/4/99										
MW-7	8/9/99										
MW-7	8/23/99										
MW-7	8/30/99										

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Hecla Mining Company
Grouse Creek Unit

Water Quality Monitoring Data
Site MW-7

Report Date: 9/7/99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Sodium, TR (mg/l)	Zinc, D (mg/l)	Zinc, TR (mg/l)	Temperature (C)	Temperature (Cent)	Conductivity @ 25 C (micromho)	Conductivity, Field (micromho)	Conductivity (umhos/cm)
MW-7	9/28/90			<0.01	0.1					
MW-7	10/24/90				0.03					
MW-7	6/19/91			<0.01	0.02		6.1			
MW-7	9/26/91			<0.01	0.02		4.4			
MW-7	6/30/92			0.005	0.051		3.3			
MW-7	9/15/92			0.014	0.022		4.4			
MW-7	12/3/92			0.009	0.083		<0.1			
MW-7	12/1/93				0.023		3.3			
MW-7	2/24/94				0.029		1.1			
MW-7	5/18/94				0.007		3.9	221	220	
MW-7	8/23/94		6.29		0.041		6.1		768	
MW-7	11/17/94				0.117		3.9		250	
MW-7	2/25/95				0.125					
MW-7	9/30/95				0.015				190	
MW-7	11/16/95				0.016		4.9		240	
MW-7	2/18/96	Unsafe Access								
MW-7	6/6/96				0.041		4.3		190	
MW-7	8/18/96			<0.005	0.041		4.9		160	
MW-7	8/18/96	Rerun								
MW-7	12/17/96			<0.005	0.022		0.6		280	
MW-7	12/17/96	Duplicate		<0.005	0.359					
MW-7	3/17/97	Unsafe Access								
MW-7	8/24/97			0.007	0.106					
MW-7	11/11/97			0.013	0.073					
MW-7	3/24/98	Unsafe Access								
MW-7	8/19/98			0.02	0.015		8.8		200	
MW-7	10/21/98			0.02	0.02		5.5	262	220	
MW-7	3/29/99	Unsafe Access								
MW-7	5/26/99	Unsafe Access								
MW-7	6/7/99	Unsafe Access								
MW-7	6/14/99	Unsafe Access								
MW-7	6/22/99	Unsafe Access								
MW-7	7/6/99	Unsafe Access								
MW-7	7/19/99					8.1	8.1		160	160
MW-7	7/28/99									
MW-7	8/4/99						6.2		220	
MW-7	8/9/99									
MW-7	8/23/99									
MW-7	8/30/99					8.3			200	

Less detectable data assumed as one-half the detection li Mean and Standard Deviation calculations.

Hecla Mining Company
Grouse Creek Unit

Water Quality Monitoring Data
Site MW-7

Report Date: 9/7/99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	pH, Lab (su)	pH, Field (su)	Turbidity, Field (NTU)	pH (Standard Units)	Purge Volume (gallons)
MW-7	9/28/90		7.9				
MW-7	10/24/90			8			
MW-7	6/19/91		8	8			
MW-7	9/26/91		7.1	8			
MW-7	6/30/92		7.9	7.6			
MW-7	9/15/92		7.8	8			
MW-7	12/3/92		7.8				
MW-7	12/1/93			7.6			
MW-7	2/24/94		7.5	7.8			
MW-7	5/18/94		7.7	8.2			
MW-7	8/23/94		6.8	8.2			
MW-7	11/17/94		7.6	8			
MW-7	2/25/95			6.9			
MW-7	9/30/95			8	0.25		
MW-7	11/16/95			7.5	6		
MW-7	2/18/96	Unsafe Access					
MW-7	6/6/96			7.3	0.85		
MW-7	8/18/96			7.6	0.74		
MW-7	8/18/96	Rerun					
MW-7	12/17/96			6.9	5.85		
MW-7	12/17/96	Duplicate					
MW-7	3/17/97	Unsafe Access					
MW-7	8/24/97						
MW-7	11/11/97						
MW-7	3/24/98	Unsafe Access					
MW-7	8/19/98			7.27			
MW-7	10/21/98		7.3	7.28			
MW-7	3/29/99	Unsafe Access					
MW-7	5/26/99	Unsafe Access					
MW-7	6/7/99	Unsafe Access					
MW-7	6/14/99	Unsafe Access					
MW-7	6/22/99	Unsafe Access					
MW-7	7/6/99	Unsafe Access					
MW-7	7/19/99			7.9		7.9	
MW-7	7/28/99						
MW-7	8/4/99			8.84			
MW-7	8/9/99						
MW-7	8/23/99						
MW-7	8/30/99						7.75

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Hecla Mining Company
Grouse Creek Unit

Water Quality Monitoring Data
Site MW-11

Report Date: 9/7/99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Alkalinity (mg/l)	Bicarbonate (mg/l)	Carbonate (mg/l)	Hydroxide (mg/l)	Hardness (mg/l)	Chloride (mg/l)	Nitrate + Nitrite, D (mg/l)	Nitrate + Nitrite, T (mg/l)	Nitrate, D (mg/l)	Nitrate, T (mg/l)	Nitrite, D (mg/l)	Ammonia (mg/l)	Sulfate (mg/l)	Sulfide (mg/l)	Sulfite (mg/l)	CN, Free (mg/l)
MW-11	10/21/98		88	62			173		0.98			<0.02	<0.01					
MW-11	10/22/98																	
MW-11	11/26/98																	
MW-11	12/12/98																	
MW-11	12/24/98																	
MW-11	1/7/99																	
MW-11	1/21/99																	
MW-11	2/4/99																	
MW-11	2/18/99																	
MW-11	3/4/99																	
MW-11	3/8/99																	
MW-11	3/18/99																	
MW-11	3/29/99		49	49	<2	<2												
MW-11	3/29/99	Duplicate	49	49	<2	<2												
MW-11	4/1/99																	
MW-11	4/15/99																	
MW-11	4/29/99																	
MW-11	5/13/99																	
MW-11	6/7/99		18	18	<2	<2		<0.5	0.91				<0.01		70		3	0.2
MW-11	7/7/99									0.53				<0.1				
MW-11	7/8/99																	
MW-11	7/10/99																	
MW-11	7/20/99																	
MW-11	7/22/99																	
MW-11	8/1/99																	
MW-11	8/2/99																	
MW-11	8/3/99									0.66				<0.1				
MW-11	8/4/99																	
MW-11	8/5/99																	
MW-11	8/6/99																	
MW-11	8/7/99																	
MW-11	8/8/99																	
MW-11	8/9/99																	
MW-11	8/10/99																	
MW-11	8/11/99																	
MW-11	8/12/99																	
MW-11	8/13/99																	
MW-11	8/14/99																	
MW-11	8/15/99																	
MW-11	8/16/99																	
MW-11	8/17/99																	
MW-11	8/18/99																	
MW-11	8/19/99																	
MW-11	8/20/99																	
MW-11	8/21/99																	
MW-11	8/22/99																	

Statistical Summary: Mean & Standard Deviation Using All Analyses

Mean			49.3	48.5	1	1	74.3	0.44	0.621	0.595	0.492	0.397	0.005	0.0488	30.8	0.03	3	0.2
Std Dev			20.9	22.3	0	0	40.8	0.192	0.261	0.0919	0.169	0.339	0	0.0184	21.7	0.0141	3	0.2
Mean + 1X Std Dev			70.2	70.8	1	1	115.1	0.632	0.882	0.6869	0.661	0.736	0.005	0.0672	52.5	0.0441	6	0.4

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Water Quality Monitoring Data
Site MW-11

Site Number	Sample Date	Duplicate/ Rerun/No Sample	CN, Total (mg/l)	CN, WAD (mg/l)	Thiocyanate (mg/l)	TSS (mg/l)	TDS (mg/l)	SAR (Ratio)	Sum of Cations (meq/l)	Sum of Anions (meq/l)	Cation & Anion Sum (meq/l)	Aluminum, D (mg/l)	Aluminum, TR (mg/l)	Arsenic, D (mg/l)	Arsenic, TR (mg/l)	Cadmium, D (mg/l)
MW-11	10/23/98		1.8	0.22		10	230							<0.001	0.003	
MW-11	10/22/98		1.8													
MW-11	11/26/98			1.16												
MW-11	12/12/98		3.1	1.24												
MW-11	12/24/98		3.6	0.79												
MW-11	1/7/99		4.1	1.17												
MW-11	1/21/99		3.66	0.62												
MW-11	2/4/99		3.2	1												
MW-11	2/18/99		4	1.11												
MW-11	3/4/99		3.8	1.3												
MW-11	3/8/99															
MW-11	3/18/99		3	0.4												
MW-11	3/29/99		2.4	0.7		<5	220							0.001	0.002	
MW-11	3/29/99	Duplicate	2.4	0.7		<5	230							<0.001	0.003	
MW-11	4/1/99		2.3	0.6												
MW-11	4/15/99		1.9	0.48												
MW-11	4/29/99		0.57	0.21												
MW-11	5/13/99		0.78	0.27												
MW-11	6/7/99		0.97	0.23	<0.1	6	140					0.09	0.82	<0.001	0.003	<0.0005
MW-11	7/7/99		0.281	0.125												
MW-11	7/8/99		0.5	0.08												
MW-11	7/10/99															
MW-11	7/20/99															
MW-11	7/22/99		0.62	0.097												
MW-11	8/1/99															
MW-11	8/2/99															
MW-11	8/3/99		0.622	0.138												
MW-11	8/4/99															
MW-11	8/5/99															
MW-11	8/6/99															
MW-11	8/7/99															
MW-11	8/8/99															
MW-11	8/9/99															
MW-11	8/10/99															
MW-11	8/11/99															
MW-11	8/12/99															
MW-11	8/13/99															
MW-11	8/14/99															
MW-11	8/15/99															
MW-11	8/16/99															
MW-11	8/17/99															
MW-11	8/18/99															
MW-11	8/19/99															
MW-11	8/20/99															
MW-11	8/21/99															
MW-11	8/22/99															

Statistical Summary: Mean & Standard Deviation Using All A

Mean			1.6	0.217	0.05	4.22	129.9	0.377	1.43	1.35	2.79	0.065	0.888	0.0027	0.006	0.0016
Std Dev			1.63	0.325	0	3.91	54	0.0222	0.67	0.584	1.27	0.0394	0.52	0.0017	0.0043	0.00097
Mean + 1X Std Dev			3.23	0.542	0.05	8.13	183.9	0.3992	2.1	1.934	4.06	0.1044	1.208	0.0044	0.0103	0.00257

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Hecla Mining Company
Grouse Creek Unit

Water Quality Monitoring Data
Site MW-11

Report Date: 9/7/99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Cadmium, TR (mg/l)	Calcium, D (mg/l)	Calcium, TR (mg/l)	Chromium, D (mg/l)	Chromium, TR (mg/l)	Copper, D (mg/l)	Copper, TR (mg/l)	Iron, D (mg/l)	Iron, TR (mg/l)	Lead, D (mg/l)	Lead, TR (mg/l)	Magnesium, D (mg/l)	Magnesium, TR (mg/l)	Manganese, D (mg/l)
MW-11	10/23/98			33.4								<0.001	<0.001	5.1		
MW-11	10/22/98															
MW-11	11/26/98															
MW-11	12/12/98															
MW-11	12/24/98															
MW-11	1/7/99															
MW-11	1/21/99															
MW-11	2/4/99															
MW-11	2/18/99															
MW-11	3/4/99															
MW-11	3/8/99															
MW-11	3/16/99															
MW-11	3/29/99											<0.04	<0.04			
MW-11	3/29/99	Duplicate										<0.04	<0.04			
MW-11	4/1/99															
MW-11	4/15/99															
MW-11	4/29/99															
MW-11	5/13/99															
MW-11	6/7/99		<0.0005	27	21.4			0.01	<0.01	0.25	0.41	<0.001	<0.001	3.6	2.9	0.12
MW-11	7/7/99															
MW-11	7/8/99															
MW-11	7/10/99															
MW-11	7/20/99															
MW-11	7/22/99															
MW-11	8/1/99															
MW-11	8/2/99															
MW-11	8/3/99															
MW-11	8/4/99															
MW-11	8/5/99															
MW-11	8/6/99															
MW-11	8/7/99															
MW-11	8/8/99															
MW-11	8/9/99															
MW-11	8/10/99															
MW-11	8/11/99															
MW-11	8/12/99															
MW-11	8/13/99															
MW-11	8/14/99															
MW-11	8/15/99															
MW-11	8/16/99															
MW-11	8/17/99															
MW-11	8/18/99															
MW-11	8/19/99															
MW-11	8/20/99															
MW-11	8/21/99															
MW-11	8/22/99															

Statistical Summary: Mean & Standard Deviation Using All A

Mean			0.0014	22.6	19.9	0.0067	0.0044	0.008	0.008	0.2	0.737	0.0066	0.0063	13.7	2.96	0.0466
Std Dev			0.0008	8.29	6.86	0.0029	0.0012	0.0027	0.0067	0.131	0.704	0.0075	0.0087	29.7	1.08	0.0484
Mean + 1X Std Dev			0.0022	30.89	26.76	0.0096	0.0056	0.0107	0.0147	0.331	1.441	0.0141	0.013	43.4	4.04	0.095

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Manganese, TR (mg/l)	Mercury, D (mg/l)	Mercury, TR (mg/l)	Mercury, T (mg/l)	Nickel, D (mg/l)	Nickel, TR (mg/l)	Potassium, D (mg/l)	Potassium, TR (mg/l)	Selenium, D (mg/l)	Selenium, TR (mg/l)	Silver, D (mg/l)	Silver, TR (mg/l)	Silica, D (mg/l)	Silica, T (mg/l)	Sodium, D (mg/l)
MW-11	10/21/98			<0.0002	0.0003	0.0003							<0.005	<0.005			
MW-11	10/22/98																
MW-11	11/26/98					0.0018											
MW-11	12/12/98					0.0012											
MW-11	12/24/98					0.0014											
MW-11	1/7/99					0.0013											
MW-11	1/21/99					0.0007											
MW-11	2/4/99					0.0014											
MW-11	2/18/99					0.0012											
MW-11	3/4/99					0.0015											
MW-11	3/8/99																
MW-11	3/18/99					0.0013											
MW-11	3/29/99												<0.005	<0.005			
MW-11	3/29/99	Duplicate											<0.005	<0.005			
MW-11	4/1/99					0.0014											
MW-11	4/15/99					0.0013											
MW-11	4/29/99					0.0009											
MW-11	5/13/99					0.0008											
MW-11	6/7/99		0.107		0.0005		<0.01	<0.01	1.9	1.6	0.002	0.002	<0.0005	<0.0005			7.2
MW-11	7/7/99				0.0004	0.0004											
MW-11	7/8/99					0.0004											
MW-11	7/10/99																
MW-11	7/20/99																
MW-11	7/22/99					0.0004											
MW-11	8/1/99																
MW-11	8/2/99																
MW-11	8/3/99																
MW-11	8/4/99																
MW-11	8/5/99																
MW-11	8/6/99																
MW-11	8/7/99																
MW-11	8/8/99																
MW-11	8/9/99																
MW-11	8/10/99																
MW-11	8/11/99																
MW-11	8/12/99																
MW-11	8/13/99																
MW-11	8/14/99																
MW-11	8/15/99																
MW-11	8/16/99																
MW-11	8/17/99																
MW-11	8/18/99																
MW-11	8/19/99																
MW-11	8/20/99																
MW-11	8/21/99																
MW-11	8/22/99																

Statistical Summary: Mean & Standard Deviation Using All A

Mean			0.052	0.00039	0.0004	0.00069	0.005	0.008	1.42	1.73	0.00088	0.00088	0.0023	0.0029	22.9	23.2	6.8
Std Dev			0.0441	0.00076	0.0001	0.00091	0	0.0022	0.295	0.327	0.00075	0.00075	0.0006	0.0018	2.73	2.13	1.5
Mean + 1X Std Dev			0.0961	0.00115	0.0005	0.0016	0.005	0.0082	1.715	2.057	0.00163	0.00163	0.0029	0.0048	25.63	25.33	8.3

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Water Quality Monitoring Data
Site MW-11

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Sodium, TR (mg/l)	Zinc, D (mg/l)	Zinc, TR (mg/l)	Temperature (Cent)	Conductivity @ 25 C (micromho)	Conductivity, Field (micromho)	pH, Lab (su)	pH, Field (su)	Turbidity, Field (NTU)	Flow (gpm)	Flow (cfs)
MW-11	10/23/98			<0.01	<0.01		274		7.3				
MW-11	10/22/98											43	0.0958
MW-11	11/26/98											35	0.078
MW-11	12/12/98											38	0.0847
MW-11	12/24/98											38	0.0847
MW-11	1/7/99											38	0.0847
MW-11	1/21/99											40	0.0891
MW-11	2/4/99												
MW-11	2/18/99												
MW-11	3/4/99												
MW-11	3/8/99							250		7.1	3.3	40	0.0891
MW-11	3/18/99												
MW-11	3/29/99			0.02	0.04	7.4		310	6.7	7.96	3.95		
MW-11	3/29/99	Duplicate		0.02	0.04				6.8				
MW-11	4/1/99												
MW-11	4/15/99												
MW-11	4/29/99												
MW-11	5/13/99												
MW-11	6/7/99		6.1	0.05	0.06	6.9	208	190	6.2	6.9			
MW-11	7/7/99					11.3				7.2			
MW-11	7/8/99												
MW-11	7/10/99							100		7.02		394	
MW-11	7/20/99							90		7.11	2.7	363	0.8088
MW-11	7/22/99												
MW-11	8/1/99							90		7.13	3.7	685	0.7085
MW-11	8/2/99							150		7.14	4.7	310	0.6907
MW-11	8/3/99							130		7.37	6.7	300	0.6684
MW-11	8/4/99							100		6.81	3.9	280	0.6238
MW-11	8/5/99							110		6.92	3	283	0.6305
MW-11	8/6/99							100		7.05	3.4	279	0.6216
MW-11	8/7/99							100		7.07	2.2	273	0.6082
MW-11	8/8/99							110		6.95	2.9	263	0.586
MW-11	8/9/99							140		7.08	4.1	263	0.586
MW-11	8/10/99							130		7.33	2.5	259	0.577
MW-11	8/11/99							140		7.55	2.6	250	0.5659
MW-11	8/12/99							120		7.25	9.7	253	0.5637
MW-11	8/13/99							150		7.17	4.4	241	0.5369
MW-11	8/14/99							120		7.11	2.8	238	0.5303
MW-11	8/15/99							120		7.3	2	231	0.5147
MW-11	8/16/99							110		7.33	2.5	228	0.508
MW-11	8/17/99					12		120		7.1	2.2	221	0.4924
MW-11	8/18/99							150		7.66	1.6	223	0.5013
MW-11	8/19/99							150		7.74	2.2	220	0.4901
MW-11	8/20/99							160		7.16	2	212	0.4723
MW-11	8/21/99							150		7.2	3.1	208	0.4634
MW-11	8/22/99							160		7.69	2	210	0.4679

Statistical Summary: Mean & Standard Deviation Using All A

Mean			6.42	0.0115	0.0282	8.71	172.6	145	6.619788758	7.200859451	4.39	192.4	0.415
Std Dev			1.32	0.0124	0.025	2.54	63.7	61.7	6.657577319	7.468521083	3.92	141.3	0.292
Mean + 1X Std Dev			7.74	0.0239	0.0532	9.25	236.3	206.7	6.337242168	7.013228266	8.31	333.7	0.707

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Hecla Mining Company
Grouse Creek Unit

Water Quality Monitoring Data
Site MW-12

Report Date. 9/7/99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	()	Alkalinity (mg/l)	Bicarbonate (mg/l)	Carbonate (mg/l)	Hydroxide (mg/l)	Hardness (mg/l)	Chloride (mg/l)	Nitrate + Nitrite, D (mg/l)	Nitrate + Nitrite, T (mg/l)	Nitrate, D (mg/l)	Nitrate, T (mg/l)	Nitrite, D (mg/l)	Ammonia (mg/l)	Phosphorus, D (mg/l)	Sulfate (mg/l)	Sulfide (mg/l)
MW-12	5/6/99																570	
MW-12	5/13/99																	
MW-12	5/20/99																	
MW-12	5/27/99																	
MW-12	6/3/99																	
MW-12	6/7/99			<2	<2	<2	<2		<1	0.53				<0.01	0.33		930	
MW-12	6/10/99																	
MW-12	6/17/99																935	
MW-12	6/24/99																	
MW-12	7/1/99																	
MW-12	7/7/99										0.62				0.2			
MW-12	7/8/99																	
MW-12	7/29/99																	
MW-12	8/3/99										0.2				<0.1			
MW-12	8/5/99																	
MW-12	8/12/99																	
MW-12	8/17/99																	

Statistical Summary: Mean & Standard Deviation Using All Analyses

Mean			0.292	1.1	1.17	1	1	67.2	0.542	1.06	0.0779	1.05	0.522	0.005	0.372	2.236572006	215.1	0.01
Std Dev			0.292	0.469	0.408	0	0	14.3	0.177	1.09	0.18	1.06	0.559	0	0.561	2.142667504	267.4	0
Mean + 1X Std Dev			0.584	1.569	1.578	1	1	81.5	0.719	2.15	0.2579	2.11	1.081	0.005	0.933	1.886056846	482.5	0.01

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Sulfite (mg/l)	CN, Free (mg/l)	CN, Total (mg/l)	CN, WAD (mg/l)	Thiocyanate (mg/l)	TSS (mg/l)	TDS (mg/l)	SAR (Ratio)	Sum of Anions (meq/l)	Aluminum, D (mg/l)	Aluminum, TR (mg/l)	Antimony, T (mg/l)	Arsenic, D (mg/l)	Arsenic, TR (mg/l)	Cadmium, D (mg/l)	Cadmium, TR (mg/l)
MW-12	6/8/99							76.7	792			63.9	61					
MW-12	5/13/99																	
MW-12	5/20/99																	
MW-12	5/27/99																	
MW-12	6/3/99																	
MW-12	6/7/99		<2	<0.1	<0.01	<0.01	<0.1	8	1060			103	95.3		1.81	1.96	0.0053	0.0052
MW-12	6/10/99																	
MW-12	6/17/99							7.6	1210		19.5	92.7	92.4					
MW-12	6/24/99																	
MW-12	7/1/99																	
MW-12	7/7/99				<0.005	<0.005												
MW-12	7/8/99																	
MW-12	7/29/99																	
MW-12	8/3/99				<0.005	<0.005												
MW-12	8/5/99																	
MW-12	8/12/99																	
MW-12	8/17/99																	

Statistical Summary: Mean & Standard Deviation Using All A

Mean			1	0.1	0.044	0.0194	0.05	22.3	285.3	0.0833	10.5	27.5	23.3	0.00075	0.404	0.102	1.69	0.0024
Std Dev			1	0.166	0.181	0.0942	0	37.2	294.3	0.0058	12.8	39.1	31.6	0.00033	0.404	0.329	5.34	0.0025
Mean + 1X Std Dev			2	0.266	0.225	0.1136	0.05	59.5	579.6	0.0691	23.3	66.6	54.9	0.00108	0.508	0.431	7.03	0.0049

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Water Quality Monitoring Data
Site MW-12

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Calcium, D (mg/l)	Calcium, TR (mg/l)	Chromium, D (mg/l)	Chromium, TR (mg/l)	Copper, D (mg/l)	Copper, TR (mg/l)	Iron, D (mg/l)	Iron, TR (mg/l)	Lead, D (mg/l)	Lead, TR (mg/l)	Magnesium, D (mg/l)	Magnesium, TR (mg/l)	Manganese, D (mg/l)	Manganese, TR (mg/l)
MW-12	5/5/99						0.38	0.349	47.7	47.8						
MW-12	5/13/99															
MW-12	5/20/99															
MW-12	5/27/99															
MW-12	6/3/99															
MW-12	6/7/99		34.9	32.1			0.71	0.66	91.2	84.9	0.016	0.023	6.9	6.4	1.31	1.21
MW-12	6/10/99															
MW-12	6/17/99						0.678	0.682	82.3	80.8		80.8				
MW-12	6/24/99															
MW-12	7/1/99															
MW-12	7/7/99															
MW-12	7/8/99															
MW-12	7/29/99															
MW-12	8/3/99															
MW-12	8/5/99															
MW-12	8/12/99															
MW-12	8/17/99															

Statistical Summary: Mean & Standard Deviation Using All A

Mean			22.4	22.3	8.77	0.0058	0.147	0.13	17.6	15.5	0.0064	2.26	2.86	2.62	0.515	0.481
Std Dev			6.85	5.23	11	0.0018	0.251	0.187	33.4	28.1	0.0114	13.5	1.69	0.998	0.326	0.231
Mean + 1X Std Dev			29.25	27.53	19.77	0.0077	0.398	0.317	51	43.6	0.0178	15.76	4.55	3.618	0.841	0.712

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Water Quality Monitoring Data
Site MW-12

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Mercury, D (mg/l)	Mercury, TR (mg/l)	Mercury, T (mg/l)	Nickel, D (mg/l)	Nickel, TR (mg/l)	Potassium, D (mg/l)	Potassium, TR (mg/l)	Selenium, D (mg/l)	Selenium, TR (mg/l)	Silver, D (mg/l)	Silver, TR (mg/l)	Silica, D (mg/l)	Silica, T (mg/l)	Sodium, D (mg/l)	Sodium, TR (mg/l)
MW-12	4/8/99																
MW-12	5/13/99																
MW-12	5/20/99																
MW-12	5/27/99																
MW-12	6/3/99																
MW-12	6/7/99			0.0002		0.08	0.08	5.4	4.7	0.024	0.013	0.0038	0.0047			1.1	1
MW-12	6/10/99																
MW-12	6/17/99																
MW-12	6/24/99																
MW-12	7/1/99																
MW-12	7/7/99																
MW-12	7/8/99																
MW-12	7/29/99																
MW-12	8/3/99																
MW-12	8/5/99																
MW-12	8/12/99																
MW-12	8/17/99																

Statistical Summary: Mean & Standard Deviation Using All A

Mean			0.000095	0.00015	0.00043	0.025	0.0189	4.25	4.2	0.0042	0.0049	0.0026	0.0026	18.6	17.3	1.24	2.19
Std Dev			0.000033	0.000071	0.00065	0.0367	0.0194	1.63	0.605	0.0088	0.0041	0.0031	0.0021	2.1	9.34	0.232	2.06
Mean + 1X Std Dev			0.000128	0.000221	0.00108	0.0617	0.0383	5.88	4.805	0.013	0.009	0.0057	0.0047	20.7	26.64	1.472	4.25

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Water Quality Monitoring Data
Site MW-12

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Thallium, T (mg/l)	Zinc, D (mg/l)	Zinc, TR (mg/l)	Temperature (Cent)	Conductivity @ 25 C (micromho)	Conductivity, Field (micromho)	pH, Lab (su)	pH, Field (su)	Turbidity, Lab (NTU)	Turbidity, Field (NTU)	Flow (gpm)	Flow (cfs)
MW-12	8/8/89			1.91	1.69		976	690	2.88	3.05		70.2		
MW-12	5/13/99							1120		2.87		6		
MW-12	5/20/99							1200		2.89		16.7		
MW-12	5/27/99							1490		2.62		16.6		
MW-12	6/3/99							470		3.21		155		
MW-12	6/7/99			2.55	2.32		1830	1670	2.8	3	7.1			
MW-12	6/10/99							1150		2.98		9.8		
MW-12	6/17/99			2.35	2.28		1490	1260	2.82	2.74		9.8		
MW-12	6/24/99							1230		5.5		270		
MW-12	7/1/99							920		2.96		14.4		
MW-12	7/7/99					16.9				3.2				
MW-12	7/8/99							690		3.183		4.9		
MW-12	7/29/99							510		3.5		13.7		
MW-12	8/3/99													
MW-12	8/5/99							460		3.46		10.3		
MW-12	8/12/99							520		3.32		7		
MW-12	8/17/99					22.9		450		3.53				

Statistical Summary: Mean & Standard Deviation Using All A

Mean			0.00033	0.64	0.495	9.92	461.1	383.8	3.37675071	3.48148606	10.6	41.3	33.5	0.0745
Std Dev			0.00018	0.849	0.629	5.17	487.5	297.8	3.259637311	3.366531544	2.76	127.4	23.5	0.0523
Mean + 1X Std Dev			0.00051	1.489	1.124	15.09	948.6	681.7	3.013228266	3.119188408	13.36	168.7	57	0.1268

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Site Number	Sample Date	Duplicate/ Rerun/No Sample	()	Alkalinity (mg/l)	Bicarbonate (mg/l)	Carbonate (mg/l)	Hydroxide (mg/l)	Hardness (mg/l)	Chloride (mg/l)	Nitrate + Nitrite, D (mg/l)	Nitrate, D (mg/l)	Nitrate, T (mg/l)	Nitrite, D (mg/l)	Sulfate (mg/l)	Sulfite (mg/l)	CN, Free (mg/l)	CN, Total (mg/l)	CN, WAD (mg/l)	Thiocyanate (mg/l)	TSS (mg/l)	TDS (mg/l)
MW-13	1/21/99																<0.005	<0.005			
MW-13	2/4/99																<0.005	<0.005			
MW-13	2/21/99																<0.005	<0.005			
MW-13	3/4/99																<0.005	<0.005			
MW-13	3/29/99			109	109	<2	<2										<0.01	<0.01		<5	120
MW-13	4/20/99																<0.005	<0.005			
MW-13	5/13/99																<0.005	<0.005			
MW-13	5/26/99																				
MW-13	6/7/99			109	109	<2	<2		<0.6	<0.02			<0.01	20	<2	<0.1	<0.1	<0.01	<0.1	24	130
MW-13	6/14/99																				
MW-13	7/13/99																				
MW-13	7/19/99																				
MW-13	7/28/99																				
MW-13	8/9/99																				
MW-13	8/16/99																				
MW-13	8/17/99																				
MW-13	8/23/99																				

Statistical Summary: Mean & Standard Deviation Using All Analyses

Mean			0.0523	94.8	105.5	1	1	59.6	0.25	0.01	0.07	0.0673	0.005	20	1	0.05	0.0041	0.003	0.05	7.36	129.8
Std Dev			0.0523	8.73	5.74	0	0	26.5	0.25	0	0.0849	0.0502	8E-11	20	1	0.05	0.0066	0.0017	0.05	7.43	28.6
Mean + 1X Std Dev			0.1046	103.53	111.24	1	1	86.1	0.5	0.01	0.1549	0.1175	0.005	40	2	0.1	0.0107	0.0047	0.1	14.79	158.5

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Hecla Mining Company
Grouse Creek Unit

Water Quality Monitoring Data
Site MW-13

Report Date: 9/7/99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Aluminum, D (mg/l)	Aluminum, TR (mg/l)	Arsenic, D (mg/l)	Arsenic, TR (mg/l)	Cadmium, D (mg/l)	Cadmium, TR (mg/l)	Calcium, D (mg/l)	Calcium, TR (mg/l)	Copper, D (mg/l)	Copper, TR (mg/l)	Iron, D (mg/l)	Iron, TR (mg/l)	Lead, D (mg/l)	Lead, TR (mg/l)	Magnesium, D (mg/l)	Magnesium, TR (mg/l)
MW-13	12/28/98																	
MW-13	2/4/99																	
MW-13	2/21/99																	
MW-13	3/4/99																	
MW-13	3/29/99				0.002	0.001									<0.04	<0.04		
MW-13	4/20/99																	
MW-13	5/13/99																	
MW-13	5/26/99																	
MW-13	6/7/99		<0.03	3.2	0.001	0.002	<0.0005	<0.0005	18.1	19.1	<0.01	<0.01	0.26	4.22	<0.001	0.008	2	2.6
MW-13	6/14/99																	
MW-13	7/13/99																	
MW-13	7/19/99																	
MW-13	7/28/99																	
MW-13	8/9/99																	
MW-13	8/16/99																	
MW-13	8/17/99																	
MW-13	8/23/99																	

Statistical Summary: Mean & Standard Deviation Using All

Mean			0.015	3.2	0.002	0.0023	0.00025	0.00025	18.4	19.1	0.005	0.005	0.26	4.22	0.0044	0.0055	1.9	2.6
Std Dev			0.015	3.2	0.00089	0.00058	0.00025	0.00025	0.85	19.1	0.005	0.005	0.26	4.22	0.0057	0.0058	0.1	2.6
Mean + 1X Std Dev			0.03	6.4	0.00289	0.00288	0.0005	0.0005	19.25	38.2	0.01	0.01	0.52	8.44	0.0101	0.0114	2	5.2

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Manganese, D (mg/l)	Manganese, TR (mg/l)	Mercury, D (mg/l)	Mercury, TR (mg/l)	Mercury, T (mg/l)	Nickel, D (mg/l)	Nickel, TR (mg/l)	Potassium, D (mg/l)	Potassium, TR (mg/l)	Selenium, D (mg/l)	Selenium, TR (mg/l)	Silver, D (mg/l)	Silver, TR (mg/l)	Sodium, D (mg/l)	Sodium, TR (mg/l)	Zinc, D (mg/l)
MW-13	12/28/98						<0.0002											
MW-13	2/4/99						<0.0002											
MW-13	2/21/99						<0.0002											
MW-13	3/4/99						<0.0002											
MW-13	3/29/99													<0.005	<0.005			0.01
MW-13	4/20/99						<0.0002											
MW-13	5/13/99						<0.0002											
MW-13	5/26/99																	
MW-13	6/7/99		0.068	0.118		<0.0002		<0.01	<0.01	0.9	2.2	<0.001	<0.001	<0.0005	<0.0005	32.7	30.8	<0.01
MW-13	6/14/99																	
MW-13	7/13/99																	
MW-13	7/19/99																	
MW-13	7/28/99																	
MW-13	8/9/99																	
MW-13	8/16/99																	
MW-13	8/17/99																	
MW-13	8/23/99																	

Statistical Summary: Mean & Standard Deviation Using All

Mean			0.068	0.118	0.000016	0.0001	0.000013	0.005	0.005	0.9	2.2	0.0005	0.0005	0.0023	0.0029	32.7	30.8	0.0045
Std Dev			0.068	0.118	0.000079	0.0001	0.000068	0.005	0.005	0.9	2.2	0.0005	0.0005	0.00068	0.0023	32.7	30.8	0.0029
Mean + 1X Std Dev			0.136	0.236	0.000229	0.0002	0.000198	0.01	0.01	1.8	4.4	0.001	0.001	0.00288	0.0052	65.4	61.6	0.0074

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Zinc, TR (mg/l)	Temperature (Cent)	Conductivity @ 25 C (micromho)	Conductivity, Field (micromho)	pH, Lab (su)	pH, Field (su)	Turbidity, Field (NTU)	Depth to Water (ft)
MW-13	12/28/98									
MW-13	2/4/99									
MW-13	2/21/99									
MW-13	3/4/99									
MW-13	3/29/99		0.01	5.8		220	7.1	7.04	3.81	
MW-13	4/20/99									
MW-13	5/13/99									
MW-13	5/26/99									28.25
MW-13	6/7/99		0.03	6.2	247	210	6.8	8.3		34
MW-13	6/14/99									13.36
MW-13	7/13/99									13.03
MW-13	7/19/99									13
MW-13	7/28/99									12.93
MW-13	8/9/99									8.21
MW-13	8/16/99									5.9
MW-13	8/17/99									5.93
MW-13	8/23/99									5.92

Statistical Summary: Mean & Standard Deviation Using All

Mean			0.0143	7.2	238.7	197.9	6.95660731	7.20065945	6.59	22.3
Std Dev			0.0133	2.12	12.7	48.1	7.25963731	7.30103	5.33	11.3
Mean + 1X Std Dev			0.0276	9.32	251.4	244	6.78251608	6.94692156	11.92	33.6

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Site Number	Sample Date	Duplicate/ Rerun/No Sample	()	Alkalinity (mg/l)	Bicarbonate (mg/l)	Carbonate (mg/l)	Hydroxide (mg/l)	Hardness (mg/l)	Chloride (mg/l)	Nitrate + Nitrite, D (mg/l)	Nitrate + Nitrite, T (mg/l)	Nitrate, D (mg/l)	Nitrate, T (mg/l)	Nitrite, D (mg/l)	Ammonia (mg/l)	Sulfate (mg/l)	Sulfite (mg/l)	CN, Free (mg/l)	CN, Total (mg/l)	CN, WAD (mg/l)	Thiocyanate (mg/l)	TSS (mg/l)
MW-14	6/14/99																					
MW-14	6/22/99																					
MW-14	6/29/99																					
MW-14	7/7/99										0.28				<0.1				0.067	0.019		
MW-14	7/13/99																					
MW-14	7/19/99																					
MW-14	7/28/99																					
MW-14	8/9/99																					
MW-14	8/16/99																					
MW-14	8/17/99																					
MW-14	8/23/99																					

Statistical Summary: Mean & Standard Deviation Using All Analyses

Mean			11.3	154.9	158	1	1	167.4	0.8	0.227	0.28	0.165	0.174	0.02	0.05	40	1	0.1	0.0104	0.0055	0.05	26.1
Std Dev			11.3	7.15	2.94	0	0	3.72	0.8	0.0418	0.28	0.0212	0.0633	0.026	0.05	40	1	0.1	0.0161	0.0055	0.05	74.2
Mean + 1X Std Dev			22.6	162.05	160.94	1	1	171.12	1.6	0.2688	0.56	0.1862	0.2373	0.046	0.1	80	2	0.2	0.0265	0.011	0.1	100.3

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Site Number	Sample Date	Duplicate/ Rerun/No Sample	TDS (mg/l)	Aluminum, D (mg/l)	Aluminum, TR (mg/l)	Arsenic, D (mg/l)	Arsenic, TR (mg/l)	Cadmium, D (mg/l)	Cadmium, TR (mg/l)	Calcium, D (mg/l)	Calcium, TR (mg/l)	Copper, D (mg/l)	Copper, TR (mg/l)	Iron, D (mg/l)	Iron, TR (mg/l)	Lead, D (mg/l)	Lead, TR (mg/l)	Magnesium, D (mg/l)	Magnesium, TR (mg/l)	Manganese, D (mg/l)
MW-14	18/20/99																			
MW-14	6/22/99																			
MW-14	6/29/99																			
MW-14	7/7/99																			
MW-14	7/13/99																			
MW-14	7/19/99																			
MW-14	7/28/99																			
MW-14	8/9/99																			
MW-14	8/16/99																			
MW-14	8/17/99																			
MW-14	8/23/99																			

Statistical Summary: Mean & Standard Deviation Using All A

Mean			219.7	0.015	6.02	0.0027	0.0041	0.00025	0.00025	51.2	48.5	0.005	0.005	0.02	6.14	0.0053	0.0077	12.1	11.5	0.0025
Std Dev			26.6	0.015	6.02	0.0011	0.0053	0.00025	0.00025	4.66	48.5	0.005	0.005	0.02	6.14	0.0065	0.0106	1.02	11.5	0.0025
Mean + 1X Std Dev			246.5	0.03	12.04	0.0038	0.0094	0.0005	0.0005	55.89	97	0.01	0.01	0.04	12.28	0.0118	0.0182	13.12	23	0.005

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Manganese, TR (mg/l)	Mercury, D (mg/l)	Mercury, TR (mg/l)	Mercury, T (mg/l)	Nickel, D (mg/l)	Nickel, TR (mg/l)	Potassium, D (mg/l)	Potassium, TR (mg/l)	Selenium, D (mg/l)	Selenium, TR (mg/l)	Silver, D (mg/l)	Silver, TR (mg/l)	Sodium, D (mg/l)	Sodium, TR (mg/l)	Zinc, D (mg/l)	Zinc, TR (mg/l)	Temperature (Cent)
MW-14	18/18/98																		
MW-14	6/22/99																		
MW-14	6/29/99																		
MW-14	7/7/99				0.0002	0.0002													11.9
MW-14	7/13/99																		
MW-14	7/19/99																		
MW-14	7/28/99																		
MW-14	8/9/99																		
MW-14	8/16/99																		
MW-14	8/17/99																		11.4
MW-14	8/23/99																		

Statistical Summary: Mean & Standard Deviation Using All A

Mean			0.12	0.00016	0.0004	0.00012	0.005	0.005	2.2	3	0.0005	0.0005	0.0023	0.0025	15.3	12.4	0.0083	0.0161	7.72
Std Dev			0.12	0.00009	0.00026	0.00005	0.005	0.005	2.2	3	0.0005	0.0005	0.00065	0.00093	15.3	12.4	0.0164	0.0157	2.36
Mean + 1X Std Dev			0.24	0.00025	0.00066	0.00017	0.01	0.01	4.4	6	0.001	0.001	0.00295	0.00343	30.6	24.8	0.0247	0.0318	10.08

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Water Qua.. onitoring Data
Site MW-14

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Conductivity @ 25 C (micromho)	Conductivity, Field (micromho)	pH, Lab (su)	pH, Field (su)	Turbidity, Field (NTU)	Purge Volume (gallons)	Depth to Water (ft)
MW-14	10/16/98								19.5
MW-14	6/22/99								2.23
MW-14	6/29/99								2.04
MW-14	7/7/99			290		7.8			3.2
MW-14	7/13/99								6.39
MW-14	7/19/99								6.35
MW-14	7/28/99								6.4
MW-14	8/9/99								8.84
MW-14	8/16/99								8.53
MW-14	8/17/99			310		7.63			8.35
MW-14	8/23/99								8.68

Statistical Summary: Mean & Standard Deviation Using All A

Mean			380.7	304	7.494850022	7.455931956	4.16	118	327.2
Std Dev			11	41.5	7.677780705	7.494850022	3.27	118	1472.2
Mean + 1X Std Dev			391.7	345.5	7.27572413	7.173925197	7.43	236	1799.4

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Hecla Mining Company
Grouse Creek Unit

Water Quality Monitoring Data
Site MW-15

Report Date: 9/ /99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	()	Depth to Water (ft)
MW-15	12/18/98	Dry		
MW-15	5/26/99	Dry		
MW-15	6/7/99	Dry		30
MW-15	6/14/99			30.41
MW-15	6/22/99			30.9
MW-15	6/29/99	Dry		33.3
MW-15	7/7/99	Dry		30
MW-15	7/13/99	Dry		28.75
MW-15	7/19/99			31.83
MW-15	7/28/99	Dry		31.81
MW-15	8/9/99	Dry		
MW-15	8/16/99	Dry		32
MW-15	8/17/99	Dry		35.5
MW-15	8/23/99			31.79

Statistical Summary: Mean & Standard Deviation Using All Analyses

Mean			1584.6	31.5
Std Dev			1584.6	1.83
Mean + 1X Std Dev			3169.2	33.33

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Hecla Mining Company
Grouse Creek Unit

Water Quality Monitoring Data
Site MW-16

Report Date. 9/1/99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	()	Alkalinity (mg/l)	Bicarbonate (mg/l)	Carbonate (mg/l)	Hydroxide (mg/l)	Hardness (mg/l)	Chloride (mg/l)	Nitrate + Nitrite, D (mg/l)	Nitrate + Nitrite, T (mg/l)	Nitrate, D (mg/l)	Nitrate, T (mg/l)	Nitrite, D (mg/l)	Ammonia (mg/l)	Sulfate (mg/l)	Sulfite (mg/l)	CN, Free (mg/l)
MW-16	7/15/96																	
MW-16	7/15/96	Rerun																
MW-16	8/18/96			199				226					<0.1					
MW-16	8/18/96	Rerun																
MW-16	12/10/96			203				225					<0.1					
MW-16	12/10/96	Rerun																
MW-16	3/17/97			205				231					<0.1					
MW-16	6/4/97			204				224					<0.1					
MW-16	8/5/97			203				231										
MW-16	11/18/97			207				222					<0.1					
MW-16	1/22/98																	
MW-16	2/19/98																	
MW-16	3/24/98			207				214					<0.1					
MW-16	4/29/98																	
MW-16	5/27/98			90	<2	5	85	100		0.05		<0.02		0.04				
MW-16	5/27/98	Duplicate		89	<2	5	84	91		0.04		<0.02		0.03				
MW-16	8/17/98																	
MW-16	8/18/98			144				106					<0.1					
MW-16	9/15/98																	
MW-16	10/21/98			173	173	12		192		<0.02			<0.01	<0.01				
MW-16	12/16/98																	
MW-16	3/29/99			208	208	<2	<2											
MW-16	6/7/99			202	202	<2	<2		0.6	<0.02				<0.01	<0.05	40	2	<0.1
MW-16	6/7/99	Duplicate		200	200	<2	<2		0.7	<0.02				<0.01	<0.05	30	2	<0.1
MW-16	6/14/99																	
MW-16	6/22/99																	
MW-16	6/29/99																	
MW-16	7/6/99										<0.02				<0.1			
MW-16	7/13/99																	
MW-16	7/19/99																	
MW-16	7/28/99																	
MW-16	8/4/99										0.04				<0.1			
MW-16	8/9/99																	
MW-16	8/16/99																	
MW-16	8/18/99																	
MW-16	8/23/99																	

Statistical Summary: Mean & Standard Deviation Using All Analyses

Mean			1472.2	187.1	146	4.75	29	197.1	0.6	0.0233	0.025	0.01	0.0444	0.0167	0.0417	40	2	0.05
Std Dev			1472.2	35.9	97.9	5.19	48.5	50.9	0.6	0.0231	0.0212	0.01	0.0159	0.0202	0.0144	40	2	0.05
Mean + 1X Std Dev			2944.4	223	243.9	9.94	77.5	248	1.2	0.0464	0.0462	0.02	0.0603	0.0369	0.0561	80	4	0.1

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Hecla Mining Company
Grouse Creek Unit

Water Quality Monitoring Data
Site MW-16

Report Date: 9/7/99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	CN, Total (mg/l)	CN, WAD (mg/l)	Thiocyanate (mg/l)	TSS (mg/l)	TDS (mg/l)	Aluminum, D (mg/l)	Aluminum, TR (mg/l)	Arsenic, D (mg/l)	Arsenic, TR (mg/l)	Cadmium, D (mg/l)	Cadmium, TR (mg/l)	Calcium, D (mg/l)	Calcium, TR (mg/l)	Copper, D (mg/l)	Copper, TR (mg/l)	Iron, D (mg/l)
MW-16	7/15/96		0.02	0.01														
MW-16	7/15/96	Rerun	0.028															
MW-16	8/18/96		0.078	0.01		18	258			0.007	0.013							
MW-16	8/18/96	Rerun	<0.005	<0.005														
MW-16	12/10/96		0.039	<0.005		4	264			0.008	0.018							
MW-16	12/10/96	Rerun	<0.005								0.018							
MW-16	3/17/97		<0.005	<0.005		1	242			0.01	0.013							
MW-16	6/4/97		<0.005	<0.005		8	252			0.01	0.014							
MW-16	8/5/97		<0.005	<0.005		12	248			0.008	0.01							
MW-16	11/18/97			<0.005		5	222			0.014								
MW-16	1/22/98		<0.005	<0.005														
MW-16	2/19/98		<0.005	<0.005														
MW-16	3/24/98		<0.005	<0.005		5	220			0.012	0.018							
MW-16	4/29/98		<0.005	<0.005														
MW-16	5/27/98		<0.01	<0.01		62	130			0.002	0.012			36.2				
MW-16	5/27/98	Duplicate	<0.01	<0.01		28	120			0.002	0.008			33.1				
MW-16	6/17/98		<0.01	<0.01											113		<0.004	
MW-16	8/19/98		<0.005	<0.005		<2	196			<0.005	0.009							
MW-16	9/15/98		<0.01	<0.01											35.6		0.01	
MW-16	10/21/98		<0.01	<0.01		16	200			0.015	0.02			34.1				
MW-16	12/18/98																	
MW-16	3/29/99		<0.01	<0.01		14	240			0.01	0.018							
MW-16	6/7/99		<0.01	<0.01	<0.1	6	250	<0.03	0.35	0.012	0.014	<0.0005	<0.0005	64.1	58.8	<0.01	<0.01	0.1
MW-16	6/7/99	Duplicate	<0.01	<0.01	<0.1	12	250	<0.03	0.37	0.013	0.014	<0.0005	<0.0005	63.8	58	<0.01	<0.01	0.1
MW-16	6/14/99																	
MW-16	6/22/99																	
MW-16	6/29/99																	
MW-16	7/6/99		<0.005	<0.005														
MW-16	7/13/99																	
MW-16	7/19/99																	
MW-16	7/28/99																	
MW-16	8/4/99		<0.005	<0.005														
MW-16	8/9/99																	
MW-16	8/16/99																	
MW-16	8/18/99																	
MW-16	8/23/99																	

Statistical Summary: Mean & Standard Deviation Using All A

Mean			0.0097	0.004	0.05	12.3	226.7	0.015	0.35	0.0089	0.0147	0.00025	0.00025	44.8	69.2	0.005	0.0057	0.1
Std Dev			0.0183	0.0024	0.05	16.5	37.4	0.015	0.35	0.0042	0.0036	0.00025	0.00025	16.7	39.6	0.005	0.004	0.1
Mean + 1X Std Dev			0.028	0.0064	0.1	28.8	264.1	0.03	0.7	0.0131	0.0183	0.0005	0.0005	61.5	108.8	0.01	0.0097	0.2

Less th: :table data assumed as one-half the detection limit in Mean and Standa ation calculations.

Hecla Mining Company
Grouse Creek Unit

Water Quality Monitoring Data
Site MW-16

Report Date. 5/7/99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Iron, TR (mg/l)	Lead, D (mg/l)	Lead, TR (mg/l)	Magnesium, D (mg/l)	Magnesium, TR (mg/l)	Manganese, D (mg/l)	Manganese, TR (mg/l)	Mercury, D (mg/l)	Mercury, TR (mg/l)	Mercury, T (mg/l)	Nickel, D (mg/l)	Nickel, TR (mg/l)	Potassium, D (mg/l)	Potassium, TR (mg/l)
MW-16	7/15/98															
MW-16	7/15/98	Rerun														
MW-16	8/18/98			<0.005	0.007					<0.0002		<0.0002				
MW-16	8/18/98	Rerun														
MW-16	12/10/98			0.011						<0.0002		<0.0002				
MW-16	12/10/98	Rerun			0.118											
MW-16	3/17/97			<0.005	<0.005					<0.0002		<0.0002				
MW-16	6/4/97			<0.005	<0.005					0.0002		0.0003				
MW-16	8/5/97			<0.005	0.011					<0.0002		0.0002				
MW-16	11/18/97			<0.005	<0.005					<0.0005		<0.0005				
MW-16	1/22/98															
MW-16	2/19/98															
MW-16	3/24/98			<0.005	0.007					<0.0002		<0.0002				
MW-16	4/29/98															
MW-16	5/27/98			<0.001	0.003	2.2				<0.0002		<0.0002				
MW-16	5/27/98	Duplicate		<0.001	<0.001	2				<0.0002		<0.0002				
MW-16	6/17/98		0.235													
MW-16	8/19/98			<0.005	0.006					<0.0002		<0.0002				
MW-16	9/15/98		<0.05													
MW-16	10/21/98			<0.001	<0.001	25.9				<0.0002		<0.0002				
MW-16	12/18/98															
MW-16	3/29/99			<0.04	<0.04											
MW-16	6/7/99		0.38	0.001	<0.001	18.9	18.1	0.139	0.135		<0.0002		<0.01	<0.01	1.4	1.4
MW-16	6/7/99	Duplicate	0.25	0.001	<0.001	19.1	17.7	0.138	0.126		<0.0002		<0.01	<0.01	1.4	1.3
MW-16	6/14/99															
MW-16	6/22/99															
MW-16	6/29/99															
MW-16	7/6/99															
MW-16	7/13/99															
MW-16	7/19/99															
MW-16	7/28/99															
MW-16	8/4/99															
MW-16	8/9/99															
MW-16	8/10/99															
MW-16	8/18/99															
MW-16	8/23/99															

Statistical Summary: Mean & Standard Deviation Using All A

Mean			0.213	0.0042	0.015	15.7	18.1	0.139	0.135	0.00013	0.0001	0.00016	0.005	0.005	1.4	1.4
Std Dev			0.178	0.0057	0.0329	12.2	18.1	0.139	0.135	0.000054	0.0001	0.000076	0.005	0.005	1.4	1.4
Mean + 1X Std Dev			0.391	0.0099	0.0479	27.9	36.2	0.278	0.27	0.000184	0.0002	0.000226	0.01	0.01	2.8	2.8

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Water Quality Monitoring Data
Site MW-16

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Turbidity, Lab (NTU)	Turbidity, Field (NTU)	Depth to Water (ft)
MW-16	7/15/96				
MW-16	7/15/96	Rerun			
MW-16	8/18/96			10.2	32.5
MW-16	8/18/96	Rerun			
MW-16	12/10/96			5.88	21.2
MW-16	12/10/96	Rerun			
MW-16	3/17/97			3.07	35.9
MW-16	6/4/97			5.31	24.8
MW-16	8/5/97			5.11	32.25
MW-16	11/18/97			15.1	30.17
MW-16	1/22/98				
MW-16	2/19/98				
MW-16	3/24/98			21.9	27.1
MW-16	4/29/98				
MW-16	5/27/98			38.8	
MW-16	5/27/98	Duplicate			
MW-16	8/17/98				
MW-16	8/19/98				34.8
MW-16	9/15/98				
MW-16	10/21/98			4.35	36.85
MW-16	12/18/98				37.1
MW-16	3/29/99			6.58	
MW-16	6/7/99		7.2		25.8
MW-16	6/7/99	Duplicate	7		
MW-16	6/14/99				29.19
MW-16	6/22/99				31.18
MW-16	6/29/99				32.95
MW-16	7/6/99				33.95
MW-16	7/13/99				35.34
MW-16	7/19/99				35.82
MW-16	7/28/99				36.51
MW-16	8/4/99				37.04
MW-16	8/9/99				37.62
MW-16	8/18/99				38.25
MW-16	8/18/99				38.31
MW-16	8/23/99				39.04

Statistical Summary: Mean & Standard Deviation Using All A

Mean			7.2	11.6	33.2
Std Dev			7.2	11.2	4.86
Mean + 1X Std Dev			14.4	22.8	38.06

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Hecla Mining Company
Grouse Creek Unit

Water Quality Monitoring Data
Site MW-17

Report Date: 9/7/99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Selenium, TR (mg/l)	Silver, D (mg/l)	Silver, TR (mg/l)	Sodium, D (mg/l)	Sodium, TR (mg/l)	Zinc, D (mg/l)	Zinc, TR (mg/l)	Temperature (Cent)	Conductivity @ 25 C (micromho)	Conductivity, Field (micromho)	pH, Lab (su)	pH, Field (su)	Turbidity, Lab (NTU)
MW-17	11/21/98				<0.005			0.005			513		6.34		
MW-17	12/18/98														
MW-17	5/26/99														
MW-17	6/7/99		0.006	<0.0005	<0.0005	30.5	28.2	0.11	0.43	6.8	683	650	6.3	6.4	88
MW-17	6/14/99	Dry													
MW-17	6/22/99														
MW-17	6/29/99														
MW-17	7/6/99									8		470		6.3	
MW-17	7/13/99														
MW-17	7/19/99														
MW-17	7/28/99														
MW-17	8/4/99	Dry													
MW-17	8/9/99	Dry													
MW-17	8/16/99	Dry													
MW-17	8/23/99														

Statistical Summary: Mean & Standard Deviation Using All A

Mean			0.006	0.00025	0.0014	30.5	28.2	0.0575	0.43	7.4	598	560	6.318759763	6.346787486	88
Std Dev			0.006	0.00025	0.0016	30.5	28.2	0.0742	0.43	0.849	120.2	127.3	7.508638306	7.13687714	88
Mean + 1X Std Dev			0.012	0.0005	0.003	61	56.4	0.1317	0.86	8.249	718.2	687.3	6.2915791	6.281498311	176

Less ctable data assumed as one-half the detection limit in Mean and Sta. iation calculations.

Hecla Mining Company
Grouse Creek Unit

Water Quality Monitoring Data
Site MW-17

Report Date: 9/7/99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Iron, TR (mg/l)	Lead, D (mg/l)	Lead, TR (mg/l)	Magnesium, D (mg/l)	Magnesium, TR (mg/l)	Manganese, D (mg/l)	Manganese, TR (mg/l)	Mercury, D (mg/l)	Mercury, TR (mg/l)	Nickel, D (mg/l)	Nickel, TR (mg/l)	Potassium, D (mg/l)	Potassium, TR (mg/l)	Selenium, D (mg/l)
MW-17	11/21/98			0.002		9.04				<0.0002		0.004				
MW-17	12/18/98															
MW-17	5/26/99															
MW-17	6/7/99		5.09	0.001	0.011	9.8	10.2	2.52	2.51		<0.0002	<0.01	<0.01	3.8	4.5	0.008
MW-17	6/14/99	Dry														
MW-17	6/22/99															
MW-17	6/29/99															
MW-17	7/6/99															
MW-17	7/13/99															
MW-17	7/19/99															
MW-17	7/28/99															
MW-17	8/4/99	Dry														
MW-17	8/9/99	Dry														
MW-17	8/16/99	Dry														
MW-17	8/23/99															

Statistical Summary: Mean & Standard Deviation Using All A

Mean			5.09	0.0015	0.011	9.42	10.2	2.52	2.51	0.0001	0.0001	0.0045	0.005	3.8	4.5	0.008
Std Dev			5.09	0.00071	0.011	0.537	10.2	2.52	2.51	0.0001	0.0001	0.00071	0.005	3.8	4.5	0.008
Mean + 1X Std Dev			10.18	0.00221	0.022	9.957	20.4	5.04	5.02	0.0002	0.0002	0.00521	0.01	7.6	9	0.016

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Hecla Mining Company
Grouse Creek Unit

Water Quality Monitoring Data
Site MW-17

Report Date: 9/7/99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Thiocyanate (mg/l)	TSS (mg/l)	TDS (mg/l)	Aluminum, D (mg/l)	Aluminum, TR (mg/l)	Arsenic, D (mg/l)	Arsenic, TR (mg/l)	Cadmium, D (mg/l)	Cadmium, TR (mg/l)	Calcium, D (mg/l)	Calcium, TR (mg/l)	Chromium, D (mg/l)	Copper, D (mg/l)	Copper, TR (mg/l)	Iron, D (mg/l)
MW-17	11/21/98			126	370			<0.002		<0.002		82.6		<0.008	0.001		0.103
MW-17	12/18/98																
MW-17	5/26/99																
MW-17	6/7/99		<0.1	104	470	<0.03	3.72	0.002	0.008	<0.0005	<0.0005	92.8	90.2		<0.01	0.05	0.88
MW-17	6/14/99	Dry															
MW-17	6/22/99																
MW-17	6/29/99																
MW-17	7/6/99																
MW-17	7/13/99																
MW-17	7/19/99																
MW-17	7/28/99																
MW-17	8/4/99	Dry															
MW-17	8/9/99	Dry															
MW-17	8/16/99	Dry															
MW-17	8/23/99																

Statistical Summary: Mean & Standard Deviation Using All A

Mean			0.05	115	420	0.015	3.72	0.0015	0.008	0.00063	0.00025	87.6	90.2	0.004	0.003	0.05	0.491
Std Dev			0.05	15.6	70.7	0.015	3.72	0.00071	0.008	0.00053	0.00025	7.07	90.2	0.004	0.0028	0.05	0.549
Mean + 1X Std Dev			0.1	130.6	490.7	0.03	7.44	0.00221	0.016	0.00116	0.0005	94.67	180.4	0.008	0.0058	0.1	1.04

Less ctable data assumed as one-half the detection limit in Mean and Sta iation calculations.

Hecla Mining Company
Grouse Creek Unit

Water Quality Monitoring Data
Site MW-17

Report Date: 9/7/99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	()	Alkalinity (mg/l)	Bicarbonate (mg/l)	Carbonate (mg/l)	Hydroxide (mg/l)	Hardness (mg/l)	Chloride (mg/l)	Nitrate + Nitrite, D (mg/l)	Nitrate + Nitrite, T (mg/l)	Nitrite, D (mg/l)	Ammonia (mg/l)	Sulfate (mg/l)	Sulfite (mg/l)	CN, Free (mg/l)	CN, Total (mg/l)	CN, WAD (mg/l)
MW-17	11/21/98			110				243									0.23	0.08
MW-17	12/18/98																	
MW-17	5/26/99																	
MW-17	6/7/99			94	94	<2	<2		6.2	0.8		0.18	0.34	240	3	0.8	3.6	1.6
MW-17	6/14/99	Dry																
MW-17	6/22/99																	
MW-17	6/29/99																	
MW-17	7/6/99										0.3		0.27				2.09	0.54
MW-17	7/13/99																	
MW-17	7/19/99																	
MW-17	7/28/99																	
MW-17	8/4/99	Dry																
MW-17	8/9/99	Dry																
MW-17	8/16/99	Dry																
MW-17	8/23/99																	

Statistical Summary: Mean & Standard Deviation Using All Analyses

Mean			4.95	102	94	1	1	243	6.2	0.8	0.3	0.18	0.305	240	3	0.8	1.97	0.74
Std Dev			4.95	11.3	94	1	1	243	6.2	0.8	0.3	0.18	0.0495	240	3	0.8	1.69	0.779
Mean + 1X Std Dev			9.9	113.3	188	2	2	486	12.4	1.6	0.6	0.36	0.3545	480	6	1.6	3.66	1.519

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Water Quality Monitoring Data
Site MW-17

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Purge Volume (gallons)	Depth to Water (ft)
MW-17	11/21/98			
MW-17	12/18/98			69.34
MW-17	5/26/99			61.6
MW-17	6/7/99		70	63.7
MW-17	6/14/99	Dry		62
MW-17	6/22/99			65.4
MW-17	6/28/99			65.15
MW-17	7/6/99		19	65.3
MW-17	7/13/99			65.82
MW-17	7/19/99			65.95
MW-17	7/28/99			41.45
MW-17	8/4/99	Dry		71
MW-17	8/9/99	Dry		71
MW-17	8/16/99	Dry		
MW-17	8/23/99			71.15

Statistical Summary: Mean & Standard Deviation Using All A

Mean			44.5	64.5
Std Dev			36.1	7.66
Mean + 1X Std Dev			80.6	72.16

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Hecla Mining Company
Grouse Creek Unit

Water Quality Monitoring Data
Site MW-19

Report Date: 9/7/99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Potassium, D (mg/l)	Potassium, TR (mg/l)	Selenium, D (mg/l)	Selenium, TR (mg/l)	Silver, D (mg/l)	Silver, TR (mg/l)	Sodium, D (mg/l)	Sodium, TR (mg/l)	Zinc, D (mg/l)	Zinc, TR (mg/l)	Temperature (Cent)	Conductivity @ 25 C (micromho)
MW-19	12/15/98						<0.005				0.013			703
MW-19	12/16/98													
MW-19	5/26/99													
MW-19	6/7/99		2.7	3.8	0.01	0.01	<0.0005	<0.0005	31.7	31.9	0.15	0.26	4.4	652
MW-19	6/14/99													
MW-19	6/22/99													
MW-19	6/29/99													
MW-19	7/6/99												13.5	
MW-19	7/13/99													
MW-19	7/19/99													
MW-19	7/28/99													
MW-19	8/4/99	Dry												
MW-19	8/9/99													
MW-19	8/16/99													
MW-19	8/18/99													
MW-19	8/23/99													

Statistical Summary: Mean & Standard Deviation Using All An

Mean			2.7	3.8	0.01	0.01	0.0014	0.00025	31.7	31.9	0.0815	0.26	8.95	677.5
Std Dev			2.7	3.8	0.01	0.01	0.0016	0.00025	31.7	31.9	0.0969	0.26	6.43	36.1
Mean + 1X Std Dev			5.4	7.6	0.02	0.02	0.003	0.0005	63.4	63.8	0.1784	0.52	15.38	713.6

Le[illegible] 'etectable data assumed as one-half the detection limit in Mean [illegible] :ard Deviation calculations.

Hecla Mining Company
Grouse Creek Unit

Water Quality Monitoring Data
Site MW-19

Report Date: 9/7/99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Copper, TR (mg/l)	Iron, D (mg/l)	Iron, TR (mg/l)	Lead, D (mg/l)	Lead, TR (mg/l)	Magnesium, D (mg/l)	Magnesium, TR (mg/l)	Manganese, D (mg/l)	Manganese, TR (mg/l)	Mercury, D (mg/l)	Mercury, TR (mg/l)	Nickel, D (mg/l)	Nickel, TR (mg/l)
MW-19	12/15/98					<0.002			11.5			<0.0002			
MW-19	12/18/98														
MW-19	5/26/99														
MW-19	6/7/99		<0.01	3.78	6.58	0.002	0.005	9.9	10.3	0.108	0.15		0.0006	<0.01	<0.01
MW-19	6/14/99														
MW-19	6/22/99														
MW-19	6/29/99														
MW-19	7/6/99														
MW-19	7/13/99														
MW-19	7/19/99														
MW-19	7/28/99														
MW-19	8/4/99	Dry													
MW-19	8/9/99														
MW-19	8/16/99														
MW-19	8/18/99														
MW-19	8/23/99														

Statistical Summary: Mean & Standard Deviation Using All An

Mean			0.005	3.78	6.58	0.0016	0.005	9.9	10.9	0.108	0.15	0.0001	0.0006	0.005	0.005
Std Dev			0.005	3.78	6.58	0.00071	0.005	9.9	0.849	0.108	0.15	0.0001	0.0006	0.005	0.005
Mean + 1X Std Dev			0.01	7.56	13.16	0.00221	0.01	19.8	11.749	0.216	0.3	0.0002	0.0012	0.01	0.01

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Hecla Mining Company
Grouse Creek Unit

Water Quality Monitoring Data
Site MW-19

Report Date: 9/7/99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	CN, Total (mg/l)	CN, WAD (mg/l)	Thiocyanate (mg/l)	TSS (mg/l)	TDS (mg/l)	Aluminum, D (mg/l)	Aluminum, TR (mg/l)	Arsenic, D (mg/l)	Arsenic, TR (mg/l)	Cadmium, D (mg/l)	Cadmium, TR (mg/l)	Calcium, D (mg/l)	Calcium, TR (mg/l)	Copper, D (mg/l)
MW-19	12/15/98		0.12	0.04		165	542			<0.002					140	
MW-19	12/16/98															
MW-19	5/26/99															
MW-19	6/7/99		13	1.73	<0.1	138	430	<0.03	2.28	0.002	0.009	<0.0005	<0.0005	88.3	82	<0.01
MW-19	6/14/99															
MW-19	6/22/99															
MW-19	6/29/99															
MW-19	7/6/99		16.3	3.06												
MW-19	7/13/99															
MW-19	7/19/99															
MW-19	7/28/99															
MW-19	8/4/99	Dry														
MW-19	8/9/99															
MW-19	8/16/99															
MW-19	8/18/99															
MW-19	8/23/99															

Statistical Summary: Mean & Standard Deviation Using All An

Mean			9.81	1.61	0.05	151.5	486	0.015	2.28	0.0015	0.009	0.00025	0.00025	88.3	111	0.005
Std Dev			8.55	1.51	0.05	19.1	79.2	0.015	2.26	0.00071	0.009	0.00025	0.00025	88.3	41	0.005
Mean + 1X Std Dev			18.36	3.12	0.1	170.6	565.2	0.03	4.52	0.00221	0.018	0.0005	0.0005	172.6	152	0.01

Less tectable data assumed as one-half the detection limit in Mean an rd Deviation calculations.

Hecla Mining Company
Grouse Creek Unit

Water Quality Monitoring Data
Site MW-19

Report Date: 9/7/99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	()	Alkalinity (mg/l)	Bicarbonate (mg/l)	Carbonate (mg/l)	Hydroxide (mg/l)	Hardness (mg/l)	Chloride (mg/l)	Nitrate + Nitrite, D (mg/l)	Nitrate + Nitrite, T (mg/l)	Nitrite, D (mg/l)	Ammonia (mg/l)	Sulfate (mg/l)	Sulfite (mg/l)	CN, Free (mg/l)
MW-19	12/15/98			208				396								
MW-19	12/18/98															
MW-19	5/26/99															
MW-19	6/7/99			52	52	<2	<2		5.1	2.25		<0.01	0.32	230	2	1.1
MW-19	6/14/99															
MW-19	6/22/99															
MW-19	6/29/99															
MW-19	7/6/99										3.25		0.2			
MW-19	7/13/99															
MW-19	7/19/99															
MW-19	7/28/99															
MW-19	8/4/99	Dry														
MW-19	8/9/99															
MW-19	8/16/99															
MW-19	8/18/99															
MW-19	8/23/99															

Statistical Summary: Mean & Standard Deviation Using All Analyses

Mean			7.66	130	52	1	1	396	5.1	2.25	3.25	0.005	0.26	230	2	1.1
Std Dev			7.66	110.3	52	1	1	396	5.1	2.25	3.25	0.005	0.0849	230	2	1.1
Mean + 1X Std Dev			15.32	240.3	104	2	2	792	10.2	4.5	6.5	0.01	0.3449	460	4	2.2

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Hecla Mining Company
Grouse Creek Unit

Water Quality Monitoring Data
Site MW-19

Report Date: 9/7/99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Conductivity, Field (micromho)	pH, Lab (su)	pH, Field (su)	Turbidity, Lab (NTU)	Purge Volume (gallons)	Depth to Water (ft)
MW-19	12/15/98			7.46				
MW-19	12/18/98							48.42
MW-19	5/26/99							25.2
MW-19	6/7/99		610	6.3	6.4	105		32.2
MW-19	6/14/99							35.58
MW-19	6/22/99							38.07
MW-19	6/29/99							37.85
MW-19	7/6/99		500		6.6		26	38.55
MW-19	7/13/99							40.18
MW-19	7/19/99							41.15
MW-19	7/28/99							41.92
MW-19	8/4/99	Dry						45.88
MW-19	8/9/99							43.22
MW-19	8/16/99							43.89
MW-19	8/18/99							43.95
MW-19	8/23/99							44.22

Statistical Summary: Mean & Standard Deviation Using All An

Mean			555	6.588636236	6.494850022	105	26	40
Std Dev			77.8	6.48148608	7	105	26	5.85
Mean + 1X Std Dev			632.8	6.22184876	6.37675071	210	52	45.85

Le: ctable data assumed as one-half the detection limit in Mean and Sta iation calculations.

Hecla Mining Company
Grouse Creek Unit

Water Quality Monitoring Data
Site MW-20

Report Date: 9/7/99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Turbidity, Lab (NTU)	Purge Volume (gallons)	Depth to Water (ft)
MW-20	11/22/98				
MW-20	12/18/98				54.91
MW-20	5/26/99				41.95
MW-20	6/7/99		160		48.1
MW-20	6/14/99				49.57
MW-20	6/22/99				50.42
MW-20	6/29/99				50.55
MW-20	7/6/99			15	50.85
MW-20	7/13/99				51.1
MW-20	7/19/99				51.46
MW-20	7/28/99				52.13
MW-20	8/4/99				54.85
MW-20	8/9/99				55.45
MW-20	8/16/99				57.51
MW-20	8/18/99				57.82
MW-20	8/23/99				58.12

Statistical Summary: Mean & Standard Deviation Using All An

Mean			160	15	52.3
Std Dev			160	15	4.29
Mean + 1X Std Dev			320	30	56.59

Le 'etectable data assumed as one-half the detection limit in M Standard Deviation calculations.

Hecla Mining Company
Grouse Creek Unit

Water Quality Monitoring Data
Site MW-20

Report Date: 9/7/99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Silver, TR (mg/l)	Sodium, D (mg/l)	Sodium, TR (mg/l)	Zinc, D (mg/l)	Zinc, TR (mg/l)	Temperature (Cent)	Conductivity @ 25 C (micromho)	Conductivity, Field (micromho)	pH, Lab (su)	pH, Field (su)
MW-20	11/22/98					<0.004			444		7.89	
MW-20	12/18/98											
MW-20	5/26/99											
MW-20	6/7/99		<0.0005	7.6	7.5	1.97	1.71	5.3	567	520	6.8	8
MW-20	6/14/99											
MW-20	6/22/99											
MW-20	6/29/99											
MW-20	7/6/99							17.8		310		7.7
MW-20	7/13/99											
MW-20	7/19/99											
MW-20	7/28/99											
MW-20	8/4/99							10.3		440		7.6
MW-20	8/9/99											
MW-20	8/16/99											
MW-20	8/18/99							10.1		390		6.84
MW-20	8/23/99											

Statistical Summary: Mean & Standard Deviation Using All An

Mean			0.00025	7.6	7.5	0.986	1.71	10.9	505.5	415	7.07	7.30
Std Dev			0.00025	7.6	7.5	1.39	1.71	5.16	87	88.1	7.00	7.20
Mean + 1X Std Dev			0.0005	15.2	15	2.376	3.42	16.06	592.5	503.1	6.73	6.95

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Hecla Mining Company
Grouse Creek Unit

Water Quality Monitoring Data
Site MW-20

Report Date: 9/7/99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Manganese, D (mg/l)	Manganese, TR (mg/l)	Mercury, D (mg/l)	Mercury, TR (mg/l)	Nickel, D (mg/l)	Nickel, TR (mg/l)	Potassium, D (mg/l)	Potassium, TR (mg/l)	Selenium, D (mg/l)	Selenium, TR (mg/l)	Silver, D (mg/l)
MW-20	11/22/98				0.0004		<0.002						<0.005
MW-20	12/18/98												
MW-20	5/26/99												
MW-20	6/7/99		0.095	0.391		0.0004	<0.01	0.01	2.4	3.5	0.002	0.003	<0.0005
MW-20	6/14/99												
MW-20	6/22/99												
MW-20	6/29/99												
MW-20	7/6/99												
MW-20	7/13/99												
MW-20	7/19/99												
MW-20	7/28/99												
MW-20	8/4/99												
MW-20	8/9/99												
MW-20	8/16/99												
MW-20	8/18/99												
MW-20	8/23/99												

Statistical Summary: Mean & Standard Deviation Using All An

Mean			0.095	0.391	0.0004	0.0004	0.003	0.01	2.4	3.5	0.002	0.003	0.0014
Std Dev			0.095	0.391	0.0004	0.0004	0.0028	0.01	2.4	3.5	0.002	0.003	0.0016
Mean + 1X Std Dev			0.19	0.782	0.0008	0.0008	0.0058	0.02	4.8	7	0.004	0.006	0.003

Les[illegible] etectable data assumed as one-half the detection limit in M[illegible] Standard Deviation calculations.

Hecla Mining Company
Grouse Creek Unit

Water Quality Monitoring Data
Site MW-20

Report Date: 9/7/99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Calcium, D (mg/l)	Calcium, TR (mg/l)	Chromium, D (mg/l)	Copper, D (mg/l)	Copper, TR (mg/l)	Iron, D (mg/l)	Iron, TR (mg/l)	Lead, D (mg/l)	Lead, TR (mg/l)	Magnesium, D (mg/l)	Magnesium, TR (mg/l)
MW-20	11/22/98			84.5	<0.008	<0.001		0.173		0.002		6.11	
MW-20	12/18/98												
MW-20	5/26/99												
MW-20	6/7/99		96.1	99.2		<0.01	0.08	0.17	16.1	0.002	0.035	6.5	12.3
MW-20	6/14/99												
MW-20	6/22/99												
MW-20	6/29/99												
MW-20	7/6/99												
MW-20	7/13/99												
MW-20	7/19/99												
MW-20	7/28/99												
MW-20	8/4/99												
MW-20	8/9/99												
MW-20	8/16/99												
MW-20	8/18/99												
MW-20	8/23/99												

Statistical Summary: Mean & Standard Deviation Using All An

Mean			96.1	91.8	0.004	0.0027	0.08	0.171	16.1	0.002	0.035	6.3	12.3
Std Dev			96.1	10.4	0.004	0.0032	0.08	0.0021	16.1	0	0.035	0.276	12.3
Mean + 1X Std Dev			192.2	102.2	0.008	0.0059	0.16	0.1731	32.2	0.002	0.07	6.576	24.6

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Hecla Mining Company
Grouse Creek Unit

Water Quality Monitoring Data
Site MW-20

Report Date: 9/7/99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	CN, Free (mg/l)	CN, Total (mg/l)	CN, WAD (mg/l)	Thiocyanate (mg/l)	TSS (mg/l)	TDS (mg/l)	Aluminum, D (mg/l)	Aluminum, TR (mg/l)	Arsenic, D (mg/l)	Arsenic, TR (mg/l)	Cadmium, D (mg/l)	Cadmium, TR (mg/l)
MW-20	11/22/98			0.48	0.18		33	320			<0.002		<0.002	
MW-20	12/18/98													
MW-20	5/26/99													
MW-20	6/7/99		0.2	0.68	0.19	<0.1	324	350	<0.03	9.74	<0.001	0.007	<0.0005	<0.0005
MW-20	6/14/99													
MW-20	6/22/99													
MW-20	6/29/99													
MW-20	7/6/99			0.346	0.138									
MW-20	7/13/99													
MW-20	7/19/99													
MW-20	7/28/99													
MW-20	8/4/99			1.46	0.309									
MW-20	8/9/99													
MW-20	8/16/99													
MW-20	8/18/99													
MW-20	8/23/99													

Statistical Summary: Mean & Standard Deviation Using All An

Mean			0.2	0.742	0.204	0.05	178.5	335	0.015	9.74	0.00075	0.007	0.00063	0.00025
Std Dev			0.2	0.498	0.074	0.05	205.8	21.2	0.015	9.74	0.00035	0.007	0.00053	0.00025
Mean + 1X Std Dev			0.4	1.24	0.278	0.1	384.3	356.2	0.03	19.48	0.0011	0.014	0.00116	0.0005

Les[illegible] 'etectable data assumed as one-half the detection limit in M[illegible] Standard Deviation calculations.

Hecla ...ning Company
Grouse Creek Unit

Water Quality Monitoring Data
Site MW-20

Report Date: 9/7/99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Alkalinity (mg/l)	Bicarbonate (mg/l)	Carbonate (mg/l)	Hydroxide (mg/l)	Hardness (mg/l)	Chloride (mg/l)	Nitrate + Nitrite, D (mg/l)	Nitrate + Nitrite, T (mg/l)	Nitrite, D (mg/l)	Ammonia (mg/l)	Sulfate (mg/l)	Sulfite (mg/l)
MW-20	11/22/98		117				236							
MW-20	12/18/98													
MW-20	5/26/99													
MW-20	6/7/99		116	116	<2	<2		24.5	0.95		0.15	0.09	110	<2
MW-20	6/14/99													
MW-20	6/22/99													
MW-20	6/29/99													
MW-20	7/6/99									0.84		<0.1		
MW-20	7/13/99													
MW-20	7/19/99													
MW-20	7/28/99													
MW-20	8/4/99									0.71		<0.1		
MW-20	8/9/99													
MW-20	8/16/99													
MW-20	8/18/99													
MW-20	8/23/99													

Statistical Summary: Mean & Standard Deviation Using All Analyses

Mean			116.5	116	1	1	236	24.5	0.95	0.775	0.15	0.0633	110	1
Std Dev			0.707	116	1	1	236	24.5	0.95	0.0919	0.15	0.0231	110	1
Mean + 1X Std Dev			117.207	232	2	2	472	49	1.9	0.8669	0.3	0.0864	220	2

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Hecla Mining Company
Grouse Creek Unit

Water Quality Monitoring Data
Site MW-22

Report Date: 9/7/99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Temperature (Cent)	Conductivity, Field (micromho)	pH, Field (su)	Depth to Water (ft)
MW-22	7/19/99					42.5
MW-22	7/28/99					41.68
MW-22	8/4/99					45.48
MW-22	8/9/99					47.52
MW-22	8/16/99					51.43
MW-22	8/18/99		13.8	190	7.73	52.1

Statistical Summary: Mean & Standard Deviation Using All Analyses

Mean			13.8	190	7.72	46.8
Std Dev			13.8	190	7.72	4.39
Mean + 1X Std Dev			27.6	380	7.42	51.19

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Water Quality [illegible]itoring Data
Site MW-24

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Nickel, TR (mg/l)	Potassium, D (mg/l)	Potassium, TR (mg/l)	Selenium, D (mg/l)	Selenium, TR (mg/l)	Silver, D (mg/l)	Silver, TR (mg/l)	Sodium, D (mg/l)	Sodium, TR (mg/l)	Zinc, D (mg/l)	Zinc, TR (mg/l)	Temperature (Cent)	Conductivity @ 25 C (micromho)
MW-24	11/20/98							<0.005				0.009			388
MW-24	12/18/98														
MW-24	5/26/99														
MW-24	6/7/99		<0.01	3.2	6.1	0.002	0.002	<0.0005	<0.0005	14.8	14.8	0.09	0.51	8.3	316
MW-24	6/7/99	Duplicate	<0.01	3.2	5.7	0.002	0.002	<0.0005	<0.0005	14.8	14.1	0.16	0.41		317
MW-24	6/14/99														
MW-24	6/22/99														
MW-24	6/29/99														
MW-24	7/7/99													12.1	
MW-24	7/7/99	Duplicate												12.1	
MW-24	7/13/99														
MW-24	7/19/99														
MW-24	7/28/99														
MW-24	8/3/99													7.9	
MW-24	8/9/99														
MW-24	8/16/99														
MW-24	8/17/99													13	
MW-24	8/23/99														

Statistical Summary: Mean & Standard Deviation Using All An

Mean			0.005	3.2	6.1	0.002	0.002	0.0014	0.00025	14.8	14.8	0.0495	0.51	10.3	352
Std Dev			0.005	3.2	6.1	0.002	0.002	0.0016	0.00025	14.8	14.8	0.0573	0.51	2.6	50.9
Mean + 1X Std Dev			0.01	6.4	12.2	0.004	0.004	0.003	0.0005	29.6	29.6	0.1088	1.02	12.9	402.9

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Hecla Mining Company
Grouse Creek Unit

Water Quality Monitoring Data
Site MW-24

Report Date: 9/7/99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Copper, D (mg/l)	Copper, TR (mg/l)	Iron, D (mg/l)	Iron, TR (mg/l)	Lead, D (mg/l)	Lead, TR (mg/l)	Magnesium, D (mg/l)	Magnesium, TR (mg/l)	Manganese, D (mg/l)	Manganese, TR (mg/l)	Mercury, D (mg/l)	Mercury, TR (mg/l)	Nickel, D (mg/l)
MW-24	11/20/98		<0.001		0.16		<0.002		5.82				<0.0002		0.002
MW-24	12/18/98														
MW-24	5/26/99														
MW-24	6/7/99		<0.01	0.06	0.23	14.2	<0.001	0.041	5.3	5.9	0.126	0.578		0.0005	<0.01
MW-24	6/7/99	Duplicate	<0.01	0.04	0.21	13.1	<0.001	0.033	5.5	6.2	0.151	0.58		0.0005	<0.01
MW-24	6/14/99														
MW-24	6/22/99														
MW-24	6/29/99														
MW-24	7/7/99														
MW-24	7/7/99	Duplicate													
MW-24	7/13/99														
MW-24	7/19/99														
MW-24	7/28/99														
MW-24	8/3/99														
MW-24	8/9/99														
MW-24	8/16/99														
MW-24	8/17/99														
MW-24	8/23/99														

Statistical Summary: Mean & Standard Deviation Using All An

Mean			0.0027	0.06	0.195	14.2	0.00075	0.041	5.56	5.9	0.126	0.578	0.0001	0.0005	0.0035
Std Dev			0.0032	0.06	0.0495	14.2	0.00035	0.041	0.368	5.9	0.126	0.578	0.0001	0.0005	0.0021
Mean + 1X Std Dev			0.0059	0.12	0.2445	28.4	0.0011	0.082	5.928	11.8	0.252	1.156	0.0002	0.001	0.0056

Le ctable data assumed as one-half the detection limit in Mean and St viation calculations.

Water Quality Monitoring Data
Site MW-24

Site Number	Sample Date	Duplicate/ Rerun/No Sample	CN, WAD (mg/l)	Thiocyanate (mg/l)	TSS (mg/l)	TDS (mg/l)	Aluminum, D (mg/l)	Aluminum, TR (mg/l)	Arsenic, D (mg/l)	Arsenic, TR (mg/l)	Cadmium, D (mg/l)	Cadmium, TR (mg/l)	Calcium, D (mg/l)	Calcium, TR (mg/l)	Chromium, D (mg/l)
MW-24	11/20/98		0.06		62.8	273			<0.002		<0.002		29.6		<0.008
MW-24	12/18/98														
MW-24	5/26/99														
MW-24	6/7/99		0.11	<0.1	727	200	<0.03	8.33	0.004	0.032	<0.0005	<0.0005	36.5	35.6	
MW-24	6/7/99	Duplicate	0.13	<0.1	693	190	<0.03	8.37	0.004	0.026	<0.0005	<0.0005	36.2	35.1	
MW-24	6/14/99														
MW-24	6/22/99														
MW-24	6/29/99														
MW-24	7/7/99		0.057												
MW-24	7/7/99	Duplicate	0.064												
MW-24	7/13/99														
MW-24	7/19/99														
MW-24	7/28/99														
MW-24	8/3/99		0.049												
MW-24	8/9/99														
MW-24	8/16/99														
MW-24	8/17/99														
MW-24	8/23/99														

Statistical Summary: Mean & Standard Deviation Using All An

Mean			0.069	0.05	394.8	236.5	0.015	8.33	0.0025	0.032	0.00063	0.00025	33	35.6	0.004
Std Dev			0.0277	0.05	469.8	51.6	0.015	8.33	0.0021	0.032	0.00053	0.00025	4.88	35.6	0.004
Mean + 1X Std Dev			0.0967	0.1	864.6	288.1	0.03	16.66	0.0046	0.064	0.00116	0.0005	37.88	71.2	0.008

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Hecla Mining Company
Grouse Creek Unit

Water Quality Monitoring Data
Site MW-24

Report Date: 9/7/99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Alkalinity (mg/l)	Bicarbonate (mg/l)	Carbonate (mg/l)	Hydroxide (mg/l)	Hardness (mg/l)	Chloride (mg/l)	Nitrate + Nitrite, D (mg/l)	Nitrate + Nitrite, T (mg/l)	Nitrite, D (mg/l)	Ammonia (mg/l)	Sulfate (mg/l)	Sulfite (mg/l)	CN, Free (mg/l)	CN, Total (mg/l)
MW-24	11/20/98		53				97.9									0.4
MW-24	12/16/98															
MW-24	5/26/99															
MW-24	6/7/99		39	39	<2	<2		3.1	1.09		0.01	0.13	80	2	0.4	0.64
MW-24	6/7/99	Duplicate	38	38	<2	<2		3.1	1.09		0.01	0.11	90	2	0.3	0.69
MW-24	6/14/99															
MW-24	6/22/99															
MW-24	6/29/99															
MW-24	7/7/99									0.76		0.1				0.228
MW-24	7/7/99	Duplicate								0.73		0.1				0.254
MW-24	7/13/99															
MW-24	7/19/99															
MW-24	7/28/99															
MW-24	8/3/99									0.66		<0.1				0.175
MW-24	8/9/99															
MW-24	8/16/99															
MW-24	8/17/99															
MW-24	8/23/99															

Statistical Summary: Mean & Standard Deviation Using All Analyses

Mean			46	39	1	1	97.9	3.1	1.09	0.71	0.01	0.0933	80	2	0.4	0.361
Std Dev			9.9	39	1	1	97.9	3.1	1.09	0.0707	0.01	0.0404	80	2	0.4	0.209
Mean + 1X Std Dev			55.9	78	2	2	195.8	6.2	2.16	0.7807	0.02	0.1337	160	4	0.8	0.57

Le. ctable data assumed as one-half the detection limit in Mean and St. viation calculations.

Hecla Mining Company
Grouse Creek Unit

Water Quality Monitoring Data
Site MW-23

Report Date: 9/7/99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Mercury, D (mg/l)	Nickel, D (mg/l)	Silver, D (mg/l)	Zinc, D (mg/l)	Conductivity @ 25 C (micromho)	pH, Lab (su)	Depth to Water (ft)
MW-23	11/19/98		<0.0002	0.004	<0.005	0.012	525	7.44	
MW-23	5/26/99	Dry							
MW-23	6/7/99	Dry							47.3
MW-23	6/14/99	Dry							
MW-23	6/22/99	Dry							50
MW-23	6/29/99	Dry							51.1
MW-23	7/7/99	Dry							50.57
MW-23	7/19/99	Dry							50.5
MW-23	7/28/99	Dry							52
MW-23	8/9/99	Dry							
MW-23	8/16/99	Dry							52.5
MW-23	8/17/99	Dry							50.31
MW-23	8/23/99								50.4

Statistical Summary: Mean & Standard Deviation Using All A

Mean			0.0001	0.004	0.0025	0.012	525	7.44	50.5
Std Dev			0.0001	0.004	0.0025	0.012	525	7.44	1.46
Mean + 1X Std Dev			0.0002	0.008	0.005	0.024	1050	7.14	51.96

Les[illegible] detectable data assumed as one-half the detection limit in Mean [illegible] ndard Deviation calculations.

Hecla ...ing Company
Grouse Creek Unit

Water Quality Monitoring Data
Site MW-23

Report Date: 9/7/99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	()	Alkalinity (mg/l)	Hardness (mg/l)	CN, Total (mg/l)	CN, WAD (mg/l)	TSS (mg/l)	TDS (mg/l)	Arsenic, D (mg/l)	Cadmium, D (mg/l)	Calcium, D (mg/l)	Chromium, D (mg/l)	Copper, D (mg/l)	Iron, D (mg/l)	Lead, D (mg/l)	Magnesium, D (mg/l)
MW-23	11/19/98			47.2	256	0.12	0.03	6.2	408	<0.002	<0.002	76.3	<0.008	<0.001	0.059	<0.002	15.8
MW-23	5/26/99	Dry															
MW-23	6/7/99	Dry															
MW-23	6/14/99	Dry															
MW-23	6/22/99	Dry															
MW-23	6/29/99	Dry															
MW-23	7/7/99	Dry															
MW-23	7/19/99	Dry															
MW-23	7/28/99	Dry															
MW-23	8/9/99	Dry															
MW-23	8/16/99	Dry															
MW-23	8/17/99	Dry															
MW-23	8/23/99																

Statistical Summary: Mean & Standard Deviation Using All Analyses

Mean			4.39	47.2	256	0.12	0.03	6.2	408	0.001	0.001	76.3	0.004	0.0005	0.059	0.001	15.8
Std Dev			4.39	47.2	256	0.12	0.03	6.2	408	0.001	0.001	76.3	0.004	0.0005	0.059	0.001	15.8
Mean + 1X Std Dev			8.78	94.4	512	0.24	0.06	12.4	816	0.002	0.002	152.6	0.008	0.001	0.118	0.002	31.6

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Water Qua Monitoring Data
Site MW-24

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Conductivity, Field (micromho)	pH, Lab (su)	pH, Field (su)	Turbidity, Lab (NTU)	Purge Volume (gallons)	Depth to Water (ft)
MW-24	11/20/98			7.53				
MW-24	12/16/98							49.45
MW-24	5/26/99							49.8
MW-24	6/7/99		300	8.9	9	340	60	50.2
MW-24	6/7/99	Duplicate		8.8		300		
MW-24	6/14/99							51.09
MW-24	6/22/99							51.15
MW-24	6/29/99							79.88
MW-24	7/7/99		250		10.3		112	51.15
MW-24	7/7/99	Duplicate	250		10.3			51.15
MW-24	7/13/99							51.18
MW-24	7/19/99							51.19
MW-24	7/28/99							51.21
MW-24	8/3/99		250		8.12			51.16
MW-24	8/9/99							51.23
MW-24	8/16/99							51.13
MW-24	8/17/99				8.06			51.13
MW-24	8/23/99							51.08

Statistical Summary: Mean & Standard Deviation Using All An

Mean			266.7	7.11	8.37	340	86	52.8
Std Dev			28.9	7.17	8.36	340	36.8	7.51
Mean + 1X Std Dev			295.6	8.84	8.06	680	122.8	60.31

Le. detectable data assumed as one-half the detection limit in Mean and St Deviation calculations.

Hec. Mining Company
Grouse Creek Unit

Water Quality Monitoring Data
Site MW-25

Report Date /99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	()	Alkalinity (mg/l)	Hardness (mg/l)	CN, Total (mg/l)	CN, WAD (mg/l)	TSS (mg/l)	TDS (mg/l)	Arsenic, D (mg/l)	Cadmium, D (mg/l)
MW-25	11/22/98			33.5	160	0.96	0.15	1150	250	0.025	<0.002
MW-25	12/18/98										
MW-25	5/26/99										
MW-25	6/7/99	Dry									
MW-25	6/14/99	Dry									
MW-25	6/22/99	Dry									
MW-25	6/29/99	Dry									
MW-25	7/7/99	Dry									
MW-25	7/13/99	Dry									
MW-25	7/19/99	Dry									
MW-25	7/28/99	Dry									
MW-25	8/3/99	Dry									
MW-25	8/9/99	Dry									
MW-25	8/16/99	Dry									
MW-25	8/17/99	Dry									
MW-25	8/23/99	Dry									

Statistical Summary: Mean & Standard Deviation Using All Analyses

Mean			7.51	33.5	160	0.96	0.15	1150	250	0.025	0.001
Std Dev			7.51	33.5	160	0.96	0.15	1150	250	0.025	0.001
Mean + 1X Std Dev			15.02	67	320	1.92	0.3	2300	500	0.05	0.002

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation cal ions.

Hecla Mining Company
Grouse Creek Unit

Water Quality Monitoring Data
Site MW-25

Report Date: 9/7/99

Depth to Water (ft)
48.47
48.9
61.2
62.45
62.1
62.35
62.2
62.2
50
62.35
60.35
62.25

58.7
5.84
64.54

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Hecla Mining Company
Grouse Creek Unit

Water Quality Monitoring Data
Site MW-26

Report Date: 9/7/99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Selenium, D (mg/l)	Selenium, TR (mg/l)	Silver, D (mg/l)	Silver, TR (mg/l)	Sodium, D (mg/l)	Sodium, TR (mg/l)	Zinc, D (mg/l)	Zinc, TR (mg/l)	Temperature (Cent)	Conductivity @ 25 C (micromho)	Conductivity, Field (micromho)	pH, Lab (su)	pH, Field (su)
MW-26	12/18/98				<0.005				0.019			343		7.11	
MW-26	6/7/99		0.003	0.003	<0.0005	<0.0005	11	9.2	0.02	0.02	8.2	375	350	6.4	6.9
MW-26	6/14/99														
MW-26	6/22/99	Dry													
MW-26	6/29/99	Dry													
MW-26	7/7/99										10.7		270		7.1
MW-26	7/22/99														
MW-26	8/9/99	Dry													
MW-26	8/17/99										10		270		7
MW-26	8/23/99	continuously pumping													

Statistical Summary: Mean & Standard Deviation Using All Analys

Mean			0.003	0.003	0.0014	0.00025	11	9.2	0.0195	0.02	9.63	359	296.7	6.62	7.00
Std Dev			0.003	0.003	0.0016	0.00025	11	9.2	0.00071	0.02	1.29	22.6	46.2	6.64	7.64
Mean + 1X Std Dev			0.006	0.006	0.003	0.0005	22	18.4	0.02021	0.04	10.92	381.6	342.9	6.33	6.91

Less/ [illegible]electable data assumed as one-half the detection limit in Mean and Sta[illegible]eviation calculations.

Hecla Mining Company
Grouse Creek Unit

Water Quality Monitoring Data
Site MW-26

Report Date:

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Lead, D (mg/l)	Lead, TR (mg/l)	Magnesium, D (mg/l)	Magnesium, TR (mg/l)	Manganese, D (mg/l)	Manganese, TR (mg/l)	Mercury, D (mg/l)	Mercury, TR (mg/l)	Mercury, T (mg/l)	Nickel, D (mg/l)	Nickel, TR (mg/l)	Potassium, D (mg/l)	Potassium, TR (mg/l)
MW-26	12/18/98		<0.002			11			0.0025						
MW-26	6/7/99		<0.001	<0.001	9.7	9.2	0.007	0.009		0.003		<0.01	<0.01	2.3	2.2
MW-26	6/14/99														
MW-26	6/22/99	Dry													
MW-26	6/29/99	Dry													
MW-26	7/7/99									0.0035	0.0035				
MW-26	7/22/99										0.0041				
MW-26	8/9/99	Dry													
MW-26	8/17/99														
MW-26	8/23/99	continuously pumping													

Statistical Summary: Mean & Standard Deviation Using All Analys

Mean			0.00075	0.0005	9.7	10.1	0.007	0.009	0.0025	0.0033	0.0038	0.005	0.005	2.3	2.2
Std Dev			0.00035	0.0005	9.7	1.27	0.007	0.009	0.0025	0.00035	0.00042	0.005	0.005	2.3	2.2
Mean + 1X Std Dev			0.0011	0.001	19.4	11.37	0.014	0.018	0.005	0.00365	0.00422	0.01	0.01	4.6	4.4

Less than . able data assumed as one-half the detection limit in Mean and Standard Devia. culations.

Hecla Mining Company
Grouse Creek Unit

Water Quality Monitoring Data
Site MW-26

Report Date: 9/7/99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Thiocyanate (mg/l)	TSS (mg/l)	TDS (mg/l)	Aluminum, D (mg/l)	Aluminum, TR (mg/l)	Arsenic, D (mg/l)	Arsenic, TR (mg/l)	Cadmium, D (mg/l)	Cadmium, TR (mg/l)	Calcium, D (mg/l)	Calcium, TR (mg/l)	Copper, D (mg/l)	Copper, TR (mg/l)	Iron, D (mg/l)	Iron, TR (mg/l)
MW-26	12/18/98			544	287			<0.002					50.6				
MW-26	6/7/99		<0.1	<5	250	<0.03	0.17	0.001	0.002	<0.0005	<0.0005	46.8	41.1	<0.01	0.01	0.4	0.51
MW-26	6/14/99																
MW-26	6/22/99	Dry															
MW-26	6/29/99	Dry															
MW-26	7/7/99																
MW-26	7/22/99																
MW-26	8/9/99	Dry															
MW-26	8/17/99																
MW-26	8/23/99	continuously pumping															

Statistical Summary: Mean & Standard Deviation Using All Analys

Mean			0.05	273.2	268.5	0.015	0.17	0.001	0.002	0.00025	0.00025	46.8	45.9	0.005	0.01	0.4	0.51
Std Dev			0.05	382.9	26.2	0.015	0.17	0	0.002	0.00025	0.00025	46.8	6.72	0.005	0.01	0.4	0.51
Mean + 1X Std Dev			0.1	656.1	294.7	0.03	0.34	0.001	0.004	0.0005	0.0005	93.6	52.62	0.01	0.02	0.8	1.02

Less Detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Hecla[illegible]g Company
Grouse Creek Unit

Water Qual[illegible]onitoring Data
Site MW-26

Report[illegible]/7/99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	()	Alkalinity (mg/l)	Bicarbonate (mg/l)	Carbonate (mg/l)	Hydroxide (mg/l)	Hardness (mg/l)	Chloride (mg/l)	Nitrate + Nitrite, D (mg/l)	Nitrate + Nitrite, T (mg/l)	Nitrite, D (mg/l)	Ammonia (mg/l)	Sulfate (mg/l)	Sulfite (mg/l)	CN, Free (mg/l)	CN, Total (mg/l)	CN, WAD (mg/l)
MW-26	12/18/98			31.4				172									0.82	0.19
MW-26	6/7/99			31	31	<2	<2		4.4	1.45		<0.01	<0.05	120	2	0.2	1.1	0.22
MW-26	6/14/99																	
MW-26	6/22/99	Dry																
MW-26	6/29/99	Dry																
MW-26	7/7/99										1.49		0.2				1.1	0.351
MW-26	7/22/99																1.61	0.265
MW-26	8/9/99	Dry																
MW-26	8/17/99																	
MW-26	8/23/99	continuously pumping																

Statistical Summary: Mean & Standard Deviation Using All Analyses

Mean			5.84	31.2	31	1	1	172	4.4	1.45	1.49	0.005	0.113	120	2	0.2	1.16	0.257
Std Dev			5.84	0.283	31	1	1	172	4.4	1.45	1.49	0.005	0.124	120	2	0.2	0.329	0.0701
Mean + 1X Std Dev			11.68	31.483	62	2	2	344	8.8	2.9	2.98	0.01	0.237	240	4	0.4	1.489	0.3271

Less [illegible]etectable data assumed as one-half the detection limit in Mean and Standard [illegible]n calculations.

Water Quality Monitoring Data
Site MW-26

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Turbidity, Lab (NTU)	Depth to Water (ft)
MW-26	12/18/98			48.31
MW-26	6/7/99		5.5	78.75
MW-26	6/14/99			87.88
MW-26	6/22/99	Dry		78.5
MW-26	6/29/99	Dry		83.4
MW-26	7/7/99			
MW-26	7/22/99			
MW-26	8/9/99	Dry		75.2
MW-26	8/17/99			
MW-26	8/23/99	continuously pumping		

Statistical Summary: Mean & Standard Deviation Using All Analys

Mean			5.5	75.3
Std Dev			5.5	14
Mean + 1X Std Dev			11	89.3

Less t... detectable data assumed as one-half the detection limit in Mean and Standard De...ation calculations.

Hecla Mining Company
Grouse Creek Unit

Water Quality Monitoring Data
Site MW-27

Report 9/7/99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	()	Alkalinity (mg/l)	Bicarbonate (mg/l)	Carbonate (mg/l)	Hydroxide (mg/l)	Hardness (mg/l)	Chloride (mg/l)	Nitrate + Nitrite, D (mg/l)	Nitrate + Nitrite, T (mg/l)	Nitrite, D (mg/l)	Ammonia (mg/l)	Sulfate (mg/l)	Sulfite (mg/l)	CN, Free (mg/l)	CN, Total (mg/l)
MW-27	12/8/98			244				397									0.06
MW-27	12/18/98																
MW-27	5/26/99																
MW-27	6/7/99			105	105	<2	<2		11.2	1.47		0.57	0.26	350	2	1.6	12
MW-27	6/14/99																
MW-27	6/22/99																
MW-27	7/6/99										0.96		0.19				7.42
MW-27	7/13/99	Dry															
MW-27	7/22/99																5.04
MW-27	8/16/99																
MW-27	8/18/99																
MW-27	8/23/99																
MW-27	8/23/99	Dry															

Statistical Summary: Mean & Standard Deviation Using All Analyses

Mean			14	174.5	105	1	1	397	11.2	1.47	0.96	0.57	0.225	350	2	1.6	6.13
Std Dev			14	88.3	105	1	1	397	11.2	1.47	0.96	0.57	0.0495	350	2	1.6	4.97
Mean + 1X Std Dev			28	272.8	210	2	2	794	22.4	2.94	1.92	1.14	0.2745	700	4	3.2	11.1

Les. detectable data assumed as one-half the detection limit in Mean and Sta. Deviation calculations.

Water Quality Monitoring Data
Site MW-27

Site Number	Sample Date	Duplicate/ Rerun/No Sample	CN, WAD (mg/l)	Thiocyanate (mg/l)	TSS (mg/l)	TDS (mg/l)	Aluminum, D (mg/l)	Aluminum, TR (mg/l)	Arsenic, D (mg/l)	Arsenic, TR (mg/l)	Cadmium, D (mg/l)	Cadmium, TR (mg/l)	Calcium, D (mg/l)	Calcium, TR (mg/l)	Copper, D (mg/l)
MW-27	12/8/98		<0.01		567	548			0.186					133	
MW-27	12/18/98														
MW-27	5/26/99														
MW-27	6/7/99		4.8	0.5	<5	670	<0.03	<0.03	0.012	0.014	<0.0005	<0.0005	115	101	<0.01
MW-27	6/14/99														
MW-27	6/22/99														
MW-27	7/6/99		2.76												
MW-27	7/13/99	Dry													
MW-27	7/22/99		0.94												
MW-27	8/16/99														
MW-27	8/18/99														
MW-27	8/23/99														
MW-27	8/23/99	Dry													

Statistical Summary: Mean & Standard Deviation Using All An

Mean			2.13	0.5	284.8	609	0.015	0.015	0.099	0.014	0.00025	0.00025	115	117	0.005
Std Dev			2.12	0.5	399.2	86.3	0.015	0.015	0.123	0.014	0.00025	0.00025	115	22.6	0.005
Mean + 1X Std Dev			4.25	1	684	695.3	0.03	0.03	0.222	0.028	0.0005	0.0005	230	139.6	0.01

Le... n detectable data assumed as one-half the detection limit in Mean a... Standard Deviation calculations.

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Copper, TR (mg/l)	Iron, D (mg/l)	Iron, TR (mg/l)	Lead, D (mg/l)	Lead, TR (mg/l)	Magnesium, D (mg/l)	Magnesium, TR (mg/l)	Manganese, D (mg/l)	Manganese, TR (mg/l)	Mercury, D (mg/l)	Mercury, TR (mg/l)	Mercury, T (mg/l)	Nickel, D (mg/l)
MW-27	12/8/98					0.003			16			<0.0002			
MW-27	12/16/98														
MW-27	5/26/99														
MW-27	6/7/99		<0.01	3.99	4.34	<0.001	<0.001	20.4	18.9	4.81	4.48		0.0012		<0.01
MW-27	6/14/99														
MW-27	6/22/99														
MW-27	7/6/99														
MW-27	7/13/99	Dry													
MW-27	7/22/99													<0.0002	
MW-27	8/16/99														
MW-27	8/16/99														
MW-27	8/23/99														
MW-27	8/23/99	Dry													

Statistical Summary: Mean & Standard Deviation Using All An

Mean			0.005	3.99	4.34	0.0018	0.0005	20.4	17.4	4.81	4.48	0.0001	0.0012	0.0001	0.005
Std Dev			0.005	3.99	4.34	0.0018	0.0005	20.4	2.05	4.81	4.48	0.0001	0.0012	0.0001	0.005
Mean + 1X Std Dev			0.01	7.98	8.68	0.0036	0.001	40.8	19.45	9.62	8.96	0.0002	0.0024	0.0002	0.01

Less [illegible] letectable data assumed as one-half the detection limit in Mean and Star [illegible] eviation calculations.

Hecla Mining Company
Grouse Creek Unit

Water Quality Monitoring Data
Site MW-27

Report Date: 9/7/99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Nickel, TR (mg/l)	Potassium, D (mg/l)	Potassium, TR (mg/l)	Selenium, D (mg/l)	Selenium, TR (mg/l)	Silver, D (mg/l)	Silver, TR (mg/l)	Sodium, D (mg/l)	Sodium, TR (mg/l)	Zinc, D (mg/l)	Zinc, TR (mg/l)	Temperature (Cent)	Conductivity @ 25 C (micromho)
MW-27	12/8/98							<0.005				0.009			733
MW-27	12/18/98														
MW-27	5/26/99														
MW-27	6/7/99		<0.01	2.6	2.4	0.03	0.028	0.007	0.0026	64.5	60	0.01	0.08	8.4	958
MW-27	6/14/99														
MW-27	6/22/99														
MW-27	7/6/99													23	
MW-27	7/13/99	Dry													
MW-27	7/22/99														
MW-27	8/16/99														
MW-27	8/18/99														
MW-27	8/23/99														
MW-27	8/23/99	Dry													

Statistical Summary: Mean & Standard Deviation Using All An

Mean			0.005	2.6	2.4	0.03	0.028	0.0047	0.0026	64.5	60	0.0095	0.08	15.7	845.5
Std Dev			0.005	2.6	2.4	0.03	0.028	0.0032	0.0028	64.5	60	0.00071	0.08	10.3	159.1
Mean + 1X Std Dev			0.01	5.2	4.8	0.06	0.056	0.0079	0.0052	129	120	0.01021	0.16	26	1004.6

Less detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Hecla Mining Company
Grouse Creek Unit

Water Quality Monitoring Data
Site MW-27

Report Date: 9/7/99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Conductivity, Field (micromho)	pH, Lab (su)	pH, Field (su)	Turbidity, Lab (NTU)	Depth to Water (ft)
MW-27	12/8/98			6.68			
MW-27	12/18/98						52.87
MW-27	5/26/99						29.8
MW-27	6/7/99		910	6.3	6.3	5.4	
MW-27	6/14/99						40.59
MW-27	6/22/99						42.22
MW-27	7/6/99		630		6.5		
MW-27	7/13/99	Dry					83.3
MW-27	7/22/99						
MW-27	8/16/99						77.27
MW-27	8/16/99						75.65
MW-27	8/23/99						77.43
MW-27	8/23/99	Dry					41.2

Statistical Summary: Mean & Standard Deviation Using All An

Mean			770	6.44	6.39	5.4	57.8
Std Dev			198	0.68	0.89	5.4	20.5
Mean + 1X Std Dev			968	6.24	6.27	10.8	78.3

Less detectable data assumed as one-half the detection limit in Mean and Stan Deviation calculations.

Hecla Mining Company
Grouse Creek Unit

Water Quality Monitoring Data
Site MW-28

Report Date: 9/7/99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Potassium, D (mg/l)	Potassium, TR (mg/l)	Selenium, D (mg/l)	Selenium, TR (mg/l)	Silver, D (mg/l)	Silver, TR (mg/l)	Sodium, D (mg/l)	Sodium, TR (mg/l)	Zinc, D (mg/l)	Zinc, TR (mg/l)	Temperature (Cent)	Conductivity @ 25 C (micromho)
MW-28	12/10/98						<0.005				<0.004			357
MW-28	12/10/98	Duplicate					<0.005				<0.004			367
MW-28	12/18/98													
MW-28	5/26/99													
MW-28	6/7/99		2.3	3.4	0.003	0.003	<0.0005	<0.0005	15.8	9.1	1.74	1.72	8.4	499
MW-28	6/14/99													
MW-28	6/22/99													
MW-28	6/29/99													
MW-28	7/6/99												14.1	
MW-28	7/13/99													
MW-28	7/19/99													
MW-28	7/28/99													
MW-28	8/4/99												14.1	
MW-28	8/9/99													
MW-28	8/16/99													
MW-28	8/18/99												12	
MW-28	8/23/99													

Statistical Summary: Mean & Standard Deviation Using All An

Mean			2.3	3.4	0.003	0.003	0.0014	0.00025	15.8	9.1	0.871	1.72	12.2	428
Std Dev			2.3	3.4	0.003	0.003	0.0016	0.00025	15.8	9.1	1.23	1.72	2.69	100.4
Mean + 1X Std Dev			4.6	6.8	0.006	0.006	0.003	0.0005	31.6	18.2	2.101	3.44	14.89	528.4

Less detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Copper, TR (mg/l)	Iron, D (mg/l)	Iron, TR (mg/l)	Lead, D (mg/l)	Lead, TR (mg/l)	Magnesium, D (mg/l)	Magnesium, TR (mg/l)	Manganese, D (mg/l)	Manganese, TR (mg/l)	Mercury, D (mg/l)	Mercury, TR (mg/l)	Nickel, D (mg/l)	Nickel, TR (mg/l)
MW-28	12/10/98					<0.002			22.9			<0.0002			
MW-28	12/10/98	Duplicate				<0.002			22.1			<0.0002			
MW-28	12/16/98														
MW-28	5/26/99														
MW-28	6/7/99		<0.01	0.24	22.4	<0.001	0.022	21.9	28.2	0.562	1.02		<0.0002	<0.01	0.02
MW-28	6/14/99														
MW-28	6/22/99														
MW-28	6/29/99														
MW-28	7/6/99														
MW-28	7/13/99														
MW-28	7/19/99														
MW-28	7/28/99														
MW-28	8/4/99														
MW-28	8/9/99														
MW-28	8/16/99														
MW-28	8/18/99														
MW-28	8/23/99														

Statistical Summary: Mean & Standard Deviation Using All An

Mean			0.005	0.24	22.4	0.00075	0.022	21.9	25.5	0.562	1.02	0.0001	0.0001	0.005	0.02
Std Dev			0.005	0.24	22.4	0.00035	0.022	21.9	3.75	0.562	1.02	0.0001	0.0001	0.005	0.02
Mean + 1X Std Dev			0.01	0.48	44.8	0.0011	0.044	43.8	29.25	1.124	2.04	0.0002	0.0002	0.01	0.04

Less [illegible]etectable data assumed as one-half the detection limit in Mean and Stan[illegible]eviation calculations.

Hec.. ..ining Company
Grouse Creek Unit

Water Quality ..onitoring Data
Site MW-28

Report Date: 9/7/99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	CN, WAD (mg/l)	Thiocyanate (mg/l)	TSS (mg/l)	TDS (mg/l)	Aluminum, D (mg/l)	Aluminum, TR (mg/l)	Arsenic, D (mg/l)	Arsenic, TR (mg/l)	Cadmium, D (mg/l)	Cadmium, TR (mg/l)	Calcium, D (mg/l)	Calcium, TR (mg/l)	Copper, D (mg/l)
MW-28	12/10/98		<0.01		110	250			0.016					56.1	
MW-28	12/10/98	Duplicate	<0.01		76.5	241			0.017					57.8	
MW-28	12/18/98														
MW-28	5/26/99														
MW-28	6/7/99		0.09	<0.1	1680	280	<0.03	11.1	0.007	0.048	<0.0005	<0.0005	66.4	96.3	<0.01
MW-28	6/14/99														
MW-28	6/22/99														
MW-28	6/29/99														
MW-28	7/6/99		0.063												
MW-28	7/13/99														
MW-28	7/19/99														
MW-28	7/28/99														
MW-28	8/4/99		0.006												
MW-28	8/9/99														
MW-28	8/16/99														
MW-28	8/18/99														
MW-28	8/23/99														

Statistical Summary: Mean & Standard Deviation Using All An

Mean			0.041	0.05	895	265	0.015	11.1	0.0115	0.048	0.00025	0.00025	66.4	76.2	0.005
Std Dev			0.0424	0.05	1110.2	21.2	0.015	11.1	0.0084	0.048	0.00025	0.00025	66.4	28.4	0.005
Mean + 1X Std Dev			0.0834	0.1	2005.2	286.2	0.03	22.2	0.0178	0.096	0.0005	0.0005	132.8	104.8	0.01

Less ... detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Hecla M[illegible]g Company
Grouse Creek Unit

Water Quality [illegible]onitoring Data
Site MW-28

Report Date: 9/7/99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Alkalinity (mg/l)	Bicarbonate (mg/l)	Carbonate (mg/l)	Hydroxide (mg/l)	Hardness (mg/l)	Chloride (mg/l)	Nitrate + Nitrite, D (mg/l)	Nitrate + Nitrite, T (mg/l)	Nitrite, D (mg/l)	Ammonia (mg/l)	Sulfate (mg/l)	Sulfite (mg/l)	CN, Free (mg/l)	CN, Total (mg/l)
MW-28	12/10/98		204				235									<0.01
MW-28	12/10/98	Duplicate	204				235									<0.01
MW-28	12/18/98															
MW-28	5/26/99															
MW-28	6/7/99		204	204	<2	<2		1.8	0.03		0.02	0.27	50	2	0.5	0.19
MW-28	6/14/99															
MW-28	6/22/99															
MW-28	6/29/99															
MW-28	7/6/99									<0.02		0.1				0.138
MW-28	7/13/99															
MW-28	7/19/99															
MW-28	7/28/99															
MW-28	8/4/99									0.03		<0.1				0.053
MW-28	8/9/99															
MW-28	8/16/99															
MW-28	8/18/99															
MW-28	8/23/99															

Statistical Summary: Mean & Standard Deviation Using All Analyses

Mean			204	204	1	1	235	1.8	0.03	0.02	0.02	0.14	50	2	0.5	0.0965
Std Dev			0	204	1	1	235	1.8	0.03	0.0141	0.02	0.115	50	2	0.5	0.0831
Mean + 1X Std Dev			204	408	2	2	470	3.6	0.06	0.0341	0.04	0.255	100	4	1	0.1796

Less th[illegible]ctable data assumed as one-half the detection limit in Mean and Standa[illegible]ation calculations.

Water Quality Monitoring Data
Site MW-28

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Conductivity, Field (micromho)	pH, Lab (su)	pH, Field (su)	Turbidity, Lab (NTU)	Purge Volume (gallons)	Depth to Water (ft)
MW-28	12/10/98			7.81				
MW-28	12/10/98	Duplicate		7.82				
MW-28	12/18/98							49.21
MW-28	5/26/99							31.1
MW-28	6/7/99		510	7.4	7.6	720	250	36.5
MW-28	6/14/99							41.43
MW-28	6/22/99							41.52
MW-28	6/29/99							42.1
MW-28	7/6/99		310		7.3			42.44
MW-28	7/13/99							42.68
MW-28	7/19/99							43.01
MW-28	7/28/99							44
MW-28	8/4/99		270		7.43			46.87
MW-28	8/9/99							48.61
MW-28	8/16/99							54.41
MW-28	8/18/99		280		7.31			53.3
MW-28	8/23/99							53.91

Statistical Summary: Mean & Standard Deviation Using All An

Mean			342.5	7.55	7.40	720	250	44.7
Std Dev			113	7.77	7.92	720	250	6.47
Mean + 1X Std Dev			455.5	7.35	7.28	1440	500	51.17

Less [illegible] detectable data assumed as one-half the detection limit in Mean and Stan[illegible] deviation calculations.

Hecla Mining Company
Grouse Creek Unit

Water Quality Monitoring Data
Site MW-29

Report Date 9/7/99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Conductivity, Field (micromho)	Depth to Water (ft)
MW-29	6/14/99			35.5
MW-29	6/22/99			38.6
MW-29	6/29/99			35.93
MW-29	7/13/99			38.24
MW-29	7/19/99			38.36
MW-29	7/28/99			38.65
MW-29	8/9/99			38.84
MW-29	8/16/99			38.83
MW-29	8/17/99		290	38.78

Statistical Summary: Mean & Standard Deviation Using All Analyses

Mean			290	38
Std Dev			290	1.3
Mean + 1X Std Dev			580	39.3

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Hecla Mining Company
Grouse Creek Unit

Water Quality Monitoring Data
Site MW-30

Report Date: 9/7/99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Potassium, TR (mg/l)	Selenium, D (mg/l)	Selenium, TR (mg/l)	Silver, D (mg/l)	Silver, TR (mg/l)	Sodium, D (mg/l)	Sodium, TR (mg/l)	Zinc, D (mg/l)	Zinc, TR (mg/l)	Temperature (Cent)	Conductivity @ 25 C (micromho)	Conductivity, Field (micromho)
MW-30	6/7/99		12.3	0.004	0.005	0.0029	<0.0005	23.2	21.8	<0.01	0.12	7.7	560	560
MW-30	6/14/99													
MW-30	6/22/99													
MW-30	6/29/99													
MW-30	7/7/99											10.8		330
MW-30	7/13/99													
MW-30	7/19/99													
MW-30	7/28/99													
MW-30	8/3/99											9.3		340
MW-30	8/9/99	Dry												
MW-30	8/16/99													
MW-30	8/17/99	Dry												
MW-30	8/23/99	Dry												

Statistical Summary: Mean & Standard Deviation Using All An

Mean			12.3	0.004	0.005	0.0029	0.00025	23.2	21.8	0.005	0.12	9.27	560	410
Std Dev			12.3	0.004	0.005	0.0029	0.00025	23.2	21.8	0.005	0.12	1.55	560	130
Mean + 1X Std Dev			24.6	0.008	0.01	0.0058	0.0005	46.4	43.6	0.01	0.24	10.82	1120	540

L[illegible]n detectable data assumed as one-half the detection limit in Mean[illegible]andard Deviation calculations.

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Iron, TR (mg/l)	Lead, D (mg/l)	Lead, TR (mg/l)	Magnesium, D (mg/l)	Magnesium, TR (mg/l)	Manganese, D (mg/l)	Manganese, TR (mg/l)	Mercury, TR (mg/l)	Mercury, T (mg/l)	Nickel, D (mg/l)	Nickel, TR (mg/l)	Potassium, D (mg/l)
MW-30	6/7/99		30.4	<0.001	0.059	16.9	27.5	0.048	2.17	0.0081		<0.01	0.01	8.2
MW-30	6/14/99													
MW-30	6/22/99													
MW-30	6/29/99													
MW-30	7/7/99									0.0101	0.0101			
MW-30	7/13/99													
MW-30	7/19/99													
MW-30	7/26/99													
MW-30	8/3/99													
MW-30	8/9/99	Dry												
MW-30	8/16/99													
MW-30	8/17/99	Dry												
MW-30	8/23/99	Dry												

Statistical Summary: Mean & Standard Deviation Using All An

Mean			30.4	0.0005	0.059	16.9	27.5	0.048	2.17	0.0091	0.0101	0.005	0.01	8.2
Std Dev			30.4	0.0005	0.059	16.9	27.5	0.048	2.17	0.0014	0.0101	0.005	0.01	8.2
Mean + 1X Std Dev			60.8	0.001	0.118	33.8	55	0.096	4.34	0.0105	0.0202	0.01	0.02	16.4

Le[illegible] detectable data assumed as one-half the detection limit in Mean and Sta[illegible] Deviation calculations.

Hecla Mining Company
Grouse Creek Unit

Water Quality Monitoring Data
Site MW-30

Report Date: 9/7/99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Thiocyanate (mg/l)	TSS (mg/l)	TDS (mg/l)	Aluminum, D (mg/l)	Aluminum, TR (mg/l)	Arsenic, D (mg/l)	Arsenic, TR (mg/l)	Cadmium, D (mg/l)	Cadmium, TR (mg/l)	Calcium, D (mg/l)	Calcium, TR (mg/l)	Copper, D (mg/l)	Copper, TR (mg/l)	Iron, D (mg/l)
MW-30	6/7/99		<0.1	1740	360	0.36	30	0.002	0.048	<0.0005	<0.0005	57.5	69.3	<0.01	0.02	0.5
MW-30	6/14/99															
MW-30	6/22/99															
MW-30	6/29/99															
MW-30	7/7/99															
MW-30	7/13/99															
MW-30	7/19/99															
MW-30	7/28/99															
MW-30	8/3/99															
MW-30	8/9/99	Dry														
MW-30	8/16/99															
MW-30	8/17/99	Dry														
MW-30	8/23/99	Dry														

Statistical Summary: Mean & Standard Deviation Using All An

Mean			0.05	1740	360	0.36	30	0.002	0.048	0.00025	0.00025	57.5	69.3	0.005	0.02	0.5
Std Dev			0.05	1740	360	0.36	30	0.002	0.048	0.00025	0.00025	57.5	69.3	0.005	0.02	0.5
Mean + 1X Std Dev			0.1	3480	720	0.72	60	0.004	0.096	0.0005	0.0005	115	138.6	0.01	0.04	1

Less 'etectable data assumed as one-half the detection limit in Mean an lard Deviation calculations.

Hecla Mining Company
Grouse Creek Unit

Water Quality Monitoring Data
Site MW-30

Report Date: 9/7/99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	()	Alkalinity (mg/l)	Bicarbonate (mg/l)	Carbonate (mg/l)	Hydroxide (mg/l)	Chloride (mg/l)	Nitrate + Nitrite, D (mg/l)	Nitrate + Nitrite, T (mg/l)	Nitrite, D (mg/l)	Ammonia (mg/l)	Sulfate (mg/l)	Sulfite (mg/l)	CN, Free (mg/l)	CN, Total (mg/l)	CN, WAD (mg/l)
MW-30	6/7/99			74	74	<2	<2	17.4	1.83		0.01	2.48	160	2	0.8	1.3	0.52
MW-30	6/14/99																
MW-30	6/22/99																
MW-30	6/29/99																
MW-30	7/7/99									2.18		<0.1				2.33	0.32
MW-30	7/13/99																
MW-30	7/19/99																
MW-30	7/28/99																
MW-30	8/3/99									2.15		<0.1				4.88	0.394
MW-30	8/9/99	Dry															
MW-30	8/16/99																
MW-30	8/17/99	Dry															
MW-30	8/23/99	Dry															

Statistical Summary: Mean & Standard Deviation Using All Analyses

Mean			11.2	74	74	1	1	17.4	1.83	2.17	0.01	0.86	160	2	0.8	2.64	0.411
Std Dev			11.2	74	74	1	1	17.4	1.83	0.0212	0.01	1.4	160	2	0.8	1.84	0.101
Mean + 1X Std Dev			22.4	148	148	2	2	34.8	3.66	2.1912	0.02	2.26	320	4	1.6	4.68	0.512

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Water Quality Monitoring Data
Site MW-30

Site Number	Sample Date	Duplicate/ Rerun/No Sample	pH, Lab (su)	pH, Field (su)	Turbidity, Lab (NTU)	Purge Volume (gallons)	Depth to Water (ft)
MW-30	6/7/99		7.2	7.6	700	84	56
MW-30	6/14/99						56.4
MW-30	6/22/99						56.4
MW-30	6/29/99						56.71
MW-30	7/7/99			7.7		4	57.94
MW-30	7/13/99						57.86
MW-30	7/19/99						57.82
MW-30	7/28/99						58.05
MW-30	8/3/99			7.42			58.1
MW-30	8/9/99	Dry					
MW-30	8/16/99						60.2
MW-30	8/17/99	Dry					60.34
MW-30	8/23/99	Dry					61.1

Statistical Summary: Mean & Standard Deviation Using All An

Mean			7.20	7.55	700	44	58.1
Std Dev			7.20	8.03	700	56.6	1.67
Mean + 1X Std Dev			6.90	7.43	1400	100.6	59.77

Les: Detectable data assumed as one-half the detection limit in Mean and Stan eviation calculations.

He[illegible] Mining Company
Grouse Creek Unit

Water Quality Monitoring Data
Site MW-31

Report Da[illegible]/7/99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Depth to Water (ft)
MW-31	7/13/99		51.85
MW-31	7/19/99		52.68
MW-31	7/28/99		53.26
MW-31	8/9/99		53.43
MW-31	8/16/99		49.43
MW-31	8/17/99		49.45
MW-31	8/23/99		49.36

Statistical Summary: Mean & Standard Deviation Using All Analyses

Mean			51.4
Std Dev			1.88
Mean + 1X Std Dev			53.28

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation c[illegible]ations.

Hecla Mining Company
Grouse Creek Unit

Water Quality Monitoring Data
Site mw-32

Report Date: 9/7/99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Nitrate + Nitrite, T (mg/l)	Ammonia (mg/l)	CN, Total (mg/l)	CN, WAD (mg/l)	Temperature (Cent)	Conductivity, Field (micromho)	pH, Field (su)
mw-32	6/22/99								
mw-32	6/29/99								
mw-32	7/13/99								
mw-32	7/19/99								
mw-32	7/28/99								
mw-32	8/2/99						10.1		8.23
mw-32	8/3/99		<0.02	0.1	<0.005	<0.005	10.1		8.23
mw-32	8/9/99								
mw-32	8/16/99								
mw-32	8/17/99						14.3	780	8.07
mw-32	8/23/99								

Statistical Summary: Mean & Standard Deviation Using All Analyses

Mean			0.01	0.1	0.0025	0.0025	11.5	780	8.17
Std Dev			0.01	0.1	0.0025	0.0025	2.42	780	8.82
Mean + 1X Std Dev			0.02	0.2	0.005	0.005	13.92	1560	8.08

Les[illegible]an detectable data assumed as one-half the d[illegible]tion limit in Mean and Standard Deviation calcula[illegible]

Hecla Mining Company
Grouse Creek Unit

Water Quality Monitoring Data
Site mw-32

Report Date 7/99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Purge Volume (gallons)	Depth to Water (ft)
mw-32	6/22/99			142.95
mw-32	6/29/99			135.75
mw-32	7/13/99			128.39
mw-32	7/19/99			124.99
mw-32	7/28/99			120.27
mw-32	8/2/99			116.91
mw-32	8/3/99		13	116.91
mw-32	8/9/99			123.61
mw-32	8/16/99			119.58
mw-32	8/17/99			119.16
mw-32	8/23/99			124.25

Statistical Summary: Mean & Standard Deviation Using All An

Mean			13	124.8
Std Dev			13	8.17
Mean + 1X Std Dev			26	132.97

Le an detectable data assumed as one-half the detec 'imit in Mean and Standard Deviation calculat

Hecla Mining Company
Grouse Creek Unit

Water Quality Monitoring Data
Site MW-33

Report Date: 9/ /99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Depth to Water (ft)
MW-33	7/13/99		41.39
MW-33	7/19/99		42.01
MW-33	7/28/99		43.76
MW-33	8/4/99		47.48
MW-33	8/9/99		53.57
MW-33	8/16/99		71.36
MW-33	8/18/99		70.98
MW-33	8/23/99		69.86

Statistical Summary: Mean & Standard Deviation Using All Analyses

Mean			55.1
Std Dev			13.5
Mean + 1X Std Dev			68.6

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Hecla Mining Company
Grouse Creek Unit

Water Quality Monitoring Data
Site MW-34

Report Date: 9/7/99

Sample Date	Duplicate/ Rerun/No Sample	Temperature (Cent)	Conductivity, Field (micromho)	pH, Field (su)	Depth to Water (ft)
7/13/99					36.45
7/19/99					36.46
7/28/99					36.64
8/4/99					36.96
8/9/99					37.05
8/16/99					37.97
8/18/99		13	70	7.5	37.92
8/23/99					38.02

an & Standard Deviation Using All Analyses

		13	70	7.49	37.2
		13	70	7.49	0.685
		26	140	7.19	37.885

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Hecla Mining Company
Grouse Creek Unit

Water Quality Monitoring Data
Site MW-35

Report Date: 9/ /99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Depth to Water (ft)
MW-35	7/13/99		84.07
MW-35	7/19/99		85.21
MW-35	7/28/99		87.76
MW-35	8/4/99		91.35
MW-35	8/9/99		97.72

Statistical Summary: Mean & Standard Deviation Using All Analyses

Mean			89.2
Std Dev			5.51
Mean + 1X Std Dev			94.71

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Hecla Mining Company
Grouse Creek Unit

Water Quality Monitoring Data
Site MW-36

Report Date: 9/ /99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	()	Depth to Water (ft)
MW-36	7/19/99			38.41
MW-36	8/16/99	Dry		48.5
MW-36	8/18/99			48.84
MW-36	8/23/99	Dry		48.87

Statistical Summary: Mean & Standard Deviation Using All Analyses

Mean			5.51	46.2
Std Dev			5.51	5.17
Mean + 1X Std Dev			11.02	51.37

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Hecla Mining Company
Grouse Creek Unit

Water Quality Monitoring Data
Site MW-37

Report Date: 9/ /99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	()	Depth to Water (ft)
MW-37	7/19/99			85.26
MW-37	7/28/99			87.87
MW-37	8/4/99	Dry		54.5
MW-37	8/18/99			124.93
MW-37	8/23/99			125.1

Statistical Summary: Mean & Standard Deviation Using All Analyses

Mean			5.17	95.5
Std Dev			5.17	29.9
Mean + 1X Std Dev			10.34	125.4

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Hecla Mining Company
Grouse Creek Unit

Water Quality Monitoring Data
Site MW-38

Report Date: 9/ /99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Depth to Water (ft)
MW-38	7/28/99		69.99
MW-38	8/4/99		70.03
MW-38	8/9/99		70.26
MW-38	8/16/99		71
MW-38	8/18/99		70.91
MW-38	8/23/99		71.09

Statistical Summary: Mean & Standard Deviation Using All Analyses

Mean			70.5
Std Dev			0.508
Mean + 1X Std Dev			71.008

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Hecla Mining Company
Grouse Creek Unit

Water Quality Monitoring Data
Site MW-40

Report Date: 9/ / /99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Depth to Water (ft)
MW-40	8/9/99		49.89
MW-40	8/16/99		50.18

Statistical Summary: Mean & Standard Deviation Using All Analyses

Mean			50
Std Dev			0.205
Mean + 1X Std Dev			50.205

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Hecla Mining Company
Grouse Creek Unit

Water Quality Monitoring Data
Site MW-42

Report Date: 9/ /99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Depth to Water (ft)
MW-42	8/9/99		7.1
MW-42	8/16/99		6.84
MW-42	8/17/99		13.4
MW-42	8/23/99		7.29

Statistical Summary: Mean & Standard Deviation Using All Analyses

Mean			8.66
Std Dev			3.17
Mean + 1X Std Dev			11.83

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Hecla Mining Company
Grouse Creek Unit

Internal Lab Results
Site MW-1

Report Date: 9/9/99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	()	Total Cyanide (mg/l)	WAD Cyanide (mg/l)	Temperature (Cent)	Conductivity, Field (micromho)	pH, Field (su)	Turbidity, Field (NTU)	Depth to Water (ft)
MW-1	2/2/88					4.6		7.2		30.6
MW-1	5/19/88					4.5		7.1		24.6
MW-1	8/19/88					6.2		7.2		31.63
MW-1	11/4/88					5.2		7		33.56
MW-1	3/14/89					2.1		7.1		32.98
MW-1	5/15/89					4.8		6.7		19.99
MW-1	8/18/89									31.67
MW-1	10/27/89					5.9				32.31
MW-1	3/28/90					3.1				31.82
MW-1	6/12/90					4.1		8.5		19.91
MW-1	8/31/90					6.6		7.5		29.91
MW-1	9/28/90					6.6		7.8		28.91
MW-1	10/26/90							7		
MW-1	3/28/91					5.6		8		30.59
MW-1	6/19/91					8.1		8.4		19.65
MW-1	9/27/91					5		8		
MW-1	11/20/91					4.4		8		27.74
mw-1	3/26/92					3.9		6.9		28.39
MW-1	6/30/92					4.4		8		25.71
MW-1	9/15/92					5.6		8.2		28.16
MW-1	12/4/92					2.9				31.1
MW-1	3/17/93					6		12.3		27.1
MW-1	5/27/93					6.1		10		13.5
MW-1	12/1/93					3.9		8.5		28.09
MW-1	2/24/94					2.2		8.4		28.95
MW-1	5/18/94					4.4		8.2		16.5
MW-1	8/23/94					4.4				26.02
MW-1	11/17/94					4.4	250	7.9		26.2
MW-1	6/23/95					7.2	235	8.3		18.5
MW-1	9/30/95						180	8	7.25	29.5
MW-1	11/17/95					2.5	210	7.3	22	17.5
MW-1	2/18/96					4.5	210	7.4	61.3	22
MW-1	6/1/96					5.1	180	6.4	8.33	15
MW-1	8/12/96					7.4	180	6.6	7.53	26
MW-1	12/10/96					4.6	280	7.6	14.4	24
MW-1	3/17/97	accessible due to snow depth								
MW-1	6/4/97					7.7	240	6.4	4.1	16
MW-1	8/5/97					8.3	240	7.4	7.44	18.17
MW-1	8/5/97	Duplicate				8.3	240	7.2	7.44	18.1
MW-1	11/18/97					6.8	230	7.3	5.11	18.5
MW-1	3/24/98	*naccessible due to snow depth*								
MW-1	5/27/98					3.3	250	6.3	20.4	
MW-1	8/24/98					21	370	6.66		20
MW-1	10/21/98					9	300			23.71
MW-1	3/29/99	Unsafe Access								
MW-1	5/26/99	Unsafe Access								
MW-1	6/7/99			0.005	0.005	4.5	860	7.7		15.4
MW-1	6/14/99									10.7
MW-1	6/15/99									10.7
MW-1	6/22/99									11.2
MW-1	6/29/99									12.29
MW-1	7/6/99			0.005	0.005	13.3	570	7.4		14.01
MW-1	7/13/99									15.15
MW-1	7/19/99									15.75
MW-1	7/28/99									18.65
MW-1	8/4/99									19
MW-1	8/9/99						500			19.26
MW-1	8/16/99									19.49
MW-1	8/18/99			0.055	0.085	10.6	550	7.56		19.61
MW-1	8/23/99						249	8.1		21.24
MW-1	8/30/99						530			21.46
MW-1	8/31/99			0.028	0.042					

Statistical Summary: Mean & Standard Deviation Using All Analyses

Mean			4.39	0.0232	0.0343	5.82	330.7	7.113509275	15.8	22.6
Std Dev			4.39	0.0238	0.0381	3.27	179.4	6.920818754	17.2	6.63
Mean + 1X Std Dev			8.78	0.047	0.0724	9.09	510.1	6.705533774	33	29.23

Less than detectable data assumed as in Mean and Standard Deviation calculations.

Hecla Mining Company
Grouse Creek Unit

Internal Lab Results
Site MW-13

Report Date: 9/9/99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	()	Total Cyanide (mg/l)	WAD Cyanide (mg/l)	Total Mercury (mg/l)	Temperature (Cent)	Conductivity, Field (micromho)	pH, Field (su)	Turbidity, Field (NTU)	Depth to Water (ft)
MW-13	2/17/96						4.5	190	7.3	3.14	31
MW-13	6/4/96						7.9	180	7.1	5.28	29.5
MW-13	8/13/96						7.5	140	7.8	8.46	31
MW-13	12/12/96						5.5	180	7.1	21.7	30.3
MW-13	2/1/97	Rerun									
MW-13	2/11/97	Rerun									
MW-13	3/18/97						7.2	170	7.8	4.39	29.8
MW-13	6/4/97						6.3	150	7.1	2.78	27.5
MW-13	6/4/97	Duplicate					6.3	150	7.1	2.78	27.5
MW-13	8/6/97						12	330	7.4	2.99	30
MW-13	11/16/97						6.2	180	7.5	5.22	
MW-13	3/24/98						5.2	220	8.08	10.8	41.4
MW-13	5/27/98						6.8	220	6.8	4.04	
MW-13	8/19/98						9.4	200	6.79		20
MW-13	8/19/98	Rerun									
MW-13	10/21/98						10.5	200	7.16	6.7	30.25
MW-13	10/21/98	Duplicate					10.5	200	7.15	6.7	30.25
MW-13	12/15/98			0.088							
MW-13	12/18/98										32.71
MW-13	12/24/98			0.03	10.499	0.0002					
MW-13	1/14/99			0.036		0.0002					
MW-13	2/5/99			0.021	9.785	0.0002					
MW-13	2/18/99			0.023		0.0002					
MW-13	3/4/99			0.061		0.0002					
MW-13	3/11/99			0.005	0.005						
MW-13	3/29/99						5.8	220	7.04	3.61	
MW-13	4/15/99			0.044							
MW-13	4/27/99	Dry									
MW-13	5/4/99										25.6
MW-13	5/11/99										28.5
MW-13	5/19/99										28.5
MW-13	5/26/99			0.062	0.119			280			28.25
MW-13	6/7/99			0.019	0.027		6.2	210	8.3		34
MW-13	6/14/99										13.38
MW-13	6/24/99			0.005	0.02	0.0002					
MW-13	7/13/99										
MW-13	7/19/99										
MW-13	7/28/99										
MW-13	8/9/99										
MW-13	8/16/99										[illegible]
MW-13	8/17/99										5.93
MW-13	8/19/99			0.076	0.141						
MW-13	8/23/99										5.92
MW-13	9/1/99			0.044	0.083						

Statistical Summary: Mean & Standard Deviation Using All Analyses

Mean			127.4	0.0395	2.58	0.0002	7.2	203.3	7.200659451	6.59	23.2
Std Dev			127.4	0.0262	4.87	0	2.12	49.2	7.301029996	5.33	10.5
Mean + 1X Std Dev			254.8	0.0657	7.25	0.0002	9.32	252.5	6.946921557	11.92	33.7

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Hecla Mining CompanyInternal Lab Results

Report Date: 9/9/99

Grouse Creek Unit Site MW-18

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Total Cyanide (mg/l)	WAD Cyanide (mg/l)
MW-18	9/1/99		2.847	0.254

Statistical Summary: Mean & Standard Deviation Using All Analyses

Mean			2.847	0.254
Std Dev				
Mean + 1X Std Dev				

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Hecla Mining Company
Grouse Creek Unit

Internal Lab Results
Site MW-14

Report Date: 9/9/99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Total Cyanide (mg/l)	WAD Cyanide (mg/l)	Total Mercury (mg/l)	Temperature (Cent)	Conductivity, Field (micromho)	pH, Field (su)	Turbidity, Field (NTU)	Depth to Water (ft)
MW-14	3/24/98					5.2	360	7.9	3.96	32
MW-14	5/27/98					5.4	340	7.5	2.88	
MW-14	8/19/98					11	310	6.9		19
MW-14	10/21/98					8	330	7.58	1.77	22.14
MW-14	12/15/98		0.03	0.005	0.0002					
MW-14	12/18/98									22.85
MW-14	12/24/98		0.05	0.064	0.0002					
MW-14	1/14/99		0.03	0.045	0.0002					
MW-14	2/5/99		0.033	0.005	0.0002					
MW-14	2/18/99		0.051	0.005	0.0002					
MW-14	3/4/99		0.048	0.005	0.0002					
MW-14	3/11/99		0.056	0.005						
MW-14	3/29/99					6.3	320	7.77	9.99	
MW-14	4/15/99		0.057	0.005	0.0002					
MW-14	4/27/99		0.046	0.005						14.3
MW-14	5/4/99									13.4
MW-14	5/11/99									12.9
MW-14	5/19/99									12.6
MW-14	5/26/99		0.019	0.007						11.5
MW-14	6/7/99		0.024	0.005		6.6	370	8		12.8
MW-14	6/14/99									19.5
MW-14	6/22/99									2.23
MW-14	6/24/99		0.016	0.005	0.0002					
MW-14	6/29/99									2.64
MW-14	7/7/99		0.067	0.009		11.9	290	7.8		3.2
MW-14	7/13/99									6.39
MW-14	7/19/99									6.35
MW-14	7/28/99									6.4
MW-14	8/9/99									8.84
MW-14	8/16/99									8.53
MW-14	8/17/99		0.221	0.070737		11.4	310	7.63		8.35
MW-14	8/19/99		0.312	0.034						
MW-14	8/23/99									8.68
MW-14	9/1/99		0.243	0.041						
MW-14	9/7/99		0.024	0.005						

Statistical Summary: Mean & Standard Deviation Using All Analyses

Mean			0.0781	0.0189	0.0002	8.22	328.8	7.48148606	4.65	12
Std Dev			0.089	0.0228	0	2.8	27	7.420216403	3.67	7.54
Mean + 1X Std Dev			0.1671	0.0417	0.0002	11.02	355.8	7.148741651	8.32	19.64

Less than detectable data assumed as in Mean and Standard Deviation calculations.

Hecla Mining Company
Grouse Creek Unit

Internal Lab Results
Site MW-20

Report Date: 9/9/99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	()	Total Cyanide (mg/l)	WAD Cyanide (mg/l)	Total Mercury (mg/l)	Temperature (Cent)	Conductivity, Field (micromho)	pH, Field (su)	Depth to Water (ft)
MW-20	11/6/98			0.263	0.015					
MW-20	11/22/98			0.045	0.124	0.0006				
MW-20	12/18/98									54.91
MW-20	4/27/99	no data								
MW-20	5/4/99									
MW-20	5/11/99	no data								
MW-20	5/19/99	no data								45.8
MW-20	5/26/99			0.09	0.02			240	8	41.95
MW-20	6/7/99			0.48	0.04		5.3	520	8	48.1
MW-20	6/14/99									49.57
MW-20	6/15/99									49.57
MW-20	6/22/99									50.42
MW-20	6/29/99									50.55
MW-20	7/6/99			0.33	0.04		17.8	310	7.7	50.85
MW-20	7/13/99									51.1
MW-20	7/19/99									51.46
MW-20	7/28/99									52.13
MW-20	8/4/99			1.322	0.108		10.3	440	7.6	54.85
MW-20	8/9/99									55.45
MW-20	8/16/99									57.51
MW-20	8/18/99			0.855	0.128		10.1	390	6.84	57.82
MW-20	8/23/99									58.12
MW-20	8/30/99									56.85
MW-20	9/1/99			0.66	0.071					

Statistical Summary: Mean & Standard Deviation Using All Analyses

Mean			6.08	0.506	0.0683	0.0006	10.9	380	7.37675071	52.1
Std Dev			6.08	0.429	0.0463	0.0006	5.16	109.3	7.236572006	4.39
Mean + 1X Std Dev			12.16	0.935	0.1146	0.0012	16.06	489.3	7	56.49

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Hecla Mining Company Internal Lab Results 9/9/99

Grouse Creek Unit Site MW-21

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Total Cyanide (mg/l)	WAD Cyanide (mg/l)
MW-21	8/3/99		0.222	0.011
Mean			0.222	0.011
Std Dev			0.222	0.011
Mean + 1X Std Dev			0.444	0.022

Hecla Mining Company
Trouse Creek Unit

Internal Lab Results
Site MW-24

Report Date: 9/9/99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	Total Cyanide (mg/l)	WAD Cyanide (mg/l)	Total Mercury (mg/l)	Temperature (Cent)	Conductivity, Field (micromho)	pH, Field (su)	Depth to Water (ft)
MW-24	11/6/98		0.168	0.007					
MW-24	11/11/98		0.28	0.02					
MW-24	11/20/98		0.057	0.013	0.0002				
MW-24	12/18/98								49.45
MW-24	3/11/99		0.169	0.005					
MW-24	4/27/99		0.465	0.068					47
MW-24	5/4/99								48.6
MW-24	5/11/99								49.1
MW-24	5/19/99								49.1
MW-24	5/26/99		0.38	0.1			430		48
MW-24	6/7/99		0.531	0.088		8.3	300	9	50.2
MW-24	6/14/99								51.09
MW-24	6/22/99								51.15
MW-24	6/29/99								79.88
MW-24	7/7/99		0.264	0.141		12.1	250	10.3	51.15
MW-24	7/7/99	Duplicate				12.1	250	10.3	51.15
MW-24	7/13/99								51.18
MW-24	7/19/99								51.19
MW-24	7/28/99								51.21
MW-24	8/3/99					7.9	250	8.12	51.16
MW-24	8/9/99								51.23
MW-24	8/16/99								51.13
MW-24	8/17/99		0.113	0.0260875		13		8.06	51.13
MW-24	8/23/99								51.08
MW-24	9/1/99		0.131	0.026					

Statistical Summary: Mean & Standard Deviation Using All Analyses

Mean			0.256	0.0494	0.0002	10.3	307.5	8.366531544	51.8
Std Dev			0.159	0.0469	0.0002	2.6	85	8.356547324	6.93
ean + 1X Std Dev			0.415	0.0963	0.0004	12.9	392.5	8.060480747	58.73

Less than detectable data assumed as in Mean and Standard Deviation calculations.

Hecla Mining Company
Grouse Creek Unit

Internal Lab Results
Site MW-22

Report Date: 9/9/99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	()	Total Cyanide (mg/l)	WAD Cyanide (mg/l)	Temperature (Cent)	Conductivity, Field (micromho)	pH, Field (su)	Depth to Water (ft)
MW-22	11/9/98								
MW-22	7/12/99	@100'		4.192	0.109				
MW-22	7/12/99	@40'		7.856	0.18				
MW-22	7/12/99	@50'		58.855	0.16				
MW-22	7/12/99	@70'		8.518	0.715				
MW-22	7/12/99	@80		1.829	0.173				
MW-22	7/12/99	@90'		0.245	0.033				
MW-22	7/13/99			6.68	0.255				
MW-22	7/14/99			1.059	0.077				
MW-22	7/19/99								42.5
MW-22	7/28/99								41.68
MW-22	8/4/99								45.48
MW-22	8/9/99								47.52
MW-22	8/16/99								51.43
MW-22	8/18/99			0.1	0.128	13.8	190	7.73	52.1
MW-22	9/1/99			0.034	0.009				

Statistical Summary: Mean & Standard Deviation Using All Analyses

Mean			0	8.74	0.184	13.8	190	7.721246399	46.8
Std Dev			0	17.2	0.2	13.8	190	7.721246399	4.39
Mean + 1X Std Dev			0	25.94	0.384	27.6	380	7.420216403	51.19

Less than detectable data assumed as in Mean and Standard Deviation calculations.

Hecla Mining Company
Grouse Creek Unit

Internal Lab Results
Site MW-26

Report Date: 9/9/99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	0	Total Cyanide (mg/l)	WAD Cyanide (mg/l)	Total Mercury (mg/l)	Temperature (Cent)	Conductivity, Field (micromho)	pH, Field (su)	Depth to Water (ft)
MW-26	11/4/98			1.04	0.04					
MW-26	11/8/98			0.613	0.017					
MW-26	11/15/98			0.565	0.047					
MW-26	12/18/98			0.94	0.017					48.31
MW-26	4/27/99			1.44	0.164					44.6
MW-26	5/4/99	no data								
MW-26	5/11/99									77.3
MW-26	5/19/99									77.2
MW-26	5/26/99			0.974	0.543			1600		77.25
MW-26	6/7/99			0.856	0.084		8.2	350	6.9	78.75
MW-26	6/14/99									87.88
MW-26	6/22/99	Dry								78.5
MW-26	6/24/99			1.083	0.066	0.0002				
MW-26	6/29/99	Dry								83.4
MW-26	7/7/99			1.205	0.544		10.7	270	7.1	
MW-26	7/22/99			1.241	0.113					
MW-26	8/9/99	Dry								75.2
MW-26	8/17/99			1.386	0.375364		10	270	7	
MW-26	8/19/99			1.428	0.15					
MW-26	8/23/99	ontinuously pumping								

Statistical Summary: Mean & Standard Deviation Using All Analyses

Mean			6.35	1.07	0.18	0.0002	9.63	822.5	7	72.8
Std Dev			6.35	0.294	0.196	0.0002	1.29	652.8	7.538272164	14.4
Mean + 1X Std Dev			12.7	1.364	0.376	0.0004	10.92	1275.3	6.910094889	87.2

Less than detectable data assumed as in Mean and Standard Deviation calculations.

Hecla Mining Company
Grouse Creek Unit

Internal Lab Results
Site MW-27

Report Date: 9/9/99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	()	Total Cyanide (mg/l)	WAD Cyanide (mg/l)	Total Mercury (mg/l)	Temperature (Cent)	Conductivity, Field (micromho)	pH, Field (su)	Depth to Water (ft)
MW-27	11/19/98			0.38	0.024					
MW-27	11/22/98			0.033	0.005					
MW-27	12/9/98			0.042	0.005					
MW-27	12/18/98									52.87
MW-27	4/27/99	no data								
MW-27	5/4/99	no data								
MW-27	5/11/99	no data								
MW-27	5/19/99									35
MW-27	5/26/99			6.984	0.301			720		29.8
MW-27	6/1/99			5.956	1.75					
MW-27	6/7/99			5.406	1.008		8.4	910	6.3	
MW-27	6/14/99									40.59
MW-27	6/15/99									40.59
MW-27	6/22/99									42.22
MW-27	7/6/99						23	630	6.5	
MW-27	7/7/99			7	0.892					
MW-27	7/13/99	Dry								83.3
MW-27	7/22/99			3.562	0.679					
MW-27	8/7/99			2.791	0.767					
MW-27	8/11/99			2.028	0.577					
MW-27	8/12/99			15.115	0.822					
MW-27	8/13/99			6.33	0.656					
MW-27	8/14/99	no data		7.102						
MW-27	8/15/99			4.896	0.861					
MW-27	8/16/99			7.698	1.568					77.27
MW-27	8/17/99			4.731	0.953					
MW-27	8/18/99									75.65
MW-27	8/19/99			11.171	0.853	0.0002				
MW-27	8/23/99			10.37	1.188					77.43
MW-27	8/23/99	Dry								41.2
MW-27	8/25/99			10.62	0.733					
MW-27	8/27/99			11.607	0.773					
MW-27	8/28/99			9.649	0.765					
MW-27	8/29/99			6.843	1.065					
MW-27	8/30/99			3.54	0.508			980	6.5	
MW-27	8/31/99			4.032	0.793					
MW-27	9/1/99			1.524	0.871					

Statistical Summary: Mean & Standard Deviation Using All Analyses

Mean			14.4	5.98	0.759	0.0002	15.7	810	6.420216403	54.2
Std Dev			14.4	3.93	0.421	0.0002	10.3	162.7	6.958607315	20.1
Mean + 1X Std Dev			28.8	9.91	1.18	0.0004	26	972.7	6.30980392	74.3

Less than detectable data assumed as in Mean and Standard Deviation calculations.

Hecla Mining Company
Grouse Creek Unit

Internal Lab Results
Site MW-28

Report Date: 9/9/99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	()	Total Cyanide (mg/l)	WAD Cyanide (mg/l)	Temperature (Cent)	Conductivity, Field (micromho)	pH, Field (su)	Depth to Water (ft)
MW-28	4/27/98								
MW-28	5/4/98								
MW-28	5/11/98								
MW-28	5/19/98								
MW-28	5/26/98								
MW-28	6/7/98								
MW-28	6/15/98								
MW-28	6/22/98								
MW-28	6/29/98								
MW-28	12/8/98			0.005	0.005				
MW-28	12/9/98			0.005	0.005				
MW-28	12/10/98			0.005	0.005				
MW-28	12/18/98								49.21
MW-28	4/27/99	no data							
MW-28	5/4/99	no data							
MW-28	5/11/99	no data							
MW-28	5/19/99								36.1
MW-28	5/26/99			0.268	0.177		420		31.1
MW-28	6/7/99			0.149	0.072	8.4	510	7.6	36.5
MW-28	6/14/99								41.43
MW-28	6/15/99								40.59
MW-28	6/22/99								41.52
MW-28	6/29/99								42.1
MW-28	7/6/99			0.071	0.047	52.52	310	7.3	42.44
MW-28	7/13/99								42.68
MW-28	7/19/99								43.01
MW-28	7/28/99								44
MW-28	8/4/99			0.032	0.005	14.1	270	7.43	46.87
MW-28	8/9/99								48.61
MW-28	8/16/99								54.41
MW-28	8/18/99			0.03	0.026	12	280	7.31	53.3
MW-28	8/23/99								53.91
MW-28	8/30/99						350		
MW-28	8/31/99	no data		0.017					

Statistical Summary: Mean & Standard Deviation Using All Analyses

Mean			20.1	0.0647	0.0428	21.8	356.7	7.397940009	44
Std Dev			20.1	0.0892	0.0596	20.6	92.9	7.920818754	6.46
Mean + 1X Std Dev			40.2	0.1539	0.1024	42.4	449.6	7.283996856	50.46

Less than detectable data assumed as in Mean and Standard Deviation calculations.

Hecla Mining Company
Grouse Creek Unit

Internal Lab Results
Site MW-30

Report Date: 9/9/99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	()	Total Cyanide (mg/l)	WAD Cyanide (mg/l)	Temperature (Cent)	Conductivity, Field (micromho)	pH, Field (su)	Depth to Water (ft)
MW-30	6/3/99			0.216	0.023				
MW-30	6/4/99			0.76	0.044				
MW-30	6/7/99			1.031	0.206	7.7	560	7.6	56
MW-30	6/14/99								56.4
MW-30	6/15/99								56.4
MW-30	6/22/99								56.4
MW-30	6/29/99								56.71
MW-30	7/7/99			2.63	0.284	10.3	330	7.7	57.94
MW-30	7/13/99								57.86
MW-30	7/19/99								57.82
MW-30	7/28/99								58.05
MW-30	8/3/99			3.64	0.257	9.3	340	7.42	58.1
MW-30	8/9/99	Dry							
MW-30	8/16/99								60.2
MW-30	8/17/99	Dry							60.34
MW-30	8/23/99	Dry							61.1

Statistical Summary: Mean & Standard Deviation Using All Analyses

Mean			9.32	1.66	0.163	9.1	410	7.552841969	57.9
Std Dev			9.32	1.43	0.122	1.31	130	8.031517051	1.67
Mean + 1X Std Dev			18.64	3.09	0.285	10.41	540	7.428291168	59.57

Less than detectable data assumed as in Mean and Standard Deviation calculations.

Hecla Mining CompanyInternal Lab Results

Report Date: 9/9/99

Grouse Creek Unit Site MW-31

Site Number	Sample Date	Duplicate/ Rerun/No Sample	()	Total Cyanide (mg/l)	WAD Cyanide (mg/l)	Depth to Water (ft)
MW-31	6/23/99	@72'		0.029	0.017	
MW-31	6/23/99	@97' no data				
MW-31	6/24/99	@112'		2.168	0.049	
MW-31	6/24/99	@112.5'		1.913	0.038	
MW-31	6/27/99			1.912	0.1	
MW-31	7/13/99					51.85
MW-31	7/19/99					52.68
MW-31	7/28/99					53.26
MW-31	8/9/99					53.43
MW-31	8/16/99					49.43
MW-31	8/17/99					49.45
MW-31	8/23/99					49.36
MW-31	8/25/99			1.96	0.18	
MW-31	8/27/99			1.695	0.152	
MW-31	8/28/99			1.385	0.14	
MW-31	8/29/99			1.921	0.145	
MW-31	8/31/99			1.461	0.104	
MW-31	9/1/99			1.507	0.153	

atistical Summary: Mean & Standard Deviation Using All Analyses

Mean			2.34	1.6	0.108	51.4
Std Dev			2.34	0.606	0.0561	1.88
Mean + 1X Std Dev			4.68	2.206	0.1641	53.28

Less than detectable data assumed as in Mean and Standard Deviation calculations.

Hecla Mining Company
Grouse Creek Unit

Internal Lab Results
Site MW-32

Report Date: 9/9/99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	()	Total Cyanide (mg/l)	WAD Cyanide (mg/l)	Temperature (Cent)	Conductivity, Field (micromho)	pH, Field (su)	Depth to Water (ft)
mw-32	6/13/99	@110'		0.007	0.005				
mw-32	6/13/99	@143' no data							
mw-32	6/13/99	@165' no data							
mw-32	6/21/99			0.029	0.005				
mw-32	6/22/99								142.98
mw-32	6/29/99								135.75
mw-32	7/13/99								128.39
mw-32	7/19/99								124.99
mw-32	7/28/99								120.27
mw-32	8/2/99					10.1		8.23	116.91
mw-32	8/3/99					10.1		8.23	116.91
mw-32	8/9/99								123.61
mw-32	8/16/99								119.58
mw-32	8/17/99			<0.005	<0.005	14.3	780	8.07	119.16
mw-32	8/17/99	no data							
mw-32	8/23/99								124.25
mw-32	9/1/99	no data							

Statistical Summary: Mean & Standard Deviation Using All Analyses

Mean			1.88	0.0128	0.0042	11.5	780	8.167491087	124.8
Std Dev			1.88	0.0142	0.0014	2.42	780	8.823908741	8.18
Mean + 1X Std Dev			3.76	0.027	0.0056	13.92	1560	8.080921908	132.98

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calcu

Hecla Mining Company **Internal Lab Results** Report Date: 9/9/99
Grouse Creek Unit **Site MW-33**

Site Number	Sample Date	Duplicate/ Rerun/No Sample	()	Total Cyanide (mg/l)	WAD Cyanide (mg/l)	Temperature (Cent)	Conductivity, Field (micromho)	Depth to Water (ft)
MW-33	6/28/99	@85'		0.679	0.008			
MW-33	6/28/99	@95'		3.154	0.071			
MW-33	7/1/99			2.939	0.333			
MW-33	7/13/99							41.39
MW-33	7/19/99							42.01
MW-33	7/28/99							43.76
MW-33	8/4/99							47.48
MW-33	8/9/99			3.715	0.395			53.57
MW-33	8/10/99			5.099	0.528			
MW-33	8/11/99			4.412	0.399			
MW-33	8/12/99			4.351	0.274			
MW-33	8/13/99			6.763	0.4			
MW-33	8/14/99	no data		6.801				
MW-33	8/16/99							71.36
MW-33	8/18/99							70.98
MW-33	8/23/99							69.86
MW-33	8/29/99			9.259	0.326			
MW-33	8/30/99			0.812	6.941	8.9	970	
MW-33	8/31/99			0.53	5.236			
MW-33	9/1/99			5.245	0.802			

Statistical Summary: Mean & Standard Deviation Using All Analyses

Mean			8.18	4.14	1.31	8.9	970	55.1
Std Dev			8.18	2.6	2.27	8.9	970	13.5
Mean + 1X Std Dev			16.36	6.74	3.58	17.8	1940	68.6

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Hecla Mining Company
Grouse Creek Unit

Internal Lab Data
Site MW-34

Report Date: 9/9/99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	()	Total Cyanide (mg/l)	WAD Cyanide (mg/l)	Temperature (Cent)	Conductivity, Field (micromho)	pH, Field (su)	Depth to Water (ft)
MW-34	7/1/99	@50'		0.043	0.069				
MW-34	7/1/99	@70'		0.008	0.011				
MW-34	7/7/99	@70'		0.035	0.033				
MW-34	7/7/99	@80'		0.029	0.027				
MW-34	7/13/99								36.45
MW-34	7/19/99								36.46
MW-34	7/28/99								36.64
MW-34	8/4/99								36.96
MW-34	8/9/99								37.05
MW-34	8/16/99								37.97
MW-34	8/18/99			0.009	0.01	13	70	7.5	37.92
MW-34	8/23/99								38.02
MW-34	8/30/99					12.4		7.55	38.02
MW-34	8/31/99	no data		0.005					

Statistical Summary: Mean & Standard Deviation Using All Analyses

Mean			13.5	0.0215	0.03	12.7	70	7.522878745	37.3
Std Dev			13.5	0.0162	0.024	0.424	70	8.619788758	0.699
Mean + 1X Std Dev			27	0.0377	0.054	13.124	140	7.48945499	37.999

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calcu

Hecla Mining Company
Grouse Creek Unit

Internal Lab Data
Site MW-35

Report Date: 9/9/99

Site Number	Sample Date	Duplicate/ Rerun/No Sample	()	Total Cyanide (mg/l)	WAD Cyanide (mg/l)	Temperature (Cent)	Conductivity, Field (micromho)	Depth to Water (ft)
MW-35	7/8/99	@50'		1.174	0.026			
MW-35	7/9/99	@120'		0.189	0.145			
MW-35	7/9/99	@130'		0.189	0.145			
MW-35	7/9/99	@140'		1.994	0.239			
MW-35	7/9/99	@150'		1.35	0.175			
MW-35	7/11/99			0.332	0.084			
MW-35	7/13/99							84.07
MW-35	7/19/99							85.21
MW-35	7/28/99							87.76
MW-35	8/4/99							91.35
MW-35	8/9/99							97.72
MW-35	8/12/99			2.935	0.222			
MW-35	8/13/99			1.313	0.146			
MW-35	8/14/99	no data		1.022				
MW-35	8/15/99			0.807	0.221			
MW-35	8/16/99			0.606	0.232			
MW-35	8/17/99			0.705	0.314			
MW-35	8/18/99			0.752	0.226			
MW-35	8/19/99			0.806	0.45			
MW-35	8/21/99			0.662	0.31			
MW-35	8/22/99			0.666	0.301			
MW-35	8/23/99			0.71	0.251			
MW-35	8/25/99			0.62	0.24			
MW-35	8/28/99			0.569	0.209			
MW-35	8/29/99			6.92	0.27			
MW-35	8/30/99			0.613	0.215	9.1	540	
MW-35	8/31/99			0.552	0.236			
MW-35	9/1/99			0.57	0.212			

atistical Summary: Mean & Standard Deviation Using All Analyses

Mean			0.699	1.13	0.221	9.1	540	89.2
Std Dev			0.699	1.4	0.0862	9.1	540	5.51
Mean + 1X Std Dev			1.398	2.53	0.3072	18.2	1080	94.71

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Hecla Mining CompanyInternal Lab Results

Report Date: 9/9/99

Grouse Creek Unit Site MW-36

Site Number	Sample Date	Duplicate/ Rerun/No Sample	()	Total Cyanide (mg/l)	WAD Cyanide (mg/l)	Depth to Water (ft)
MW-36	7/14/99	@40'		24.522	0.229	
MW-36	7/14/99	@50'		20.007	0.255	
MW-36	7/14/99	@52'		13.375	0.84	
MW-36	7/19/99					38.41
MW-36	7/28/99			6.873	0.302	
MW-36	7/29/99			6.666	0.612	
MW-36	7/30/99			6.635	0.31	
MW-36	7/31/99			6.722	0.513	
MW-36	8/1/99			7.054	0.613	
MW-36	8/2/99			6.835	0.751	
MW-36	8/5/99			6.357	0.541	
MW-36	8/8/99			8.843	0.491	
MW-36	8/9/99			29.055	0.693	
MW-36	8/10/99			10.306	0.93	
MW-36	8/11/99			12.206	0.835	
MW-36	8/12/99			13.008	0.612	
MW-36	8/14/99			15.773		
MW-36	8/16/99	Dry				48.5
MW-36	8/18/99					48.84
MW-36	8/23/99	Dry				48.8
MW-36	8/30/99	Dry				

Statistical Summary: Mean & Standard Deviation Using All Analyses

Mean			5.51	12.1	0.568	46.2
Std Dev			5.51	7	0.222	5.17
Mean + 1X Std Dev			11.02	19.1	0.79	51.37

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Hecla Mining CompanyInternal Lab Results

Report Date: 9/9/99

Grouse Creek Unit Site MW-40

Site Number	Sample Date	Duplicate/ Rerun/No Sample	()	Total Cyanide (mg/l)	WAD Cyanide (mg/l)	Depth to Water (ft)
MW-40	7/22/99	@62'		0.054	0.005	
MW-40	7/22/99	@79'		0.005	0.005	
MW-40	7/29/99	no data				
MW-40	7/30/99	no data		0.012		
MW-40	8/9/99					49.89
MW-40	8/16/99					50.18
MW-40	8/26/99	@60'		35.339	0.756	
MW-40	8/27/99			18.117	0.823	

Statistical Summary: Mean & Standard Deviation Using All Analyses

Mean			1.67	10.7	0.397	50
Std Dev			1.67	15.8	0.454	0.205
Mean + 1X Std Dev			3.34	26.5	0.851	50.205

Less than detectable data assumed as in Mean and Standard Deviation calculations.

Hecla Mining CompanyInternal Lab Results

Report Date: 9/9/99

Grouse Creek Unit Site MW-37

Site Number	Sample Date	Duplicate/ Rerun/No Sample	()	Total Cyanide (mg/l)	WAD Cyanide (mg/l)	Depth to Water (ft)
MW-37	7/15/99					
MW-37	7/15/99	@120'		5.247	0.035	
MW-37	7/17/99			0.301	0.099	
MW-37	7/19/99					85.26
MW-37	7/28/99					87.87
MW-37	8/4/99	Dry				54.5
MW-37	8/6/99			0.243	0.077	
MW-37	8/7/99			0.261	0.053	
MW-37	8/9/99			0.318	0.109	
MW-37	8/10/99			0.309	0.091	
MW-37	8/11/99			0.31	0.072	
MW-37	8/12/99			0.345	0.085	
MW-37	8/13/99			0.19	0.033	
MW-37	8/14/99	no data		0.186		
MW-37	8/15/99			0.18	0.041	
MW-37	8/16/99			0.156	0.047	
MW-37	8/17/99			0.171	0.078	
MW-37	8/18/99					124.93
MW-37	8/19/99			0.17	0.01	
MW-37	8/21/99			0.136	0.052	
MW-37	8/22/99			0.136	0.044	
MW-37	8/23/99					125
MW-37	8/25/99			0.125	0.036	
MW-37	8/27/99			0.637	0.242	
MW-37	8/30/99	Dry				

Statistical Summary: Mean & Standard Deviation Using All Analyses

Mean			5.17	0.523	0.0708	95.5
Std Dev			5.17	1.19	0.0517	29.9
Mean + 1X Std Dev			10.34	1.713	0.1225	125.4

Less than detectable data assumed as one-half the detection limit in Mean and Standard Deviation calculations.

Hecla Mining CompanyInternal Lab Results

Report Date: 9/9/99

Grouse Creek Unit Site MW-42

Site Number	Sample Date	Duplicate/ Rerun/No Sample	()	Total Cyanide (mg/l)	WAD Cyanide (mg/l)	Depth to Water (ft)
MW-42	8/3/99	@40' / ND		0.006		
MW-42	8/4/99	@100' / ND		0.037		
MW-42	8/4/99	@117' / ND		0.012		
MW-42	8/4/99	@127' / ND				
MW-42	8/4/99	@140' / ND				
MW-42	8/4/99	@80'		0.018	0.008	
MW-42	8/5/99	@107'		0.038	0.006	
MW-42	8/6/99			0.05	0.007	
MW-42	8/9/99					7.1
MW-42	8/16/99					6.84
MW-42	8/17/99					13.4
MW-42	8/23/99					7.29

Statistical Summary: Mean & Standard Deviation Using All Analyses

Mean			0.205	0.0268	0.007	8.66
Std Dev			0.205	0.0173	0.001	3.17
Mean + 1X Std Dev			0.41	0.0441	0.008	11.83

Less than detectable data assumed as in Mean and Standard Deviation calculations.

SVL ANALYTICAL, INC.
One Government Gulch ▪ P.O. Box 929 ▪ Kellogg, Idaho 83827-0929 ▪ Phone: (208)784-1258 ▪ Fax: (208)783-0891

REPORT OF ANALYTICAL RESULTS

CLIENT : Hecla Mining Company
Sample Receipt : 8/11/99

SVL JOB No. : 92058
Date of Report : 8/25/99

SVL ID	CLIENT SAMPLE ID	Test Method	CN 335.4	CN-WAD 4500I	NH3-N 350.3	NO2NO3 353.2
W212568	S-101	8/09/99	0.03mg/L	0.02mg/L	<0.1mg/L	0.19mg/L
W212569	S-2	8/09/99	0.01mg/L	0.007mg/L	<0.1mg/L	<0.02mg/L
W212570	S-3	8/09/99	0.04mg/L	0.02mg/L	<0.1mg/L	<0.02mg/L
W212571	S-4	8/09/99	0.04mg/L	0.02mg/L	<0.1mg/L	0.19mg/L
W212572	S-5	8/09/99	0.03mg/L	0.01mg/L	<0.1mg/L	0.08mg/L
W212573	S-10	8/09/99	0.007mg/L	<0.005mg/L	<0.1mg/L	<0.02mg/L
W212574	S-11	8/09/99	0.02mg/L	0.01mg/L	<0.1mg/L	0.05mg/L
W212575	S-12	8/09/99	0.03mg/L	0.02mg/L	<0.1mg/L	0.17mg/L
W212576	S-13	8/09/99	0.009mg/L	<0.005mg/L	<0.1mg/L	<0.02mg/L

Reviewed By: Blake Johnson Date: 8/25/99

SVL ANALYTICAL, INC.
Government Gulch ▪ P.O. Box 929 ▪ Kellogg, Idaho 83827-0929 ▪ Phone: (208)784-1258 ▪ Fax: (208)783-0891

REPORT OF ANALYTICAL RESULTS

CLIENT : HECLA-GROUSE CREEK
Sample Receipt : 8/10/99

SVL JOB No. : 92034
Date of Report : 8/24/99

SVL ID	CLIENT SAMPLE ID	Test Method	CN 335.4	CN-WAD 4500I	NH3-N 350.3	NO2NO3 353.2
W212323	JC-26	8/05/99	1.08mg/L	0.11mg/L	<0.1mg/L	0.16mg/L
W212324	JC-28	8/05/99	0.38mg/L	0.11mg/L	<0.1mg/L	0.11mg/L
W212325	JC-44	8/05/99	0.03mg/L	0.02mg/L	<0.1mg/L	0.07mg/L
W212326	JC-43	8/05/99	0.09mg/L	<0.005mg/L	<0.1mg/L	<0.02mg/L
W212327	JC-101	8/05/99	0.40mg/L	0.11mg/L	<0.1mg/L	0.11mg/L
W212328	JI-101	8/05/99	<0.005mg/L	<0.005mg/L	<0.1mg/L	<0.02mg/L

Reviewed By: Becky Johnson Date: 8/24/99

SVL ANALYTICAL, INC.
One Government Gulch ▪ P.O. Box 929 ▪ Kellogg, Idaho 83827-0929 ▪ Phone: (208)784-1258 ▪ Fax: (208)783-0891

REPORT OF ANALYTICAL RESULTS

CLIENT : Hecla Mining Company
Sample Receipt : 8/06/99

SVL JOB No. : 92017
Date of Report : 8/18/99

SVL ID	CLIENT SAMPLE ID	Test Method	CN 335.4	CN-WAD 4500I	NH3-N 350.3	NO2NO3 353.2
W212194	MW-3	8/04/99	<0.005mg/L	<0.005mg/L	<0.1mg/L	0.19mg/L
W212195	MW-20	8/04/99	1.46mg/L	0.31mg/L	<0.1mg/L	0.71mg/L
W212196	MW-28	8/04/99	0.05mg/L	0.006mg/L	<0.1mg/L	0.03mg/L
W212197	MI-101	8/04/99	<0.005mg/L	<0.005mg/L	<0.1mg/L	0.05mg/L
W212198	MW-7	8/04/99	<0.005mg/L	<0.005mg/L	<0.1mg/L	0.05mg/L
W212199	MW-16	8/04/99	<0.005mg/L	<0.005mg/L	<0.1mg/L	0.04mg/L

Reviewed By: Blake Johnson Date: 8/18/99

SVL ANALYTICAL, INC.
Government Gulch ■ P.O. Box 929 ■ Kellogg, Idaho 83827-0929 ■ Phone: (208)784-1258 ■ Fax: (208)783-0891

REPORT OF ANALYTICAL RESULTS

CLIENT :Hecla Mining Company
Sample Receipt : 8/05/99

SVL JOB No. : 91995
Date of Report : 8/18/99

SVL ID	CLIENT SAMPLE ID	Test Method	CN 335.4	CN-WAD 4500I	NH3-N 350.3	NO2NO3 353.2
W212046	MW-12	8/03/99	<0.005mg/L	<0.005mg/L	<0.1mg/L	0.20mg/L
W212047	MW-24	8/03/99	0.18mg/L	0.05mg/L	<0.1mg/L	0.66mg/L
W212048	MW-30	8/03/99	4.88mg/L	0.39mg/L	<0.1mg/L	2.15mg/L
W212049	MW-11	8/03/99	0.62mg/L	0.14mg/L	<0.1mg/L	0.66mg/L
W212050	MW-32	8/03/99	<0.005mg/L	<0.005mg/L	0.1mg/L	<0.02mg/L
W212051	POND 6	8/03/99	3.35mg/L	0.82mg/L	0.1mg/L	2.02mg/L
W212052	S-10	8/03/99	0.005mg/L	<0.005mg/L	<0.1mg/L	0.04mg/L
W212053	S-11	8/03/99	0.02mg/L	0.02mg/L	<0.1mg/L	0.04mg/L
W212054	S-5	8/03/99	0.03mg/L	0.02mg/L	<0.1mg/L	0.08mg/L
W212055	S-12	8/03/99	0.04mg/L	0.02mg/L	<0.1mg/L	0.18mg/L
W212056	S-4	8/03/99	0.04mg/L	0.02mg/L	<0.1mg/L	0.20mg/L
W212057	S-3	8/03/99	0.04mg/L	0.02mg/L	<0.1mg/L	<0.02mg/L
W212058	S-13	8/03/99	0.03mg/L	0.009mg/L	<0.1mg/L	<0.02mg/L
W212059	S-2	8/03/99	0.03mg/L	0.02mg/L	<0.1mg/L	<0.02mg/L
W212060	S-101	8/03/99	0.04mg/L	0.03mg/L	<0.1mg/L	<0.02mg/L
W212061	SI-101	8/03/99	<0.005mg/L	<0.005mg/L	<0.1mg/L	0.02mg/L

Reviewed By: Blake Johnson Date: 8/18/99

SVL ANALYTICAL, INC.
One Government Gulch ■ P.O. Box 929 ■ Kellogg, Idaho 83837-0929 ■ Phone: (208)784-1258 ■ Fax: (208)783-0891

SVL JOB No.: 91995
PAGE: 2

REPORT OF ANALYTICAL RESULTS

CLIENT :Hecla Mining Company
Sample Receipt: 8/05/99 Date of Report: 8/27/99

Determination :Cyanide-WAD Method :4500I Reference :3

SVL No.	CLIENT SAMPLE ID	DATE	%SOLID	MATRIX	RESULT	UNITS	ANALYZED
212053	S-11	8/03/99		WATERS	0.011	mg/L	8/27/99
212054	S-5	8/03/99		WATERS	0.011	mg/L	8/27/99
212055	S-12	8/03/99		WATERS	0.019	mg/L	8/27/99
212056	S-4	8/03/99		WATERS	0.020	mg/L	8/27/99
212057	S-3	8/03/99		WATERS	0.019	mg/L	8/27/99
212058	S-13	8/03/99		WATERS	<0.005	mg/L	8/27/99
212059	S-2	8/03/99		WATERS	0.005	mg/L	8/27/99

REFERENCES: 1) "Methods for Chemical Analysis of Water and Wastes", EPA-600/4-79-20; 2) "Test Methods for Evaluating Solid Wastes, 3rd Edition", SW 846, 1991; 3) "Standard Methods for the Examination of Water and Wastewater", 18th ED. 1992; 4) ASTM Method; 5 40 CFR. Part 261

Samples reanalyzed out of holding time

Reviewed By: Kirby Gray Date 8/27/99
8/27/99 15:50

Rerun Analysis

SVL ANALYTICAL, INC.
One Government Gulch ▪ P.O. Box 929 ▪ Kellogg, Idaho 83837-0929 ▪ Phone: (208)784-1258 ▪ Fax: (208)783-0891

SVL JOB No.: 91995
PAGE: 1

REPORT OF ANALYTICAL RESULTS

CLIENT :Hecla Mining Company
Sample Receipt: 8/05/99 Date of Report: 8/27/99

Determination :Cyanide-TOT Method :335.4 Reference :1

SVL No.	CLIENT SAMPLE ID	DATE	%SOLID	MATRIX	RESULT	UNITS	ANALYZED
212053	S-11	8/03/99		WATERS	0.024	mg/L	8/27/99
212054	S-5	8/03/99		WATERS	0.029	mg/L	8/13/99
212055	S-12	8/03/99		WATERS	0.035	mg/L	8/27/99
212056	S-4	8/03/99		WATERS	0.044	mg/L	8/27/99
212057	S-3	8/03/99		WATERS	0.047	mg/L	8/27/99
212058	S-13	8/03/99		WATERS	<0.005	mg/L	8/27/99
212059	S-2	8/03/99		WATERS	0.030	mg/L	8/27/99

REFERENCES: 1) "Methods for Chemical Analysis of Water and Wastes", EPA-600/4-79-20; 2) "Test Methods for Evaluating Solid Wastes, 3rd Edition", SW 846, 1994; 3) "Standard Methods for the Examination of Water and Wastewater", 19th Ed. 1992; 4) ASTM Method; 5) 40 CFR, Part 261

SAMPLES ANALYZED OUT OF HOLDING TIME.

Reviewed By: Kirby Gray Date 8/27/99
8/27/99 15:39
Rerun Analyses

Post-it® Fax Note 7671
To EILEEN STEILMAN
Co./Dept. HECLA
Phone #
Fax # 208/879-5529
Date
# of pages ▶
From MELBA BENCICH
Co. SVL ANALYTICAL
Phone #
Fax #

SVL ANALYTICAL, INC.
0-· Government Gulch ▪ P.O. Box 929 ▪ Kellogg, Idaho 83827-0929 ▪ Phone: (208)784-1258 ▪ Fax: (208)783-0891

REPORT OF ANALYTICAL RESULTS

CLIENT :Hecla Mining Company
Sample Receipt : 7/30/99

SVL JOB No. : 91921
Date of Report : 8/13/99

SVL ID	CLIENT SAMPLE ID	Test Method	CN 335.4	CN-WAD 4500I	NH3-N 350.3	NO2NO3 353.2
W211322	S-3	7/28/99	0.04mg/L	0.02mg/L	<0.1mg/L	<0.02mg/L
W211323	S-12	7/28/99	0.06mg/L	0.02mg/L	<0.1mg/L	0.07mg/L
W211324	S-5	7/28/99	0.04mg/L	0.02mg/L	<0.1mg/L	<0.02mg/L
W211325	S-13	7/28/99	<0.005mg/L	<0.005mg/L	<0.1mg/L	<0.02mg/L
W211326	S-10	7/28/99	<0.005mg/L	<0.005mg/L	<0.1mg/L	<0.02mg/L
W211327	S-101	7/28/99	0.07mg/L	0.02mg/L	<0.1mg/L	<0.02mg/L
W211328	S-2	7/28/99	0.01mg/L	0.006mg/L	<0.1mg/L	<0.02mg/L
W211329	S-11	7/28/99	0.04mg/L	0.009mg/L	<0.1mg/L	0.04mg/L
W211330	S-4	7/28/99	0.08mg/L	0.02mg/L	<0.1mg/L	0.16mg/L

Reviewed By: Kathy Gilley Date: 8/13/99

ACZ

Analytical Results

ACZ Laboratories, Inc.
2773 Downhill Drive
Steamboat Springs, CO 80487
(800) 334-5493

Lab Sample ID: *L24003-01*
Client Sample ID: *MW-7*
Client Project ID: *Grouse Creek Unit*
ACZ Report ID: *RG97921*

Hecla Mining Co.-Grouse Creek Unit
P.O. Box 647
Challis, ID 83226
Eileen Steilman

Date Sampled: *7/19/99 00:00*
Date Received: *7/21/99*
Date Reported: *8/12/99*

Sample Matrix: *Ground Water*

Metals Analysis

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	0.32		mg/L	0.03	0.2	7/30/99	kr
Aluminum, total recoverable	M200.7 ICP	0.53		mg/L	0.03	0.2	8/1/99	jb
Arsenic, dissolved	M206.2 GFAA	0.074		mg/L	0.004	0.02	8/4/99	jl
Arsenic, total recoverable	M206.2 GFAA	0.074		mg/L	0.004	0.02	7/31/99	jb
Cadmium, dissolved	M213.2 GFAA		U	mg/L	0.0005	0.003	7/27/99	jb
Cadmium, total recoverable	M213.2 GFAA		U	mg/L	0.0005	0.003	8/4/99	jl
Calcium, dissolved	M200.7 ICP	42.5		mg/L	0.2	1	7/30/99	kr
Calcium, total recoverable	M200.7 ICP	39.4		mg/L	0.2	1	7/31/99	jb
Copper, dissolved	M200.7 ICP		U	mg/L	0.01	0.05	7/30/99	kr
Copper, total recoverable	M200.7 ICP		U	mg/L	0.01	0.05	7/31/99	jb
Iron, dissolved	M200.7 ICP	0.44		mg/L	0.01	0.05	7/30/99	kr
Iron, total recoverable	M200.7 ICP	0.56		mg/L	0.01	0.05	7/31/99	jb
Lead, dissolved	M239.2 GFAA	0.005		mg/L	0.001	0.005	7/27/99	jb
Lead, total recoverable	M239.2 GFAA	0.007		mg/L	0.001	0.005	8/2/99	jl
Magnesium, dissolved	M200.7 ICP	1.3		mg/L	0.2	1	7/30/99	kr
Magnesium, total recoverable	M200.7 ICP	1.2		mg/L	0.2	1	7/31/99	jb
Manganese, dissolved	M200.7 ICP	0.398		mg/L	0.005	0.03	7/30/99	kr
Manganese, total recoverable	M200.7 ICP	0.365		mg/L	0.005	0.03	7/31/99	jb
Mercury, dissolved	M245.1 CVAA		U	mg/L	0.0002	0.001	8/5/99	ms
Mercury, total recoverable	M245.1 CVAA		U	mg/L	0.0002	0.001	8/4/99	ms
Nickel, dissolved	M200.7 ICP		U	mg/L	0.01	0.05	7/30/99	kr
Nickel, total recoverable	M200.7 ICP		U	mg/L	0.01	0.05	7/31/99	jb
Potassium, dissolved	M200.7 ICP	1.4		mg/L	0.3	1	7/30/99	kr
Potassium, total recoverable	M200.7 ICP	1.5		mg/L	0.3	1	7/31/99	jb
Selenium, dissolved	SM 3500-Se C, AA-Hydride		U	mg/L	0.001	0.005	8/3/99	ms
Selenium, total recoverable	SM 3500-Se C, AA-Hydride		U	mg/L	0.001	0.005	7/31/99	ms
Silver, dissolved	M272.2 GFAA		U	mg/L	0.0005	0.003	8/3/99	jl
Silver, total recoverable	M272.2 GFAA		U	mg/L	0.0005	0.003	8/9/99	jl
Sodium, dissolved	M200.7 ICP	5.4		mg/L	0.3	1	7/30/99	kr
Sodium, total recoverable	M200.7 ICP	4.7		mg/L	0.3	1	7/31/99	jb
Zinc, dissolved	M200.7 ICP	0.65		mg/L	0.01	0.05	7/30/99	kr
Zinc, total recoverable	M200.7 ICP	0.59		mg/L	0.01	0.05	7/31/99	jb

Metals Prep

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Total Recoverable Digestion	M200.2 GFAA						7/30/99	tdr
Total Recoverable Digestion	M200.2 ICP						7/30/99	tdr

Laboratory Qualifiers (Based on SLS-GSP-V90)

U = Analyte was analyzed for but not detected at the indicated MDL

B = Analyte concentration detected at a value between MDL and PQL

PQL = Practical Quantitation Limit

S. Haremehl for

Vice President of Operations: Ralph Poulsen

ACZ

Analytical Results

CZ Laboratories, Inc.
773 Downhill Drive
Steamboat Springs, CO 80487
(800) 334-5493

Lab Sample ID: *L24003-01*
Client Sample ID: *MW-7*
Client Project ID: *Grouse Creek Unit*
ACZ Report ID: *RG97921*

Hecla Mining Co.-Grouse Creek Unit
P.O. Box 647
Challis, ID 83226
Eileen Steilman

Date Sampled: *7/19/99 00:00*
Date Received: *7/21/99*
Date Reported: *8/12/99*

Sample Matrix: *Ground Water*

Wet Chemistry

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	M2320B							
Bicarbonate as CaCO3		67		mg/L	2	10	7/23/99	cd
Carbonate as CaCO3			U	mg/L	2	10	7/23/99	cd
Hydroxide as CaCO3			U	mg/L	2	10	7/23/99	cd
Total Alkalinity		67		mg/L	2	10	7/23/99	cd
Cation-Anion Balance	Calculation							
Cation-Anion Balance		4.0		%			8/12/99	calc
Sum of Anions		2.4		meq/L	0.1	0.5	8/12/99	calc
Sum of Cations		2.6		meq/L	0.1	0.5	8/12/99	calc
Chloride	M300.0 - Ion Chromatography	0.7	B	mg/L	0.5	3	7/23/99	bg
Conductivity @25C	M120.1 - Meter	244		umhos/cm	1	10	7/23/99	cd
Cyanide, free	M335.3 - Colorimetric		U	mg/L	0.1	0.5	8/2/99	bg
Cyanide, total	M335.4 - Colorimetric w/ distillation		U	mg/L	0.01	0.05	7/31/99	td/bg
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation		U	mg/L	0.01	0.05	7/28/99	tr/bg
Hardness as CaCO3	SM2340B - Calculation	112		mg/L	1	7	8/12/99	calc
Lab Filtration	***						7/21/99	tdr
Nitrate as N, dissolved	Calculation: NO3NO2 minus NO2		U	mg/L	0.02	0.1	8/12/99	calc
Nitrate/Nitrite as N, dissolved	M353.2 - Automated Cadmium Reduction		U	mg/L	0.02	0.1	7/21/99	ss
Nitrite as N, dissolved	M353.2 - Automated Cadmium Reduction		U	mg/L	0.01	0.05	7/21/99	ss
Nitrogen, ammonia	M350.1 - Automated Phenate		U	mg/L	0.05	0.3	7/27/99	bg
pH (lab)	M150.1 - Electrometric	6.6		units	0.1	0.1	7/23/99	cd
Residue, Filterable (TDS) @180C	M160.1 - Gravimetric	180		mg/L	10	20	7/21/99	cd/ss
Residue, Non-Filterable (TSS) @105C	M160.2 - Gravimetric	24		mg/L	5	20	7/23/99	cd/ss
Sulfate	M375.3 - Gravimetric	50		mg/L	10	20	7/22/99	cd
Sulfide as S	SM427C - Modified, Methylene Blue	0.02	B	mg/L	0.02	0.1	7/21/99	cd
Sulfite	M377.1 - Titrimetric	2	B	mg/L	2	10	7/21/99	cd
Thiocyanate as SCN	SM4500-CN M		U	mg/L	0.1	0.5	7/23/99	mh
Turbidity	M180.1 - Nephelometric	7.5		NTU	0.1	0.5	7/22/99	cd

Data Qualifiers (based on EPA CLP 3/90)

U = Analyte was analyzed for but not detected at the indicated MDL

B = Analyte concentration detected at a value between MDL and PQL

PQL = Practical Quantitation Limit

S.H.

Vice President of Operations: Ralph Poulsen

ACZ

Analytical Results

ACZ Laboratories, Inc.
173 Downhill Drive
Steamboat Springs, CO 80487
(800) 334-5493

Lab Sample ID: *L24116-01*
Client Sample ID: *Pond 1*
Client Project ID:
ACZ Report ID: *RG99194*

Hecla Mining Co.-Grouse Creek Unit
P.O. Box 647
Challis, ID 83226
Eileen Steilman

Date Sampled: *7/26/99*
Date Received: *7/29/99*
Date Reported: *8/23/99*

Sample Matrix: *Waste Water*

Metals Analysis

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP		U	mg/L	0.06	0.3	8/13/99	kr
Aluminum, total recoverable	M200.7 ICP	0.05	B	mg/L	0.03	0.2	8/6/99	gg
Antimony, dissolved	M204.2 GFAA		U	mg/L	0.02	0.1	8/10/99	jl
Antimony, total recoverable	M204.2 GFAA	0.012		mg/L	0.002	0.01	8/11/99	jl
Arsenic, dissolved	M206.2 GFAA		U	mg/L	0.01	0.05	8/9/99	jl
Arsenic, total recoverable	M206.2 GFAA	0.002	B	mg/L	0.001	0.005	8/10/99	jl
Cadmium, dissolved	M200.7 ICP		U	mg/L	0.006	0.03	8/13/99	kr
Cadmium, total recoverable	M200.7 ICP		U	mg/L	0.003	0.02	8/6/99	gg
Calcium, dissolved	M200.7 ICP	64.7		mg/L	0.4	2	8/13/99	kr
Calcium, total recoverable	M200.7 ICP	63.2		mg/L	0.2	1	8/6/99	gg
Chromium, dissolved	M200.7 ICP		U	mg/L	0.02	0.1	8/13/99	kr
Chromium, total recoverable	M200.7 ICP		U	mg/L	0.01	0.05	8/6/99	gg
Copper, dissolved	M200.7 ICP		U	mg/L	0.02	0.1	8/13/99	kr
Copper, total recoverable	M200.7 ICP	0.01	B	mg/L	0.01	0.05	8/7/99	jb
Iron, dissolved	M200.7 ICP	8.53		mg/L	0.02	0.1	8/13/99	kr
Iron, total recoverable	M200.7 ICP	9.69		mg/L	0.01	0.05	8/6/99	gg
Lead, dissolved	M200.7 ICP		U	mg/L	0.08	0.4	8/13/99	kr
Lead, total recoverable	M200.7 ICP		U	mg/L	0.04	0.2	8/6/99	gg
Magnesium, dissolved	M200.7 ICP	3.6		mg/L	0.4	2	8/13/99	kr
Magnesium, total recoverable	M200.7 ICP	3.3		mg/L	0.2	1	8/6/99	gg
Manganese, dissolved	M200.7 ICP	0.01	B	mg/L	0.01	0.05	8/13/99	kr
Manganese, total recoverable	M200.7 ICP		U	mg/L	0.005	0.03	8/6/99	gg
Mercury, dissolved	M245.1 CVAA	0.0002	B	mg/L	0.0002	0.001	8/11/99	ms
Mercury, total recoverable	M245.1 CVAA		U	mg/L	0.0002	0.001	8/4/99	ms
Nickel, dissolved	M200.7 ICP	0.02	B	mg/L	0.02	0.1	8/13/99	kr
Nickel, total recoverable	M200.7 ICP	0.02	B	mg/L	0.01	0.05	8/6/99	gg
Potassium, dissolved	M200.7 ICP	12.2		mg/L	0.6	2	8/13/99	kr
Potassium, total recoverable	M200.7 ICP	12.9		mg/L	0.3	1	8/6/99	gg
Selenium, dissolved	SM 3500-Se C, AA-Hydride	0.047		mg/L	0.005	0.03	8/13/99	ms
Selenium, total recoverable	SM 3500-Se C, AA-Hydride	0.032		mg/L	0.001	0.005	8/18/99	ms
Silver, dissolved	M200.7 ICP	0.012	B	mg/L	0.005	0.03	8/18/99	jb
Silver, total recoverable	M200.7 ICP	0.026	B	mg/L	0.005	0.03	8/6/99	gg
Sodium, dissolved	M200.7 ICP	239		mg/L	0.6	2	8/13/99	kr
Sodium, total recoverable	M200.7 ICP	232		mg/L	2	10	8/7/99	jb
Thallium, dissolved	M279.2 GFAA		U	mg/L	0.02	0.1	8/11/99	jl
Thallium, total recoverable	M279.2 GFAA		U	mg/L	0.002	0.01	8/18/99	jl
Zinc, dissolved	M200.7 ICP		U	mg/L	0.02	0.1	8/13/99	kr
Zinc, total recoverable	M200.7 ICP		U	mg/L	0.01	0.05	8/6/99	gg

Organic Qualifiers (Based on EPA CLP 3/90)

U = Analyte was analyzed for but not detected at the indicated MDL

B = Analyte concentration detected at a value between MDL and PQL

PQL = Practical Quantitation Limit

RVPoulsen

Vice President of Operations: Ralph Poulsen

ACZ

Analytical Results

ACZ Laboratories, Inc.
773 Downhill Drive
Steamboat Springs, CO 80487
(800) 334-5493

Lab Sample ID: *L24116-01*
Client Sample ID: *Pond 1*
Client Project ID:
ACZ Report ID: *RG99194*

Hecla Mining Co.-Grouse Creek Unit
P.O. Box 647
Challis, ID 83226
Eileen Steilman

Date Sampled: *7/26/99*
Date Received: *7/29/99*
Date Reported: *8/23/99*

Sample Matrix: *Waste Water*

Metals Prep

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Total Recoverable Digestion	M200.2 GFAA						8/9/99	sts
Total Recoverable Digestion	M200.2 ICP						8/4/99	sts

Wet Chemistry

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	M310.1							
Bicarbonate as CaCO3		154		mg/L	2	10	7/29/99	cd
Carbonate as CaCO3			U	mg/L	2	10	7/29/99	cd
Hydroxide as CaCO3			U	mg/L	2	10	7/29/99	cd
Total Alkalinity		154		mg/L	2	10	7/29/99	cd
Cation-Anion Balance	Calculation							
Cation-Anion Balance		5.5		%			8/23/99	calc
Sum of Anions		16.3		meq/L	0.1	0.5	8/23/99	calc
Sum of Cations		18.2		meq/L	0.1	0.5	8/23/99	calc
Chloride	M325.2 - Colorimetric (RFA)	20	B	mg/L	10	50	8/6/99	bg
Conductivity @25C	M120.1 - Meter	1700		umhos/cm	1	10	7/29/99	cd
Cyanide, free	M335.3 - Colorimetric	1.6		mg/L	0.1	0.5	8/2/99	bg
Cyanide, total	M335.4 - Colorimetric w/ distillation	25.9		mg/L	0.5	3	8/10/99	bg
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	4.3		mg/L	0.5	3	8/2/99	la/bg
Hardness as CaCO3	SM2340B - Calculation	177		mg/L	1	7	8/23/99	calc
Nitrate as N, dissolved	Calculation: NO3NO2 minus NO2	3.48		mg/L	0.04	0.2	8/23/99	calc
Nitrate/Nitrite as N, dissolved	M353.2 - Automated Cadmium Reduction	4.16		mg/L	0.04	0.2	7/29/99	ss
Nitrite as N, dissolved	M353.2 - Automated Cadmium Reduction	0.68		mg/L	0.02	0.1	7/29/99	ss
Nitrogen, ammonia	M350.1 - Automated Phenate	47.0		mg/L	0.5	3	8/6/99	bg
pH (lab)	M150.1 - Electrometric	8.1		units	0.1	0.1	7/29/99	cd
Phosphate	Calculation based on Ortho Phosphorus	0.06	B	mg/L	0.03	0.15	8/23/99	calc
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	0.02	B	mg/L	0.01	0.05	7/29/99	ss
Residue, Filterable (TDS) @180C	M160.1 - Gravimetric	960		mg/L	10	20	8/1/99	cd/ss
Residue, Non-Filterable (TSS) @105C	M160.2 - Gravimetric		U	mg/L	5	20	7/30/99	cd
Sulfate	M375.3 - Gravimetric	590		mg/L	10	20	7/30/99	cd
Sulfide as S	SM427C - Modified, Methylene Blue	1.0		mg/L	0.2	1	7/31/99	cd
TDS (calculated)	Calculation	1100		mg/L	10	50	8/23/99	calc
TDS (ratio - measured/calculated)	Calculation	0.88					8/23/99	calc
Thiocyanate as SCN	SM4500-CN M	6.8		mg/L	0.1	0.5	8/5/99	cd
Turbidity	M180.1 - Nephelometric	8.3		NTU	0.1	0.5	7/29/99	cd

Organic Qualifiers (based on EPA CLP 3/90)

U = Analyte was analyzed for but not detected at the indicated MDL

B = Analyte concentration detected at a value between MDL and PQL

PQL = Practical Quantitation Limit

RP

Vice President of Operations: Ralph Poulsen

ACZ

Analytical Results

ACZ Laboratories, Inc.
73 Downhill Drive
Steamboat Springs, CO 80487
(800) 334-5493

Lab Sample ID: *L24116-01*
Client Sample ID: *Pond 1*
Client Project ID:
ACZ Report ID: *RG99194*

Hecla Mining Co.-Grouse Creek Unit
P.O. Box 647
Challis, ID 83226
Eileen Steilman

Date Sampled: *7/26/99*
Date Received: *7/29/99*
Date Reported: *8/23/99*

Sample Matrix: *Waste Water*

Note: The Silver value is estimated due to matrix interferences.

Inorganic Qualifiers (based on EPA CLP 3/90)

J = Analyte was analyzed for but not detected at the indicated MDL

B = Analyte concentration detected at a value between MDL and PQL

PQL = Practical Quantitation Limit

RVP

Vice President of Operations: Ralph Poulsen

ACZ

Analytical Results

ACZ Laboratories, Inc.
1773 Downhill Drive
Steamboat Springs, CO 80487
(800) 334-5493

Lab Sample ID: *L23775-01*
Client Sample ID: *Pond 1*
Client Project ID:
ACZ Report ID: *RG96443*

Hecla Mining Co.-Grouse Creek Unit
P.O. Box 647
Challis, ID 83226
Eileen Steilman

Date Sampled: *6/30/99 11:30*
Date Received: *7/2/99*
Date Reported: *7/26/99*

Sample Matrix: *Waste Water*

Metals Analysis

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	0.12	B	mg/L	0.03	0.2	7/13/99	gg
Aluminum, total recoverable	M200.7 ICP	0.13	B	mg/L	0.03	0.2	7/23/99	kr
Antimony, dissolved	M204.2 GFAA	0.016		mg/L	0.002	0.01	7/20/99	lcj
Antimony, total recoverable	M204.2 GFAA	0.016		mg/L	0.002	0.01	7/26/99	jl
Arsenic, dissolved	M206.2 GFAA	0.004	B	mg/L	0.001	0.005	7/23/99	jb
Arsenic, total recoverable	M206.2 GFAA	0.004	B	mg/L	0.001	0.005	7/23/99	bg
Cadmium, dissolved	M200.7 ICP		U	mg/L	0.003	0.02	7/13/99	gg
Cadmium, total recoverable	M200.7 ICP		U	mg/L	0.003	0.02	7/23/99	kr
Calcium, dissolved	M200.7 ICP	62.5		mg/L	0.2	1	7/13/99	gg
Calcium, total recoverable	M200.7 ICP	54.0		mg/L	0.2	1	7/23/99	kr
Chromium, dissolved	M200.7 ICP		U	mg/L	0.01	0.05	7/13/99	gg
Chromium, total recoverable	M200.7 ICP		U	mg/L	0.01	0.05	7/23/99	kr
Copper, dissolved	M200.7 ICP	0.03	B	mg/L	0.01	0.05	7/13/99	gg
Copper, total recoverable	M200.7 ICP	0.02	B	mg/L	0.01	0.05	7/23/99	kr
Iron, dissolved	M200.7 ICP	14.20		mg/L	0.01	0.05	7/13/99	gg
Iron, total recoverable	M200.7 ICP	13.40		mg/L	0.01	0.05	7/23/99	kr
Lead, dissolved	M200.7 ICP		U	mg/L	0.04	0.2	7/13/99	gg
Lead, total recoverable	M200.7 ICP		U	mg/L	0.04	0.2	7/23/99	kr
Magnesium, dissolved	M200.7 ICP	3.2		mg/L	0.2	1	7/13/99	gg
Magnesium, total recoverable	M200.7 ICP	2.8		mg/L	0.2	1	7/23/99	kr
Manganese, dissolved	M200.7 ICP	0.006	B	mg/L	0.005	0.03	7/13/99	gg
Manganese, total recoverable	M200.7 ICP	0.007	B	mg/L	0.005	0.03	7/23/99	kr
Mercury, dissolved	M245.1 CVAA	0.0003	B	mg/L	0.0002	0.001	7/21/99	ms
Mercury, total recoverable	M245.1 CVAA	0.0002	B	mg/L	0.0002	0.001	7/16/99	ms
Nickel, dissolved	M200.7 ICP	0.02	B	mg/L	0.01	0.05	7/13/99	gg
Nickel, total recoverable	M200.7 ICP	0.02	B	mg/L	0.01	0.05	7/23/99	kr
Potassium, dissolved	M200.7 ICP	12.2		mg/L	0.3	1	7/13/99	gg
Potassium, total recoverable	M200.7 ICP	10.6		mg/L	0.3	1	7/23/99	kr
Selenium, dissolved	SM 3500-Se C, AA-Hydride	0.054		mg/L	0.005	0.03	7/20/99	ms
Selenium, total recoverable	SM 3500-Se C, AA-Hydride	0.050		mg/L	0.005	0.03	7/20/99	ms
Silver, dissolved	M200.7 ICP	0.05	B	mg/L	0.03	0.1	7/21/99	kr
Silver, total recoverable	M200.7 ICP	0.070		mg/L	0.005	0.03	7/23/99	kr
Sodium, dissolved	M200.7 ICP	230		mg/L	2	10	7/13/99	gg
Sodium, total recoverable	M200.7 ICP	206		mg/L	0.3	1	7/23/99	kr
Thallium, dissolved	M279.2 GFAA		U	mg/L	0.002	0.01	7/5/99	jl
Thallium, total recoverable	M279.2 GFAA		U	mg/L	0.002	0.01	7/24/99	jb
Zinc, dissolved	M200.7 ICP		U	mg/L	0.01	0.05	7/13/99	gg
Zinc, total recoverable	M200.7 ICP		U	mg/L	0.01	0.05	7/23/99	kr

Definitions (based on EPA CLP-3/90)

U = Analyte was analyzed for but not detected at the indicated MDL

B = Analyte concentration detected at a value between MDL and PQL

PQL = Practical Quantitation Limit

Vice President of Operations: Ralph Poulsen

ACZ

Analytical Results

ACZ Laboratories, Inc.
773 Downhill Drive
Steamboat Springs, CO 80487
(800) 334-5493

Lab Sample ID: L23775-01
Client Sample ID: Pond 1
Client Project ID:
ACZ Report ID: RG96443

Hecla Mining Co.-Grouse Creek Unit
P.O. Box 647
Challis, ID 83226
Eileen Steilman

Date Sampled: 6/30/99 11:30
Date Received: 7/2/99
Date Reported: 7/26/99

Sample Matrix: Waste Water

Metals Prep

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Total Recoverable Digestion	M200.2 GFAA						7/24/99	tdr
Total Recoverable Digestion	M200.2 ICP						7/22/99	sts

Wet Chemistry

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	M310.1							
Bicarbonate as CaCO3		145		mg/L	2	10	7/5/99	cd
Carbonate as CaCO3			U	mg/L	2	10	7/5/99	cd
Hydroxide as CaCO3			U	mg/L	2	10	7/5/99	cd
Total Alkalinity		145		mg/L	2	10	7/5/99	cd
Cation-Anion Balance	Calculation							
Cation-Anion Balance		6.0		%			7/26/99	calc
Sum of Anions		15.6		meq/L	0.1	0.5	7/26/99	calc
Sum of Cations		17.6		meq/L	0.1	0.5	7/26/99	calc
Chloride	M325.2 - Colorimetric (RFA)	25		mg/L	1	5	7/8/99	bg
Conductivity @25C	M120.1 - Meter	1670		umhos/cm	1	10	7/6/99	cd/ss
Cyanide, free	M335.3 - Colorimetric	2.6		mg/L	0.2	1	7/8/99	bg
Cyanide, total	M335.4 - Colorimetric w/ distillation	44		mg/L	5	30	7/8/99	bg
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	6		mg/L	1	5	7/8/99	bg
Hardness as CaCO3	SM2340B - Calculation	169		mg/L	1	7	7/26/99	calc
Nitrate as N, dissolved	Calculation: NO3NO2 minus NO2	3.32		mg/L	0.02	0.1	7/26/99	calc
Nitrate/Nitrite as N, dissolved	M353.2 - Automated Cadmium Reduction	3.86		mg/L	0.02	0.1	7/3/99	ss
Nitrite as N, dissolved	M353.2 - Automated Cadmium Reduction	0.54		mg/L	0.01	0.05	7/3/99	ss
Nitrogen, ammonia	M350.1 - Automated Phenate	42.9		mg/L	0.5	3	7/6/99	bg
pH (lab)	M150.1 - Electrometric	8.1		units	0.1	0.1	7/5/99	cd
Phosphate	Calculation based on Ortho Phosphorus	0.18		mg/L	0.03	0.15	7/26/99	calc
Phosphorus, ortho dissolved	M365.1 - Automated Ascorbic Acid	0.059		mg/L	0.005	0.03	7/3/99	ss
Residue, Filterable (TDS) @180C	M160.1 - Gravimetric	980		mg/L	10	20	7/6/99	mh
Residue, Non-Filterable (TSS) @103-5C	M160.2 - Gravimetric		U	mg/L	5	20	7/2/99	cd
Sulfate	M375.3 - Gravimetric	560		mg/L	10	20	7/9/99	cd
Sulfide as S	SM427C - Modified, Methylene Blue	1.9		mg/L	0.1	0.5	7/7/99	mh
TDS (calculated)	Calculation	1050		mg/L	10	50	7/26/99	calc
TDS (ratio - measured/calculated)	Calculation	0.93					7/26/99	calc
Thiocyanate as SCN	SM4500-CN M	9.3		mg/L	0.5	3	7/6/99	mh
Turbidity	M180.1 - Nephelometric	5.1		NTU	0.1	0.5	7/2/99	cd

Qualifiers (based on EPA CLP 3/90)

U = Analyte was analyzed for but not detected at the indicated MDL

B = Analyte concentration detected at a value between MDL and PQL

PQL = Practical Quantitation Limit

RVP

Vice President of Operations: Ralph Poulsen

ACZ

Analytical Results

ACZ Laboratories, Inc.
773 Downhill Drive
Steamboat Springs, CO 80487
(800) 334-5493

Lab Sample ID: *L23775-02*
Client Sample ID: *Pond 1-Filtered*
Client Project ID:
ACZ Report ID: *RG96444*

Hecla Mining Co.-Grouse Creek Unit
P.O. Box 647
Challis, ID 83226
Eileen Steilman

Date Sampled: *6/30/99 11:30*
Date Received: *7/2/99*
Date Reported: *7/26/99*

Sample Matrix: *Waste Water*

Wet Chemistry

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Cyanide, total	M335.4 - Colorimetric w/ distillation	39		mg/L	5	30	7/8/99	bg
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	6.9		mg/L	0.4	2	7/14/99	la/bg

Qualifiers Defined in EPA CLP 3/90

U = Analyte was analyzed for but not detected at the indicated MDL

B = Analyte concentration detected at a value between MDL and PQL

PQL = Practical Quantitation Limit

R V Poulsen

Vice President of Operations: Ralph Poulsen

ACZ

Analytical Results

ACZ Laboratories, Inc.
773 Downhill Drive
Steamboat Springs, CO 80487
(800) 334-5493

Lab Sample ID: *L23967-01*
Client Sample ID: *MW-22-2.5*
Client Project ID:
ACZ Report ID: *RG98044*

Hecla Mining Co.-Grouse Creek Unit
P.O. Box 647
Challis, ID 83226
Dave Berbenick

Date Sampled: *7/11/99*
Date Received: *7/17/99*
Date Reported: *7/31/99*

Sample Matrix: *Soil*

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	96.7		%	0.1	0.5	7/23/99	bs

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Synthetic Precip. Leaching Procedure	M1312, DI Water						7/21/99	bs/sw

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Cyanide, Total (1312-DI)	SM4500-CN I		U	mg/L	0.01	0.05	7/28/99	tr/bg
Cyanide, total	M9012 - Automated Colorimetric		U	mg/Kg	0.5	3	7/23/99	bg
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation		U	mg/Kg	0.5	3	7/23/99	bg

Result Qualifiers (unless noted EPA CLP 2001)

U = Analyte was analyzed for but not detected at the indicated MDL

B = Analyte concentration detected at a value between MDL and PQL

PQL = Practical Quantitation Limit

RVPoulsen

Vice President of Operations: Ralph Poulsen

ACZ

Analytical Results

ACZ Laboratories, Inc.
1773 Downhill Drive
Steamboat Springs, CO 80487
(800) 334-5493

Lab Sample ID: *L23967-02*
Client Sample ID: *MW-22-5*
Client Project ID:
ACZ Report ID: *RG98045*

Hecla Mining Co.-Grouse Creek Unit
P.O. Box 647
Challis, ID 83226
Dave Berbenick

Date Sampled: *7/11/99*
Date Received: *7/17/99*
Date Reported: *7/31/99*

Sample Matrix: *Soil*

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	96.7		%	0.1	0.5	7/23/99	bs

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Synthetic Precip. Leaching Procedure	M1312, DI Water						7/21/99	bs/sw

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Cyanide, Total (1312-DI)	SM4500-CN I		U	mg/L	0.01	0.05	7/28/99	tr/bg
Cyanide, total	M9012 - Automated Colorimetric		U	mg/Kg	0.5	3	7/23/99	bg
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation		U	mg/Kg	0.5	3	7/23/99	bg

Data Qualifier Definitions (EPA CLP 2/90)

U = Analyte was analyzed for but not detected at the indicated MDL

B = Analyte concentration detected at a value between MDL and PQL

PQL = Practical Quantitation Limit

Vice President of Operations: Ralph Poulsen

ACZ

Analytical Results

ACZ Laboratories, Inc.
773 Downhill Drive
Steamboat Springs, CO 80487
(800) 334-5493

Lab Sample ID: *L23967-03*
Client Sample ID: *MW-22-7.5*
Client Project ID:
ACZ Report ID: *RG98046*

Hecla Mining Co.-Grouse Creek Unit
P.O. Box 647
Challis, ID 83226
Dave Berbenick

Date Sampled: *7/11/99*
Date Received: *7/17/99*
Date Reported: *7/31/99*

Sample Matrix: *Soil*

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	96.4		%	0.1	0.5	7/23/99	bs

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Synthetic Precip. Leaching Procedure	M1312, DI Water						7/21/99	bs/sw

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Cyanide, Total (1312-DI)	SM4500-CN I		U	mg/L	0.01	0.05	7/28/99	tr/bg
Cyanide, total	M9012 - Automated Colorimetric		U	mg/Kg	0.5	3	7/23/99	bg
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation		U	mg/Kg	0.5	3	7/23/99	bg

Qualifiers (Unless otherwise specified in EPA CLP-2 20)

U = Analyte was analyzed for but not detected at the indicated MDL

B = Analyte concentration detected at a value between MDL and PQL

PQL = Practical Quantitation Limit

Vice President of Operations: Ralph Poulsen

ACZ

Analytical Results

ACZ Laboratories, Inc.
2773 Downhill Drive
Steamboat Springs, CO 80487
(800) 334-5493

Lab Sample ID: *L23967-04*
Client Sample ID: *MW-22-10*
Client Project ID:
ACZ Report ID: *RG98047*

Hecla Mining Co.-Grouse Creek Unit
P.O. Box 647
Challis, ID 83226
Dave Berbenick

Date Sampled: *7/11/99*
Date Received: *7/17/99*
Date Reported: *7/31/99*

Sample Matrix: *Soil*

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	95.5		%	0.1	0.5	7/23/99	bs

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Synthetic Precip. Leaching Procedure	M1312, DI Water						7/21/99	bs/sw

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Cyanide, Total (1312-DI)	SM4500-CN I		U	mg/L	0.01	0.05	7/28/99	tr/bg
Cyanide, total	M9012 - Automated Colorimetric		U	mg/Kg	0.5	3	7/23/99	bg
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation		U	mg/Kg	0.5	3	7/23/99	bg

Parameter Qualifiers (based on EPA CLP 3/90)

U = Analyte was analyzed for but not detected at the indicated MDL
B = Analyte concentration detected at a value between MDL and PQL
PQL = Practical Quantitation Limit

Vice President of Operations: Ralph Poulsen

ACZ

Analytical Results

ACZ Laboratories, Inc.
773 Downhill Drive
Steamboat Springs, CO 80487
(800) 334-5493

Lab Sample ID: *L23967-05*
Client Sample ID: *MW-22-12.5*
Client Project ID:
ACZ Report ID: *RG98048*

Hecla Mining Co.-Grouse Creek Unit
P.O. Box 647
Challis, ID 83226
Dave Berbenick

Date Sampled: *7/11/99*
Date Received: *7/17/99*
Date Reported: *7/31/99*

Sample Matrix: *Soil*

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	96.8		%	0.1	0.5	7/23/99	bs

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Synthetic Precip. Leaching Procedure	M1312, DI Water						7/21/99	bs/sw

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Cyanide, Total (1312-DI)	SM4500-CN I		U	mg/L	0.01	0.05	7/28/99	tr/bg
Cyanide, total	M9012 - Automated Colorimetric		U	mg/Kg	0.5	3	7/23/99	bg
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation		U	mg/Kg	0.5	3	7/23/99	bg

Laboratory Qualifiers (based on EPA-CLP-3/90)

U = Analyte was analyzed for but not detected at the indicated MDL

B = Analyte concentration detected at a value between MDL and PQL

PQL = Practical Quantitation Limit

Vice President of Operations: Ralph Poulsen

ACZ

Analytical Results

ACZ Laboratories, Inc.
2773 Downhill Drive
Steamboat Springs, CO 80487
(800) 334-5493

Lab Sample ID: *L23967-06*
Client Sample ID: *MW-22-15*
Client Project ID:
ACZ Report ID: *RG98049*

Hecla Mining Co.-Grouse Creek Unit
P.O. Box 647
Challis, ID 83226
Dave Berbenick

Date Sampled: *7/11/99*
Date Received: *7/17/99*
Date Reported: *7/31/99*

Sample Matrix: *Soil*

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	98.1		%	0.1	0.5	7/23/99	bs

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Synthetic Precip. Leaching Procedure	M1312, DI Water						7/21/99	bs/sw

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Cyanide, Total (1312-DI)	SM4500-CN I		U	mg/L	0.01	0.05	7/28/99	tr/bg
Cyanide, total	M9012 - Automated Colorimetric		U	mg/Kg	0.5	3	7/23/99	bg
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation		U	mg/Kg	0.5	3	7/23/99	bg

Inorganic Qualifiers (based on EPA CLP 3/90)

U = Analyte was analyzed for but not detected at the indicated MDL
B = Analyte concentration detected at a value between MDL and PQL
PQL = Practical Quantitation Limit

R Poulsen

Vice President of Operations: Ralph Poulsen

ACZ

Analytical Results

ACZ Laboratories, Inc.
773 Downhill Drive
Steamboat Springs, CO 80487
(800) 334-5493

Lab Sample ID: *L23967-07*
Client Sample ID: *MW-22-17.5*
Client Project ID:
ACZ Report ID: *RG98050*

Hecla Mining Co.-Grouse Creek Unit
P.O. Box 647
Challis, ID 83226
Dave Berbenick

Date Sampled: *7/11/99*
Date Received: *7/17/99*
Date Reported: *7/31/99*

Sample Matrix: *Soil*

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	94.9		%	0.1	0.5	7/23/99	bs

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Synthetic Precip. Leaching Procedure	M1312, DI Water						7/21/99	bs/sw

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Cyanide, Total (1312-DI)	SM4500-CN I		U	mg/L	0.01	0.05	7/28/99	tr/bg
Cyanide, total	M9012 - Automated Colorimetric		U	mg/Kg	0.5	3	7/23/99	bg
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation		U	mg/Kg	0.5	3	7/23/99	bg

Data Qualifiers (Consistent EPA CLP-5/90)

U = Analyte was analyzed for but not detected at the indicated MDL

B = Analyte concentration detected at a value between MDL and PQL

PQL = Practical Quantitation Limit

Vice President of Operations: Ralph Poulsen

ACZ

Analytical Results

ACZ Laboratories, Inc.
2773 Downhill Drive
Steamboat Springs, CO 80487
(800) 334-5493

Lab Sample ID: *L23967-08*
Client Sample ID: *MW-22-20*
Client Project ID:
ACZ Report ID: *RG98051*

Hecla Mining Co.-Grouse Creek Unit
P.O. Box 647
Challis, ID 83226
Dave Berbenick

Date Sampled: *7/11/99*
Date Received: *7/17/99*
Date Reported: *7/31/99*

Sample Matrix: *Soil*

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	96.2		%	0.1	0.5	7/23/99	bs

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Synthetic Precip. Leaching Procedure	M1312, DI Water						7/21/99	bs/sw

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Cyanide, Total (1312-DI)	SM4500-CN I		U	mg/L	0.01	0.05	7/28/99	tr/bg
Cyanide, total	M9012 - Automated Colorimetric		U	mg/Kg	0.5	3	7/23/99	bg
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation		U	mg/Kg	0.5	3	7/23/99	bg

Inorganic Qualifiers (from EPA CLP 3/90)

U = Analyte was analyzed for but not detected at the indicated MDL

B = Analyte concentration detected at a value between MDL and PQL

PQL = Practical Quantitation Limit

R V Poulsen

Vice President of Operations: Ralph Poulsen

ACZ

Analytical Results

ACZ Laboratories, Inc.
2773 Downhill Drive
Steamboat Springs, CO 80487
(800) 334-5493

Lab Sample ID: *L23967-09*
Client Sample ID: *MW-22-22.5*
Client Project ID:
ACZ Report ID: *RG98052*

Hecla Mining Co.-Grouse Creek Unit
P.O. Box 647
Challis, ID 83226
Dave Berbenick

Date Sampled: *7/11/99*
Date Received: *7/17/99*
Date Reported: *7/31/99*

Sample Matrix: *Soil*

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	97.4		%	0.1	0.5	7/23/99	bs

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Synthetic Precip. Leaching Procedure	M1312, DI Water						7/21/99	bs/sw

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Cyanide, Total (1312-DI)	SM4500-CN I		U	mg/L	0.01	0.05	7/30/99	la/bg
Cyanide, total	M9012 - Automated Colorimetric		U	mg/Kg	0.5	3	7/23/99	bg
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation		U	mg/Kg	0.5	3	7/23/99	bg

Analytical Qualifiers (based on EPA CLP-2D)

U = Analyte was analyzed for but not detected at the indicated MDL

B = Analyte concentration detected at a value between MDL and PQL

PQL = Practical Quantitation Limit

R V Poulsen

Vice President of Operations: Ralph Poulsen

ACZ

Analytical Results

ACZ Laboratories, Inc.
2773 Downhill Drive
Steamboat Springs, CO 80487
(800) 334-5493

Lab Sample ID: *L23967-10*
Client Sample ID: *MW-22-25*
Client Project ID:
ACZ Report ID: *RG98053*

Hecla Mining Co.-Grouse Creek Unit
P.O. Box 647
Challis, ID 83226
Dave Berbenick

Date Sampled: *7/11/99*
Date Received: *7/17/99*
Date Reported: *7/31/99*

Sample Matrix: *Soil*

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	95.0		%	0.1	0.5	7/23/99	bs

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Synthetic Precip. Leaching Procedure	M1312, DI Water						7/21/99	bs/sw

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Cyanide, Total (1312-DI)	SM4500-CN I		U	mg/L	0.01	0.05	7/30/99	la/bg
Cyanide, total	M9012 - Automated Colorimetric		U	mg/Kg	0.5	3	7/23/99	bg
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation		U	mg/Kg	0.5	3	7/23/99	bg

Important Conditions (Reference EPA CLP 390)

U = Analyte was analyzed for but not detected at the indicated MDL

B = Analyte concentration detected at a value between MDL and PQL

PQL = Practical Quantitation Limit

R V Poulsen

Vice President of Operations: Ralph Poulsen

ACZ

Analytical Results

ACZ Laboratories, Inc.
2773 Downhill Drive
Steamboat Springs, CO 80487
(800) 334-5493

Lab Sample ID: *L23967-11*
Client Sample ID: *MW-22-27.5*
Client Project ID:
ACZ Report ID: *RG98054*

Hecla Mining Co.-Grouse Creek Unit
P.O. Box 647
Challis, ID 83226
Dave Berbenick

Date Sampled: *7/11/99*
Date Received: *7/17/99*
Date Reported: *7/31/99*

Sample Matrix: *Soil*

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	96.3		%	0.1	0.5	7/23/99	bs

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Synthetic Precip. Leaching Procedure	M1312, DI Water						7/22/99	sw

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Cyanide, Total (1312-DI)	SM4500-CN I		U	mg/L	0.01	0.05	7/30/99	la/bg
Cyanide, total	M9012 - Automated Colorimetric		U	mg/Kg	0.5	3	7/23/99	bg
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation		U	mg/Kg	0.5	3	7/23/99	bg

Data Qualifiers Defined in ACL 4701

U = Analyte was analyzed for but not detected at the indicated MDL

B = Analyte concentration detected at a value between MDL and PQL

PQL = Practical Quantitation Limit

Vice President of Operations: Ralph Poulsen

ACZ

Analytical Results

ACZ Laboratories, Inc.
2773 Downhill Drive
Steamboat Springs, CO 80487
(800) 334-5493

Lab Sample ID: *L23967-12*
Client Sample ID: *MW-22-30*
Client Project ID:
ACZ Report ID: *RG98055*

Hecla Mining Co.-Grouse Creek Unit
P.O. Box 647
Challis, ID 83226
Dave Berbenick

Date Sampled: *7/11/99*
Date Received: *7/17/99*
Date Reported: *7/31/99*

Sample Matrix: *Soil*

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	98.2		%	0.1	0.5	7/23/99	bs

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Synthetic Precip. Leaching Procedure	M1312, DI Water						7/22/99	sw

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Cyanide, Total (1312-DI)	SM4500-CN I	0.06		mg/L	0.01	0.05	7/30/99	la/bg
Cyanide, total	M9012 - Automated Colorimetric	2.3	B	mg/Kg	0.5	3	7/23/99	bg
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation		U	mg/Kg	0.5	3	7/23/99	bg

Analytical Qualifiers (based on EPA CLP 5/90)

U = Analyte was analyzed for but not detected at the indicated MDL

B = Analyte concentration detected at a value between MDL and PQL

PQL = Practical Quantitation Limit

RV Poulsen

Vice President of Operations: Ralph Poulsen

ACZ

Analytical Results

ACZ Laboratories, Inc.
2773 Downhill Drive
Steamboat Springs, CO 80487
(800) 334-5493

Lab Sample ID: *L23967-13*
Client Sample ID: *MW-22-32.5*
Client Project ID:
ACZ Report ID: *RG98056*

Hecla Mining Co.-Grouse Creek Unit
P.O. Box 647
Challis, ID 83226
Dave Berbenick

Date Sampled: *7/11/99*
Date Received: *7/17/99*
Date Reported: *7/31/99*

Sample Matrix: *Soil*

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	96.7		%	0.1	0.5	7/23/99	bs

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Synthetic Precip. Leaching Procedure	M1312, DI Water						7/22/99	sw

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Cyanide, Total (1312-DI)	SM4500-CN I		U	mg/L	0.01	0.05	7/30/99	la/bg
Cyanide, total	M9012 - Automated Colorimetric	1.8	B	mg/Kg	0.5	3	7/23/99	bg
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation		U	mg/Kg	0.5	3	7/23/99	bg

Interpretive Comments (ref. ACZ SOP)

U = Analyte was analyzed for but not detected at the indicated MDL

B = Analyte concentration detected at a value between MDL and PQL

PQL = Practical Quantitation Limit

RVPoulsen

Vice President of Operations: Ralph Poulsen

ACZ

Analytical Results

ACZ Laboratories, Inc.
2773 Downhill Drive
Steamboat Springs, CO 80487
(800) 334-5493

Lab Sample ID: *L23967-14*
Client Sample ID: *MW-22-35*
Client Project ID:
ACZ Report ID: *RG98057*

Hecla Mining Co.-Grouse Creek Unit
P.O. Box 647
Challis, ID 83226
Dave Berbenick

Date Sampled: *7/11/99*
Date Received: *7/17/99*
Date Reported: *7/31/99*

Sample Matrix: *Soil*

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	95.3		%	0.1	0.5	7/23/99	bs

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Synthetic Precip. Leaching Procedure	M1312, DI Water						7/22/99	sw

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Cyanide, Total (1312-DI)	SM4500-CN I		U	mg/L	0.01	0.05	7/30/99	la/bg
Cyanide, total	M9012 - Automated Colorimetric	1.1	B	mg/Kg	0.5	3	7/23/99	bg
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation		U	mg/Kg	0.5	3	7/23/99	bg

Inorganic Qualifiers (Based on EPA CLP 3/90)

U = Analyte was analyzed for but not detected at the indicated MDL

B = Analyte concentration detected at a value between MDL and PQL

PQL = Practical Quantitation Limit

RVPoulsen

Vice President of Operations: Ralph Poulsen

ACZ

Analytical Results

ACZ Laboratories, Inc.
773 Downhill Drive
Steamboat Springs, CO 80487
(800) 334-5493

Lab Sample ID: *L23967-15*
Client Sample ID: *MW-22-37.5*
Client Project ID:
ACZ Report ID: *RG98058*

Hecla Mining Co.-Grouse Creek Unit
P.O. Box 647
Challis, ID 83226
Dave Berbenick

Date Sampled: *7/11/99*
Date Received: *7/17/99*
Date Reported: *7/31/99*

Sample Matrix: *Soil*

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	96.9		%	0.1	0.5	7/23/99	bs

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Synthetic Precip. Leaching Procedure	M1312, DI Water						7/22/99	sw

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Cyanide, Total (1312-DI)	SM4500-CN I		U	mg/L	0.01	0.05	7/30/99	la/bg
Cyanide, total	M9012 - Automated Colorimetric		U	mg/Kg	0.5	3	7/23/99	bg
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation		U	mg/Kg	0.5	3	7/23/99	bg

Analytical Qualifiers (based on EPA CLP 3/90)

U = Analyte was analyzed for but not detected at the indicated MDL
B = Analyte concentration detected at a value between MDL and PQL
PQL = Practical Quantitation Limit

Vice President of Operations: Ralph Poulsen

ACZ

Analytical Results

ACZ Laboratories, Inc.
773 Downhill Drive
Steamboat Springs, CO 80487
(800) 334-5493

Lab Sample ID: *L23967-16*
Client Sample ID: *MW-22-40*
Client Project ID:
ACZ Report ID: *RG98059*

Hecla Mining Co.-Grouse Creek Unit
P.O. Box 647
Challis, ID 83226
Dave Berbenick

Date Sampled: *7/11/99*
Date Received: *7/17/99*
Date Reported: *7/31/99*

Sample Matrix: *Soil*

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	96.3		%	0.1	0.5	7/23/99	bs

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Synthetic Precip. Leaching Procedure	M1312, DI Water						7/22/99	sw

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Cyanide, Total (1312-DI)	SM4500-CN I	0.06		mg/L	0.01	0.05	7/30/99	la/bg
Cyanide, total	M9012 - Automated Colorimetric	5.8		mg/Kg	0.5	3	7/23/99	bg
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation		U	mg/Kg	0.5	3	7/23/99	bg

Definition of Qualifiers (Based on EPA CLP3/90)

U = Analyte was analyzed for but not detected at the indicated MDL

B = Analyte concentration detected at a value between MDL and PQL

PQL = Practical Quantitation Limit

R V Poulsen

Vice President of Operations: Ralph Poulsen

ACZ

Analytical Results

ACZ Laboratories, Inc.
2773 Downhill Drive
Steamboat Springs, CO 80487
(800) 334-5493

Lab Sample ID: *L23967-17*
Client Sample ID: *MW-35-2.5*
Client Project ID:
ACZ Report ID: *RG98060*

Hecla Mining Co.-Grouse Creek Unit
P.O. Box 647
Challis, ID 83226
Dave Berbenick

Date Sampled: *7/9/99*
Date Received: *7/17/99*
Date Reported: *7/31/99*

Sample Matrix: *Soil*

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	96.7		%	0.1	0.5	7/23/99	bs

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Synthetic Precip. Leaching Procedure	M1312, DI Water						7/22/99	sw

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Cyanide, Total (1312-DI)	SM4500-CN I		U	mg/L	0.01	0.05	7/30/99	la/bg
Cyanide, total	M9012 - Automated Colorimetric		U	mg/Kg	0.5	3	7/23/99	bg
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation		U	mg/Kg	0.5	3	7/23/99	bg

Qualifiers (Based on EPA CLP 390)

U = Analyte was analyzed for but not detected at the indicated MDL

B = Analyte concentration detected at a value between MDL and PQL

PQL = Practical Quantitation Limit

RVPoulsen

Vice President of Operations: Ralph Poulsen

ACZ

Analytical Results

ACZ Laboratories, Inc.
773 Downhill Drive
Steamboat Springs, CO 80487
(800) 334-5493

Lab Sample ID: *L23967-18*
Client Sample ID: *MW-35-12.5*
Client Project ID:
ACZ Report ID: *RG98061*

Hecla Mining Co.-Grouse Creek Unit
P.O. Box 647
Challis, ID 83226
Dave Berbenick

Date Sampled: *7/9/99*
Date Received: *7/17/99*
Date Reported: *7/31/99*

Sample Matrix: *Soil*

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	92.8		%	0.1	0.5	7/23/99	bs

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Synthetic Precip. Leaching Procedure	M1312, DI Water						7/22/99	sw

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Cyanide, Total (1312-DI)	SM4500-CN I		U	mg/L	0.01	0.05	7/28/99	tr/bg
Cyanide, total	M9012 - Automated Colorimetric		U	mg/Kg	0.5	3	7/23/99	bg
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation		U	mg/Kg	0.5	3	7/23/99	bg

Organic Qualifiers (Based on LCS, CLP 2/90)

U = Analyte was analyzed for but not detected at the indicated MDL

B = Analyte concentration detected at a value between MDL and PQL

PQL = Practical Quantitation Limit

Vice President of Operations: Ralph Poulsen

ACZ

Analytical Results

ACZ Laboratories, Inc.
2773 Downhill Drive
Steamboat Springs, CO 80487
(800) 334-5493

Lab Sample ID: *L23967-19*
Client Sample ID: *MW-35-22.5*
Client Project ID:
ACZ Report ID: *RG98062*

Hecla Mining Co.-Grouse Creek Unit
P.O. Box 647
Challis, ID 83226
Dave Berbenick

Date Sampled: *7/9/99*
Date Received: *7/17/99*
Date Reported: *7/31/99*

Sample Matrix: *Soil*

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	95.7		%	0.1	0.5	7/23/99	bs

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Synthetic Precip. Leaching Procedure	M1312, DI Water						7/22/99	sw

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Cyanide, Total (1312-DI)	SM4500-CN I		U	mg/L	0.01	0.05	7/28/99	tr/bg
Cyanide, total	M9012 - Automated Colorimetric		U	mg/Kg	0.5	3	7/23/99	bg
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation		U	mg/Kg	0.5	3	7/23/99	bg

Qualifiers (Qual, Qual 2, Qual 3)

U = Analyte was analyzed for but not detected at the indicated MDL

B = Analyte concentration detected at a value between MDL and PQL

PQL = Practical Quantitation Limit

RJPoulsen

Vice President of Operations: Ralph Poulsen

ACZ

Analytical Results

ACZ Laboratories, Inc.
773 Downhill Drive
Steamboat Springs, CO 80487
(800) 334-5493

Lab Sample ID: *L23967-20*
Client Sample ID: *MW-35-32.5*
Client Project ID:
ACZ Report ID: *RG98063*

Hecla Mining Co.-Grouse Creek Unit
P.O. Box 647
Challis, ID 83226
Dave Berbenick

Date Sampled: *7/9/99*
Date Received: *7/17/99*
Date Reported: *7/31/99*

Sample Matrix: *Soil*

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	93.1		%	0.1	0.5	7/23/99	bs

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Synthetic Precip. Leaching Procedure	M1312, DI Water						7/22/99	sw

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Cyanide, Total (1312-DI)	SM4500-CN I		U	mg/L	0.01	0.05	7/30/99	la/bg
Cyanide, total	M9012 - Automated Colorimetric		U	mg/Kg	0.5	3	7/23/99	bg
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation		U	mg/Kg	0.5	3	7/23/99	bg

Reference Qualifiers (Method CLP-SOW)

U = Analyte was analyzed for but not detected at the indicated MDL

B = Analyte concentration detected at a value between MDL and PQL

PQL = Practical Quantitation Limit

Vice President of Operations: Ralph Poulsen

ACZ

Analytical Results

ACZ Laboratories, Inc.
2773 Downhill Drive
Steamboat Springs, CO 80487
(800) 334-5493

Lab Sample ID: *L23967-21*
Client Sample ID: *MW-35-42.5*
Client Project ID:
ACZ Report ID: *RG98064*

Hecla Mining Co.-Grouse Creek Unit
P.O. Box 647
Challis, ID 83226
Dave Berbenick

Date Sampled: *7/9/99*
Date Received: *7/17/99*
Date Reported: *7/31/99*

Sample Matrix: *Soil*

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	94.1		%	0.1	0.5	7/26/99	bs

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Synthetic Precip. Leaching Procedure	M1312, DI Water						7/22/99	sw

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Cyanide, Total (1312-DI)	SM4500-CN I	0.01	B	mg/L	0.01	0.05	7/30/99	la/bg
Cyanide, total	M9012 - Automated Colorimetric	0.5	B	mg/Kg	0.5	3	7/24/99	bg
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation		U	mg/Kg	0.5	3	7/24/99	bg

Inorganic Qualifiers (based on EPA CLP)

U = Analyte was analyzed for but not detected at the indicated MDL

B = Analyte concentration detected at a value between MDL and PQL

PQL = Practical Quantitation Limit

R V Poulsen

Vice President of Operations: Ralph Poulsen

HECLA MINING COMPANY
Grouse Creek Unit

SUMMARY OF JORDAN CREEK STREAMFLOWS

August 30, 1999

SITE	DATE	STAFF GAGE	FLOW (cfs)	FLOW (gpm)
S-1	August 30, 1999	0.14	6.87	3084.85
S-8	August 30, 1999	---	---	---
S-7	August 30, 1999	0.24	0.82	367.57
S-6	August 30, 1999	0.44	9.71	4358.27
S-2	August 30, 1999	0.16	6.56	2945.79
S-3	August 30, 1999	0.03	0.00	0.00
S-13	August 30, 1999	---	---	---
S-4	August 30, 1999	0.16	14.30	6419.28
S-12	August 30, 1999	0.46	15.45	6932.21
S-5	August 30, 1999	0.34	24.29	10901.11
S-11	August 30, 1999	0.62	14.54	6525.78
S-9	August 30, 1999	0.42	130.66	58639.85
S-10	August 30, 1999	0.00	153.78	69015.75

HECLA MINING COMPANY
Grouse Creek Unit

SUMMARY OF JORDAN CREEK STREAMFLOWS

August 19, 1999

SITE	DATE	STAFF GAGE	FLOW (cfs)	FLOW (gpm)
S-1	August 19, 1999	0.12	9.48	4256.40
S-8	August 19, 1999	---	---	---
S-7	August 19, 1999	---	---	---
S-6	August 19, 1999	0.50	12.13	5443.90
S-2	August 19, 1999	0.18	7.41	3323.86
S-3	August 19, 1999	0.10	13.92	6248.73
S-13	August 19, 1999	---	---	---
S-4	August 19, 1999	0.14	13.09	5875.26
S-12	August 19, 1999	0.46	12.76	5728.57
S-5	August 19, 1999		33.25	14920.89
S-11	August 19, 1999	0.68	15.83	7104.93
S-9	August 19, 1999	0.46	149.40	67049.46
S-10	August 19, 1999	0.12	175.63	78824.40

HECLA MINING COMPANY
Grouse Creek Unit

SUMMARY OF JORDAN CREEK STREAMFLOWS

August 5, 1999

SITE	DATE	STAFF GAGE	FLOW (cfs)	FLOW (gpm)
S-1	05-Aug-99	0.26	44.72	20068.70
S-8	05-Aug-99	---	---	---
S-7	05-Aug-99	---	---	---
S-6	05-Aug-99	0.54	6.02	2703.71
S-2	05-Aug-99	0.22	5.06	2268.76
S-3	05-Aug-99	0.24	9.48	4256.06
S-13	05-Aug-99	---	---	---
S-4	05-Aug-99	0.36	11.65	5226.39
S-12	05-Aug-99	0.56	11.03	4948.45
S-5	05-Aug-99	0.50	18.12	8132.30
S-11	05-Aug-99	0.76	11.12	4992.88
S-9	05-Aug-99	0.60	77.37	34724.55
S-10	05-Aug-99	0.16	96.91	43493.12

7

GROUSE CREEK PROJECT
TAILINGS IMPOUNDMENT SAMPLING
ANALYTICAL RESULTS SUMMARY

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1.0 INTRODUCTION

The following report summarizes the analytical test results for tailings samples collected at the Grouse Creek Unit tailings impoundment for the purpose of geochemical characterization. In accordance with project review team recommendations, the sampling and analysis of solids and pore water liquid in the tailings impoundment was performed to support the evaluation of the geochemical conditions in the upper zone of the tailings impoundment.

It is understood that the management, treatment and discharge of the tailings water during the closure period will be the responsibility of others. Analysis of the pore water samples, however, provides an indication of the quality of the seepage anticipated to migrate upwards during consolidation of the tailings mass. Comments regarding potential long-term water quality concerns associated with the loss of tailings consolidation water are offered in Section 4.0.

A brief discussion of the sampling methodology and analytical procedures is provided in Section 2. The results of the geochemical testing are provided in Section 3, with interpretation and conclusions contained in Section 4.

2.0 TAILINGS SAMPLING AND ANALYSIS

2.1 Sampling Methodology and Preparation

Solids and liquid samples were collected from the Grouse Creek Unit tailings impoundment on March 20 and 21, 1997. Figure 2.1 depicts the four locations from which samples were collected.

The impoundment surface was frozen at the time of sampling. An auger was used to bore holes through the ice, into which a 3-inch diameter PVC casing was pushed into the tailings mass, located approximately 14 feet below the ice surface. Samples were collected either by "Butterfly" sampler or bailer. A more detailed description of the actual sampling activities is provided in the memorandum. "Grouse Creek Tailings Sampling (Field Report)" (SRK, March 26, 1997) in Appendix A.

The sampling program met with limited success due to the relative lack of consolidation of the tailings. As a result, tailings and pore water flowed into the PVC casing each time a sample was extracted. This ultimately led to significant mixing of the tailings and an inability to collect tailings from discrete zones or horizons. For this reason, samples from each of the holes were composited prior to laboratory analysis. The sampling process produced samples which could be considered representative of tailings from both a shallower depth and intermediate/deeper zones. Table 2.1 provides a breakdown of the composited samples.

Composite HGCT-1 (hole 1) is considered to be representative of the tailings from 1 to 6 feet. HGCT-2 (hole 2) is considered to represent 0 to 8 feet. HGCT-3 (hole 2) is considered to represent a mixture of tailings from 6 feet to 20 feet. Composite samples HGCT-4 and -6 are considered to represent the upper portions (0-5 feet depths) of holes 3 and 4, respectively. Samples HGCT-5 and -7 are considered to represent a mixture of the entire hole profiles (i.e., 5 - 18 feet depth) in holes 3 and 4, respectively. However, due to the mixing during sampling, it is likely that some overlap between samples HGCT-4 and -6 and samples HGCT-5 and -7 occurred.

2.2 Laboratory Analysis

The seven (7) composite samples were initially subjected to pressure filtration through a 0.45 μm filter to separate the pore water liquid from the tailings solids. Pressure filtration, as opposed to centrifuging, was recommended to limit the potential for desorption and remobilization of metals during the separation process. The solid samples were then air dried and stored.

2.2.1 Liquids Handling and Analysis

The liquid samples derived from composite samples HGCT-1, -3, -5 and -6 were tested for both dissolved metals and wet chemistry parameters according to standard EPA methods.

2.2.2 Solids Handling and Analysis

Following filtration, tailings solids from each of the seven samples was rinsed in a batch type procedure with deionized water at a liquids to solids ratio of 2:1 until the pH and specific conductance stabilized. Each rinsing procedure was followed by drainage and collection of the

rinse water. The pH and conductivity following each rinse cycle was recorded (Appendix B). A rinse water target conductivity of less than 100 µS and stable pH was assumed adequate for determination of sufficient rinsing of the tailings solids. Following rinsing, the tailings solids were air dried.

Modified EPA Method 1312 Leaching Procedure

Samples of rinsed solids from composite samples HGCT-1, -3, -5 and -6 were subjected to a modified EPA method 1312 leach test. The test included a 2:1 liquid to solids ratio, with deionized water adjusted with HCl to a pH of 4.5 as the leaching agent. The unrinsed solids from samples HGCT-1 and -6 were also subjected to the modified EPA method 1312 leaching procedure.

Total Metals Assay

Samples of rinsed solids from composite samples HGCT-1, -3, -5 and -6 were subjected to a Method 3051 digestion and analyzed for total metals.

Acid-Base Accounting (ABA)

Samples of the rinsed solids from all seven composite solids samples were subjected to analysis for acid-neutralizing potential, total sulfur, and sulfate sulfur (HCl extractable).

3.0 TAILINGS SAMPLE ANALYTICAL RESULTS

The laboratory data sheets for each of the geochemical analyses are presented in Appendix C. The data is summarized in the following sections.

3.1 Total Metals Assay Results

Rinsed composite tailings samples HGCT-1, -3, -5 and -6 were subjected to Method 3051 nitric acid digestion and subsequent metals analysis. Results of the metal assay are presented in Table 3.1. The principle constituents of the Grouse Creek tailings appear to be:

- aluminum;
- arsenic;
- calcium;
- iron
- magnesium;
- potassium; and
- sodium.

These metals are typical constituents of rock forming minerals.

Moderate amounts (greater than 10 mg/kg) of barium, lead, manganese and zinc are also present in the solid tailings, while boron, chromium, copper, mercury, molybdenum, nickel, selenium, silver, strontium, titanium and vanadium are only present in trace amounts (less than 10 mg/kg). Antimony, bismuth, gallium, lithium, scandium, thallium and tin were not detected in any of the tailings samples.

For the most part, all four tailings samples appear to contain the same chemical constituents in approximately the same relative proportions. However, HGCT-1 contained lower concentrations of aluminum, barium, magnesium, potassium and titanium. This difference is believed to be the result of variation in the lithology of the ore and not due to geochemical reactions or conditions within the impoundment.

3.2 Pore Water Analysis Results

Pressure filtrate samples from HGCT-1, -3, -5 and -6 were analyzed for metals and general chemistry constituents. The results of these analyses are presented in Table 3.2.

As expected based on the metal assay results, the principle metal constituents of the tailings pore water from the four samples were calcium, iron, potassium and sodium. Most of the remaining metals are either at or below their respective detection limits. For a few species, including barium, boron, cobalt, mercury, nickel, strontium, tin and zinc, the pore water concentration was reported to be between the method detection limit (MDL) and the practical quantitation limit (PQL), suggesting that the concentrations of these constituents may be uncertain, yet low.

While antimony was not detected in the metal assay, it was detected in trace amounts in the pore water samples. This is due to the differing sensitivities and method detection limits of the two analyses. The MDL for the metal assay was 1 part per million (ppm) while the MDL for the liquid analysis was 0.01 ppm. A similar situation occurred with cobalt and tin.

Arsenic, copper, molybdenum, selenium and silver, occur as low concentrations, but could be of concern when compared to National Ambient Water Quality Criteria (NAWQC), which is discussed in Section 4.

The pH of the four samples ranged from 8.7 to 9.6. Total alkalinity ranged from 115 mg/L to 153 mg/L, suggesting that the pore water is being influenced by the lime additions associated with the milling process.

Weak-acid dissociable (WAD) cyanide concentrations are relatively low (ranging from 6 to 20 mg/L), while total cyanide concentrations are on the order of 375 mg/L. The elevated pH and alkalinity of the system appears to be maintaining the stability of the cyanide species. Until recently, tailings were still being deposited into the impoundment. With the mixing that was reported to occur during the sampling event, it is possible that relatively fresh tailings with a high cyanide content could have been mixed with older underlying tailings which would have experienced cyanide breakdown. The freezing temperatures may also be limiting degradation of the cyanide, and the surface layer of ice could reduce volatilization.

Total dissolved solids (TDS) and sulfate are both at moderate concentrations (average TDS = 2345 mg/L; average sulfate = 940 mg/L).

3.3 Modified Method 1312 Leachate Analysis Results

Results from the modified method 1312 leachate analysis for the rinsed tailings samples HGCT-1, -3, -5 and -6 are presented in Table 3.3. With the exception of arsenic, calcium, potassium and sodium, the leachate metal concentrations were between the MDL and PQL or below their respective detection limits.

The general chemistry constituents, including alkalinity, cyanide, nitrogen and TDS, etc., all decreased significantly from the concentration reported in the pore water chemical analysis. However, the pH remained at approximately 8.1.

The unrinsed tailings samples from HGCT-1 and HGCT-6 reflect little difference from the rinsed sample leachate chemistry, with the exception of iron (Table 3.4). Iron in the leachate from the unrinsed tailings sample was nearly 20 times higher than that from the rinsed tailings samples.

This is probably due to adsorption of the iron to the unrinsed solid particles. The iron was probably removed from the solids during the rinsing process.

The average pH of the unrinsed solids leachate was higher then the rinsed solids leachate (8.75 versus 8.1), reflecting the influence of the process lime which probably adhered to the solids.

Arsenic remained at elevated concentrations in both the rinsed and unrinsed sample leachates. The average arsenic concentration in the rinsed sample leachate was 3.75 mg/L while in the unrinsed sample leachate was 4.73 mg/L. When compared to the pore water arsenic concentration (5.48 mg/L), it appears that arsenic is leaching from the tailings solids.

3.4 Acid-Base Accounting

All seven rinsed composite tailings samples were subjected to ABA testing, the results of which are presented in Table 3.5. Little variation exists between the individual samples with respect to acid-generating potential (AP), acid-neutralizing potential (NP), and forms of sulfur analyses. As a result, the results of the ABA testing are as an overall statistical group.

The average net neutralizing potential (NNP) of the seven rinsed tailings solids (calculated as the NP minus the AP based on the residual sulfide sulfur content) was -4.3 tons $CaCO_3$ per kiloton (tons/KT) with a standard deviation (σ) of 2.0 tons/KT. This value falls within the range of NNP values (-20 to +20 tons/KT) which could be considered to have the ability to generate net acidity in the long term. The average NP/AP ratio is 0.32:1 (σ = 0.3:1). For materials with an NP/AP greater than 3:1, the potential to generate acid is low. When the ratio is between 1:1 and 3:1, there is an undefined potential to generate acid. For NP/AP ratios less than 1:1, which is the case for all seven of the rinsed tailings samples, the potential to generate acid exists.

The predominant sulfur form in all seven samples is as sulfide sulfur, with an average content of 0.20 percent (σ = 0.07 percent). Sulfate sulfur (HCl extractable) only accounts for approximately 17 percent of the total sulfur contained in the rinsed tailings solids, while sulfide sulfur accounts for nearly 83 percent.

4.0 CONCLUSIONS AND RECOMMENDATIONS

4.1 Acid-Generating Potential

Based on the acid-base accounting performed on each of the seven composite samples, the tailings solids can be considered to be potentially acid generating. However, due to the saturated condition of the tailings and the elevated pH and alkalinity in the process solution, the likelihood of acid generation within the impoundment is low. Even though the neutralizing potential of the tailings solids is limited, the residual lime in the process solution contains sufficient neutralizing capacity to limit acid generation in the period prior to closure.

The currently proposed reclamation plan for the tailings impoundment includes the diversion of Washout Creek across the impoundment surface. The constant source of water provided by the creek, and the fact that the impoundment is lined, is likely to result in the underlying tailings remaining in a saturated state following closure. As such, oxygen diffusion into the tailings should be limited and ARD should be controlled in the long term. In addition, the creation of an upland meadow and stream habitat on the tailings surface should cause organic biomass to accumulate on the reclaimed surface, effectively creating an oxygen barrier. The decaying biomass will consume any oxygen which could penetrate to the tailings, thus limiting its availability for oxidation.

4.2 Pore Water and Leachate Chemistry

In order to provide some method with which to evaluate the quality of the various solutions anticipated to be contained within and potentially migrate through and out of the tailings impoundment, the pore water liquid and rinsed solid tailings leachate quality was compared with potential ecological screening benchmarks designed for the protection of aquatic life. These benchmarks were chosen based on the proposed future land use of the tailings impoundment. Reclamation of the tailings impoundment as an upland meadow through which a stream/creek will flow presupposes that any pore water migrating upward from the underlying tailings as a result of consolidation would be collected in the creek. Thus, the evaluation was conducted using proposed aquatic organism benchmarks. Exceedance of any of these benchmarks suggests that some concern exists about the future concentration of the individual constituents and additional mitigation measures may need to be investigated.

The screening level benchmarks used in the evaluation are presented in Table 4.1. Both acute and chronic values are provided. Screening was performed by comparing concentrations in the pore water and rinsed solids leachate to benchmark concentrations that identify a certain level of effect. The only currently recognized benchmark values for aquatic organisms are EPA's National Ambient Water Quality Criteria (NAWQC). These values were developed for the protection of most aquatic species with a reasonable level of confidence. NAWQC were not designed for contaminant screening; however, because they are Applicable and Relevant or Appropriate Requirements (ARARs) for site clean-ups, any chemical that exceeds its NAWQC may be considered a contaminant of concern. For those constituents which do not currently possess NAWQC, Tier 2 Secondary acute and chronic values were used for the evaluation. These values were based on the method described in EPA's Proposed Water Quality guidance for the Great Lake System (1993). Aside from cyanide, none of the non-metallic general chemistry constituents analyzed as part of this study currently possesses either NAWQC or Tier 2 Secondary benchmark values.

Seven chemical constituents detected in the tailings pore water, including aluminum, arsenic, copper, selenium, silver, zinc and cyanide, currently exceed both the acute and chronic NAWQC. However, after rinsing of the tailings solids, only arsenic, selenium, silver and cyanide exceeded NAWQC. Of these, selenium and silver were at concentrations only slightly above their respective benchmark and would be expected to be of little concern. Cyanide is anticipate to degrade rapidly following cessation of tailings deposition and should come close to meeting NAWQC. Only arsenic, which exhibited a concentration of approximately 5.5 mg/L in the pore water and 3.75 mg/L in the rinsed solids leachate, consistently exceeded the NAWQC and could potentially pose some concern for future water quality. A more detailed investigation, possibly including consolidation seepage estimates, dilution predictions, and geochemical modeling of the potential future water quality anticipated to occur in and on the reclaimed tailings impoundment, may therefore be warranted.

4.3 Potential Downstream Impacts

After the tailings have settled and consolidated, there may be some mixing of ambient precipitation and tailings pore water in the upper zone of the tailing profile, allowing some pore water to migrate off of the impoundment as runoff. However, as indicated by the rinsed solids modified method 1312 leach procedure, few constituents, with the exception perhaps of arsenic, are expected to mobilize from the tailings under these conditions. A more detailed investigation

and evaluation of the future conditions anticipated to occur in and on the tailings impoundment may be warranted.

TABLE 2.1
TAILINGS COMPOSITE SAMPLE BREAKDOWN
Hecla Mining Company - Grouse Creek Unit
Stanley, Idaho

Hole No.	Samples	Composite Sample ID	Representation
1	2 - 6	HGCT 1	Tailings from 1-6 feet
2	1 - 5	HGCT 2	Tailings from 0-8 feet
2	7,8,9,12,15 & 18	HGCT 3	Tailings mixture from 6 - ~20 feet
3	1 - 4	HGCT 4	Tailings from 0-5 feet
3	10 - 16	HGCT 5	Tailings profile 0-18 feet
4	1 - 8	HGCT 6	Tailings from 0-5 feet
4	12 - 17	HGCT 7	Tailings profile 0-18 feet

TABLE 3.1
TOTAL METALS ASSAY RESULTS OF TAILINGS SOLID SAMPLES (*RINSED*)
Hecla Mining Company - Grouse Creek Unit
Stanley, Idaho

		Tailings Solid Sample (*Rinsed*)			
Parameter	Unit	HGCT-1	HGCT-3	HGCT-5	HGCT-6
Metals					
Aluminum	mg/kg	1890	8330	8030	12400
Antimony	mg/kg	< 1	< 1	< 1	< 1
Arsenic	mg/kg	428	640	427	648
Barium	mg/kg	19.2	81	63.5	102.0
Beryllium	mg/kg	< .2	0.2	0.2	0.3
Bismuth	mg/kg	< 10	< 10	< 10	< 10
Boron	mg/kg	6	10	7	10
Cadmium	mg/kg	0.3	0.4	< 0.3	< 0.3
Calcium	mg/kg	1100	1510	930	1280
Chromium	mg/kg	5	7	4	7
Cobalt	mg/kg	< 1	1	< 1	< 1
Copper	mg/kg	6	8	4	7
Gallium	mg/kg	< 10	< 10	< 10	< 10
Iron	mg/kg	7220	10900	6920	10000
Lead	mg/kg	33	58	30	47
Lithium	mg/kg	< 2	< 2	< 2	< 2
Magnesium	mg/kg	90	230	230	340
Manganese	mg/kg	10.3	13.9	8.9	15.3
Mercury	mg/kg	0.08	0.09	0.07	0.07
Molybdenum	mg/kg	5	6	5	6
Nickel	mg/kg	1	2	1	2
Potassium	mg/kg	990	4410	3720	5930
Scandium	mg/kg	< 10	< 10	< 10	< 10
Selenium	mg/kg	2.1	1.6	2.0	2.3
Silver	mg/kg	4.3	4.6	3.7	4.8
Sodium	mg/kg	40	90	90	150
Strontium	mg/kg	7	14	10	15
Thallium	mg/kg	< 1	< 1	< 1	< 1
Tin	mg/kg	< 10	< 10	< 10	< 10
Titanium	mg/kg	< 0.5	3.8	4.3	4.1
Vanadium	mg/kg	0.5	2	1.2	2.2
Zinc	mg/kg	27	33	20	34

TABLE 3.2
ANALYTICAL RESULTS OF TAILINGS LIQUID SAMPLES
Hecla Mining Company - Grouse Creek Unit
Stanley, Idaho

Parameter	Unit	Tailings Liquid Sample HGCT-1	HGCT-3	HGCT-5	HGCT-6
Metals Analysis [1]					
Aluminum	mg/L	2.00	0.16	0.78	0.48
Antimony	mg/L	0.18	0.17	0.15	0.15
Arsenic	mg/L	2.4	13	2.4	4.1
Barium	mg/L	0.019	0.013	0.014	0.014
Beryllium	mg/L	< 0.006	< 0.006	< 0.006	< 0.006
Bismuth	mg/L	< 0.3	< 0.3	< 0.3	< 0.3
Boron	mg/L	0.18	0.12	0.18	0.3
Cadmium	mg/L	< 0.003	< 0.003	< 0.003	< 0.003
Calcium	mg/L	322.0	189.0	287.0	222.0
Chromium	mg/L	< 0.03	< 0.03	< 0.03	< 0.03
Cobalt	mg/L	0.11	0.09	0.11	0.10
Copper	mg/L	0.24	0.51	0.19	0.39
Gallium	mg/L	< 0.3	< 0.3	< 0.3	< 0.3
Iron	mg/L	150.00	114.00	151.00	124.00
Lead	mg/L	< 0.005	< 0.005	< 0.005	0.014
Lithium	mg/L	< 0.06	< 0.06	< 0.06	< 0.06
Magnesium	mg/L	< 0.6	1.5	0.8	0.7
Manganese	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
Mercury	mg/L	0.0008	0.0006	0.0008	0.0009
Molybdenum	mg/L	0.43	1.03	0.39	0.66
Nickel	mg/L	0.03	0.05	0.05	0.04
Potassium	mg/L	33.0	26.0	35.3	28.3
Scandium	mg/L	< 0.3	< 0.3	< 0.3	< 0.3
Selenium	mg/L	0.28	0.27	0.32	0.35
Silver	mg/L	0.15	0.04	0.12	0.17
Sodium	mg/L	528.0	421.0	529.0	435.0
Strontium	mg/L	0.20	0.10	0.19	0.15
Thallium	mg/L	< 0.04	< 0.04	< 0.04	< 0.04
Tin	mg/L	< 0.2	0.1	0.1	0.1
Titanium	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
Vanadium	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
Zinc	mg/L	0.14	0.14	0.14	0.11

TABLE 3.2 (Continued)
ANALYTICAL RESULTS OF TAILINGS LIQUID SAMPLES
Hecla Mining Company - Grouse Creek Unit
Stanley, Idaho

Parameter	Unit	Tailings Liquid Sample HGCT-1	HGCT-3	HGCT-5	HGCT-6
General Chemistry					
Acidity	mg/L	–	–	–	–
Alkalinity as $CaCO_3$					
Bicarbonates as $CaCO_3$	mg/L	59	127	59	80
Carbonate as $CaCO_3$	mg/L	94	21	56	36
Hydroxide as $CaCO_3$	mg/L	< 2	< 2	< 2	< 2
Total Alkalinity	mg/L	153	148	115	116
Chloride	mg/L	355	300	440	390
Conductivity @25°C	umhos/cm	2810	2420	3060	2580
Cyanate	mg/L	58	18	57	56
Cyanide, Total	mg/L	310	250	370	340
Cyanide, WAD	mg/L	20	6	20	14
Fluoride	mg/L	–	–	–	–
Nitrate as N, diss	mg/L	10.1	4.2	10.3	8.4
Nitrate/Nitrite as N, diss	mg/L	12.5	4.5	10.7	8.8
Nitrite as N, diss	mg/L	2.4	0.35	0.41	0.41
Nitrogen, ammonia	mg/L	23	16.7	28	33
Phosphorus, ortho, diss	mg/L	–	–	–	–
Phosphorus, Total	mg/L	–	–	–	–
pH (*lab*)	s.u.	9.6	8.7	9.3	9.1
Total Dissolved Solids	mg/L	2810	1960	2540	2070
Sulfate	mg/L	1130	780	1060	790
TDS (*calc*)	mg/L	2690	1950	2630	2120
TDS (*ratio*)		1.05	1.00	0.96	0.98
Thiocyanate (SCN)	mg/L	70	50	40	40

[1] *Results of metals analyses reported as dissolved.*

6.4%
2.4%
5.4%
4.1%

TABLE 3.3
METHOD 1312 ANALYTICAL RESULTS OF TAILINGS SOLID SAMPLES (*RINSED*)
Hecla Mining Company - Grouse Creek Unit
Stanley, Idaho

Parameter	Unit	Tailings Solid Sample (*Rinsed*)			
		HGCT-1	HGCT-3	HGCT-5	HGCT-6
Metals Analysis [1]					
Aluminum	mg/L	0.45	0.16	0.32	0.30
Antimony	mg/L	0.094	0.069	0.84	0.117
Arsenic	mg/L	1.94	5.62	2.41	5.01
Barium	mg/L	< 0.003	< 0.003	< 0.003	< 0.003
Beryllium	mg/L	< 0.002	< 0.002	< 0.002	< 0.002
Bismuth	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
Boron	mg/L	0.01	0.01	0.02	0.01
Cadmium	mg/L	< 0.0006	< 0.0006	< 0.0006	< 0.0006
Calcium	mg/L	17.0	19.0	13.0	14.6
Chromium	mg/L	0.01	0.01	0.01	0.01
Cobalt	mg/L	< .01	< .01	< .01	< .01
Copper	mg/L	0.01	0.01	0.02	0.01
Gallium	mg/L	0.1	< 0.1	< 0.1	< 0.1
Iron	mg/L	0.48	0.35	0.72	1.01
Lead	mg/L	< 0.001	< 0.001	0.001	< 0.001
Lithium	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
Magnesium	mg/L	0.2	0.3	0.2	0.2
Manganese	mg/L	< 0.005	< 0.005	< 0.005	< 0.005
Mercury	mg/L	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Molybdenum	mg/L	0.02	0.01	0.02	0.02
Nickel	mg/L	0.01	< 0.01	< 0.01	0.01
Potassium	mg/L	8.2	5.2	4.6	27.2
Scandium	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
Selenium	mg/L	0.019	0.016	0.023	0.031
Silver	mg/L	0.008	0.007	< 0.005	< 0.005
Sodium	mg/L	7.0	6.3	12.0	16.9
Strontium	mg/L	0.01	0.01	0.01	0.01
Thallium	mg/L	< 0.002	< 0.002	< 0.002	< 0.002
Tin	mg/L	0.1	0.1	< 0.1	0.1
Titanium	mg/L	< 0.005	0.005	< 0.005	< 0.005
Vanadium	mg/L	< 0.005	< 0.005	< 0.005	< 0.005
Zinc	mg/L	< 0.01	0.01	0.02	0.01

TABLE 3.3 (Continued)
METHOD 1312 ANALYTICAL RESULTS OF TAILINGS SOLID SAMPLES (*RINSED*)
Hecla Mining Company - Grouse Creek Unit
Stanley, Idaho

Parameter	Units	Tailings Solid Sample (*Rinsed*)			
		HGCT-1	HGCT-3	HGCT-5	HGCT-6
General Chemistry					
Acidity	mg/L	< 2	< 2	< 2	< 2
Alkalinity as $CaCO_3$					
Bicarbonates as $CaCO_3$	mg/L	56	47	47	58
Carbonate as $CaCO_3$	mg/L	< 2	< 2	< 2	< 2
Hydroxide as $CaCO_3$	mg/L	< 2	< 2	< 2	< 2
Total Alkalinity	mg/L	56	47	47	58
Chloride	mg/L	5	6	5	7
Conductivity @25°C	mmhos/cm	0.179	0.184	0.170	0.208
Cyanate	mg/L	< 0.2	< 0.2	< 0.2	< 0.2
Cyanide, Total	mg/L	1.6	1.8	2.1	3.3
Cyanide, WAD	mg/L	0.05	0.02	0.04	0.07
Fluoride	mg/L	0.3	0.2	0.3	0.4
Nitrate as N, diss	mg/L	0.30	0.56	0.54	0.63
Nitrate/Nitrite as N, diss	mg/L	0.42	0.64	0.61	0.77
Nitrite as N, diss	mg/L	0.12	0.08	0.07	0.14
Nitrogen, ammonia	mg/L	0.30	0.31	0.29	0.33
Phosphorus, ortho, diss	mg/L	0.402	1.37	0.84	1.00
Phosphorus, Total	mg/L	0.456	1.320	0.790	1.210
pH (*lab*)	s.u.	8.3	7.9	8.1	8.1
Total Dissolved Solids	mg/L	90	70	90	110
Sulfate	mg/L	< 10	10	10	20
TDS (*calc*)	mg/L	–	–	–	–
TDS (*ratio*)		–	–	–	–
Thiocyanate (SCN)	mg/L	–	–	–	–

[1] *Results of metals analyses reported as dissolved.*

TABLE 3.4

METHOD 1312 ANALYTICAL RESULTS OF TAILINGS SOLID SAMPLES (*UNRINSED*)

Hecla Mining Company - Grouse Creek Unit

Stanley, Idaho

Parameter	Unit	Tailings Solid Sample (*Unrinsed*)	
		HGCT-1	HGCT-6
Metals Analysis			
Aluminum	mg/L	0.74	0.46
Antimony	mg/L	0.17	0.10
Arsenic	mg/L	3.38	6.07
Barium	mg/L	< 0.003	< 0.003
Beryllium	mg/L	< 0.002	< 0.002
Bismuth	mg/L	< 0.1	< 0.1
Boron	mg/L	0.01	0.01
Cadmium	mg/L	< 0.0005	< 0.0005
Calcium	mg/L	35.1	21.7
Chromium	mg/L	< 0.01	< 0.01
Cobalt	mg/L	0.01	0.01
Copper	mg/L	0.01	0.07
Gallium	mg/L	< 0.1	< 0.1
Iron	mg/L	22.40	18.10
Lead	mg/L	0.001	0.001
Lithium	mg/L	< 0.02	< 0.02
Magnesium	mg/L	0.2	< 0.2
Manganese	mg/L	< 0.005	< 0.005
Mercury	mg/L	< 0.0002	0.0002
Molybdenum	mg/L	0.15	0.16
Nickel	mg/L	< 0.01	0.01
Potassium	mg/L	9.3	7.4
Scandium	mg/L	< 0.1	< 0.1
Selenium	mg/L	0.076	0.092
Silver	mg/L	< 0.005	0.011
Sodium	mg/L	92.1	79.6
Strontium	mg/L	0.02	0.01
Thallium	mg/L	<0.002	<0.002
Tin	mg/L	< 0.1	< 0.1
Titanium	mg/L	< 0.005	< 0.005
Vanadium	mg/L	< 0.005	< 0.005
Zinc	mg/L	0.01	0.01

TABLE 3.4 (Continued)
METHOD 1312 ANALYTICAL RESULTS OF TAILINGS SOLID SAMPLES (*UNRINSED*)
Hecla Mining Company - Grouse Creek Unit
Stanley, Idaho

Parameter	Unit	Tailings Solid Sample (*Unrinsed*) HGCT-1	HGCT-6
General Chemistry			
Acidity	mg/L	< 2	< 2
Alkalinity as $CaCO_3$			
Bicarbonates as $CaCO_3$	mg/L	69	62
Carbonate as $CaCO_3$	mg/L	14	< 2
Hydroxide as $CaCO_3$	mg/L	< 2	< 2
Total Alkalinity	mg/L	82	62
Chloride	mg/L	56	50
Conductivity @25°C	mmhos/cm	0.678	0.604
Cyanate	mg/L	1.3	3.9
Cyanide, Total	mg/L	57	57
Cyanide, WAD	mg/L	0.7	0.7
Fluoride	mg/L	1.2	1.2
Nitrate as N, diss	mg/L	1.7	0.83
Nitrate/Nitrite as N, diss	mg/L	1.91	1.44
Nitrite as N, diss	mg/L	0.21	0.61
Nitrogen, ammonia	mg/L	1.61	3.1
Phosphorus, ortho, diss	mg/L	0.59	0.91
Phosphorus, Total	mg/L	0.566	1.000
pH (*lab*)	s.u.	8.9	8.6
Total Dissolved Solids	mg/L	440	370
Sulfate	mg/L	150	100
TDS (*calc*)	mg/L	--	--
TDS (*ratio*)		--	--
Thiocyanate (SCN)	mg/L	--	--

TABLE 3.5
ACID-BASE ACCOUNTING RESULTS OF TAILINGS SAMPLES
Hecla Mining Company - Grouse Creek Unit
Stanley, Idaho

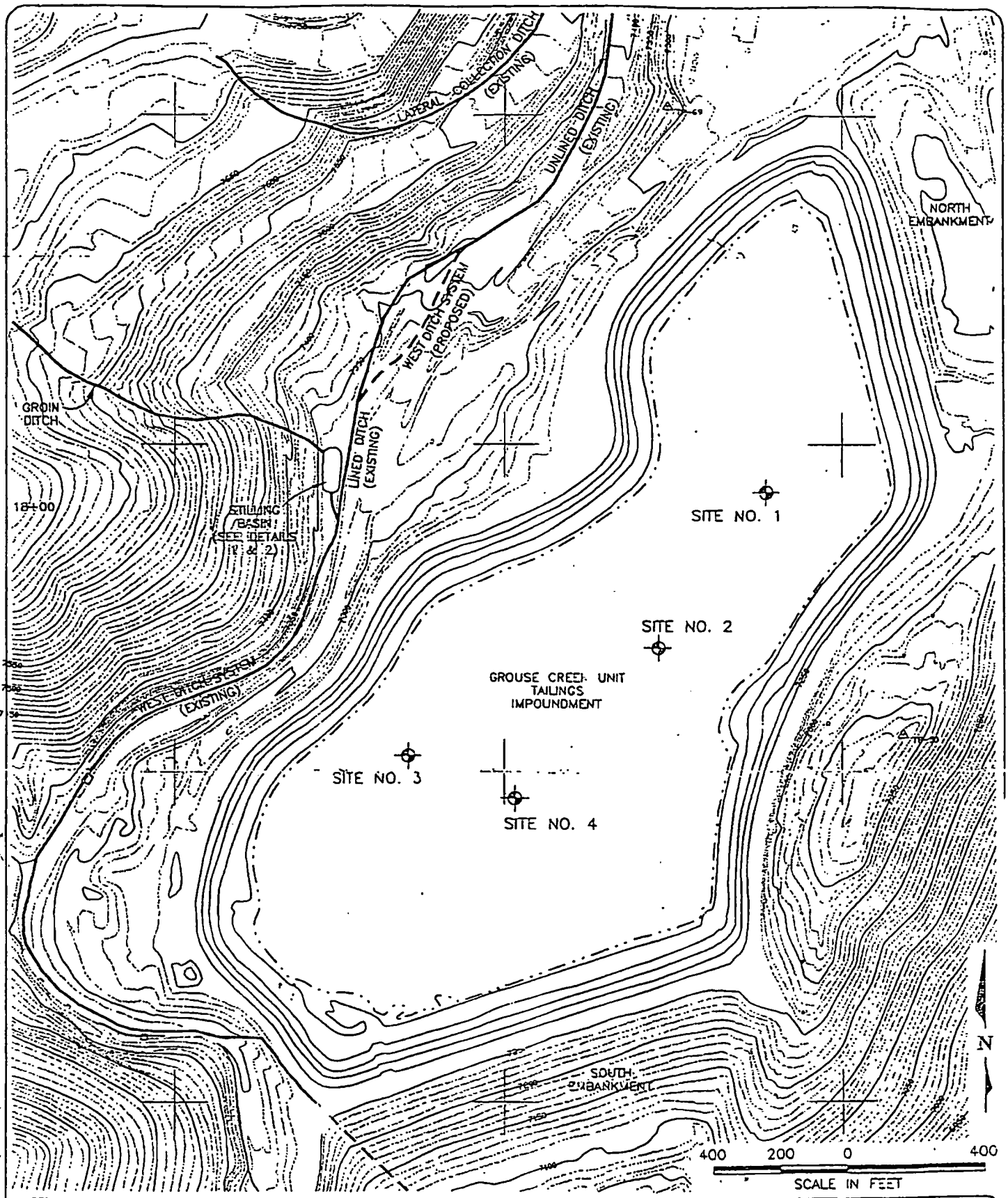
Parameter	Units	Tailings Solid Sample						
		HGCT-1	HGCT-2	HGCT-3	HGCT-4	HGCT-5	HGCT-6	HGCT-7
Acid Generation Potential (*calc*)	tons/KT	5	6	10	4	5	7	7
Acid Neutralization Potential (*calc*)	tons/KT	2	3	2	2	1	2	2
Acid-Base Potential (*calc*)	tons/KT	-3	-3	-8	-2	-4	-5	-5
Neutralization Potenial as $CaCO_3$	%	0.2	0.3	0.2	0.2	0.1	0.2	0.2
Sulfur Forms								
Total Sulfur	%	0.20	0.22	0.36	0.18	0.21	0.25	0.26
Sulfate Sulfur (*HCl extractable*)	%	0.03	0.04	0.03	0.04	0.06	0.02	0.04
Sulfide Sulfur (*Total-Sulfate*)	%	0.17	0.18	0.33	0.14	0.15	0.23	0.22

		Mean	*Minimum*	*Maximum*	*StdDev.*	*Variance*
Acid Generation Potential (*calc*)	tons/KT	6.3	4	10	2.0	3.9
Acid Neutralization Potential (*calc*)	tons/KT	2.0	1	3	0.6	0.3
Acid-Base Potential (*calc*)	tons/KT	-4.3	-8	-2	2.0	3.9
Neutralization Potential as $CaCO_3$	%	0.2	0.1	0.3	0.1	0.0
Sulfur Forms						
Total Sulfur	%	0.24	0.18	0.36	0.06	0.00
Sulfate Sulfur (*HCl extractable*)	%	0.04	0.02	0.06	0.01	0.00
Sulfide Sulfur (*Total-Sulfate*)	%	0.20	0.14	0.33	0.07	0.00

TABLE 4.1
ECOLOGICAL BENCHMARKS FOR AQUATIC TOXICITY
Hecla Mining Company - Grouse Creek Unit
Stanley, Idaho

Parameter	Unit	Acute	Chronic
Metals Analysis			
Aluminum	mg/L	0.75 [1]	0.09 [1]
Antimony	mg/L	0.18 [3]	0.030 [3]
Arsenic (III)	mg/L	0.36 [1]	0.19 [1]
Barium	mg/L	0.110 [3]	0.004 [3]
Beryllium	mg/L	0.035 [3]	0.00066 [3]
Bismuth	mg/L	– [4]	– [4]
Boron	mg/L	0.030 [3]	0.0016 [3]
Cadmium	mg/L	0.0039 [1,2]	0.0011 [1]
Calcium	mg/L	– [4]	– [4]
Chromium (III)	mg/L	1.7 [1,2]	0.21 [1]
Cobalt	mg/L	1.5 [3]	0.023 [3]
Copper	mg/L	0.018 [1,2]	0.012 [1]
Gallium	mg/L	– [4]	– [4]
Iron	mg/L	– [4]	1.0 [1]
Lead	mg/L	0.082 [1,2]	0.0032 [1]
Lithium	mg/L	0.260 [3]	0.014 [3]
Magnesium	mg/L	– [4]	– [4]
Manganese	mg/L	2.30 [3]	0.120 [3]
Mercury	mg/L	0.0024 [1]	0.0013 [3]
Molybdenum	mg/L	16.0 [3]	0.370 [3]
Nickel	mg/L	1.4 [1,2]	0.16 [1]
Potassium	mg/L	– [4]	– [4]
Scandium	mg/L	– [4]	– [4]
Selenium	mg/L	0.02 [1]	0.005 [1]
Silver	mg/L	0.0041 [1,2]	0.00036 [3]
Sodium	mg/L	– [4]	– [4]
Strontium	mg/L	15.0 [3]	1.50 [3]
Thallium	mg/L	0.110 [3]	0.012 [3]
Tin	mg/L	2.7 [3]	0.073 [3]
Titanium	mg/L	– [4]	– [4]
Vanadium	mg/L	0.280 [3]	0.020 [3]
Zinc	mg/L	0.120 [1,2]	0.110 [1]
Cyanide, Total	mg/L	0.022 [1]	0.0052 [1]

1 USEPA National Ambient Water Quality Criteria (NAWQC).
2 Acute NAWQC are a function of water hardness and water effects ratio (WER). Values listed based on hardness of 100 mg/L and WER of 1.0.
3 Tier 2 Seconday values developed according to EPA's Proposed Water Quality Guidance for the Great Lakes System (1993).
4 Not covered by either NAWQC or Tier 2 Seconday systems.



STEFFEN ROBERTSON & KIRSTEN (U.S.)
Consulting Engineers & Scientists

PROJECT NO.	DATE	REVISION
22209	06/97	A

FIGURE 2.1

HECLA MINING CO.
MARCH 1997 TAILINGS SAMPLING LOCATIONS

• STA.#3 • M:\0222\22209\06-97\FIG02-1.DWG • JUN 04, 1997 • 10:37:37 AM •

APPENDIX A

MEMORANDUM "GROUSE CREEK TAILINGS SAMPLING (FIELD REPORT)"

MEMORANDUM

TO: GENE MULLER

FROM: KENT PETER

DATE: MARCH 26, 1997

SUBJECT: GROUSE CREEK TAILINGS SAMPLING (FIELD REPORT)

The following report summarizes field activities, observations and sample shipments.

MARCH 18, 1997
Travel from Denver to Stanley, Idaho

MARCH 19, 1997
Mathew Culpo and I left Stanley at 07:30 and arrived at Grouse Creek at approximately 08:30. Met with Mr. Eric Lancaster with Hecla Mining. We were required to attend a short site specific safety training meeting prior to working at the site. The first couple of hours were spent rounding up equipment and supplies and transporting them to the tailings impoundment.

SAMPLING SITE NO. 2
At approximately 10:30 we began setting casing at sampling location No.2. The three inch diameter PVC casing was pushed very easy by hand to a depth of 55 ft. The measured depth to tailings from the "working surface" was approximately 14 ft. From pushing the PVC casing, it appears that the tailings are unconsolidated and very soft. In total, 22 samples were obtained from this location. Samples were obtained either by the "Butterfly" sampler, or by bailer. All samples were either placed in baggies (bailer samples) or obtained in the plastic tube liners (butterfly sampler). It was noted during sampling that the level of the tailings remained approximately the same, which indicated that tailings were flowing up into the PVC casing from the bottom. An attempt was made to push more casing to seal the flow, but it was not successful.

At approximately 11:45, called Gene Muller to advise him of the progress and conditions. After the conversation, we proceeded back to finish with hole No.2.

After Hole No. 2 was completed, we packed all equipment and samples back to shore. We left the site at 16:30 and arrived back in Stanley at 17:25. I unpacked all samples obtained today and re-organized sampling equipment.

MARCH 20, 1997
Left Stanley at 06:15 and arrived Grouse Creek at 07:00. Met with Eric to discuss the program for the day.

SAMPLING SITE NO. 1
Ran 3" PVC casing to 55 ft. very easy by hand. Pushed slightly harder from 50-55 ft. The measured tailings level below the working surface was 29 ft. The butterfly sampler did not obtain suitable samples, so a bailer was used to obtain the samples. Obtained nine (9) bag samples. Tailings at this site seamed to be much softer than at site No.2. Completed sampling at site No.1 and packed all equipment and samples back to the shore.

Made a call to Rob Dorey at 10:45 to discuss the sampling program to date and the remaining work. With the conditions encountered, we were to proceed with sites No.3 and 4 in the same manner. Rob requested that all samples be shipped back to Denver for review prior to shipment to ACZ Labs.

Due to relatively unsafe conditions on the pond, we left the site. Sampling of sites No. 3 and 4 to be performed early on Friday morning as the pond would be frozen harder.

Spent a couple hours at the motel packing samples for shipment and reporting.

MARCH 21, 1997
Left Stanley at 06:00 arrive mine site 06:50.
SAMPLING SITE NO. 3
Packed equipment and supplies to site No. 3. Ran 3" PVC casing to 60 ft. very easy by hand. The measured tailings level below the working surface was 14 ft. A total of 22 samples were taken at site No.3,by a combination of bailer and the butterfly sampler. The tailings level remained the same throughout sampling, at 14 ft. Moved to site No. 4.
SAMPLING SITE NO. 4
Ran 53 ft. of 3" PVC casing at site No.4. From 45 ft. to 53 ft., the tailings were somewhat denser. The tailings level below the working surface was 13.5 ft. Samples were obtained in the same manner as site No.3. A total of 22 samples were obtained.

Completed the sampling at approximately 10:50. Packed all equipment and samples to shore and loaded the vehicle.

Went to Hecla's office to review sampling program with Eric Lancaster. Left the mine site at approximately 11:45. Arrived Stanley at 12:30 and began preparing all samples and equipment for shipment to Denver. Traveled to Arco, Idaho for the night.

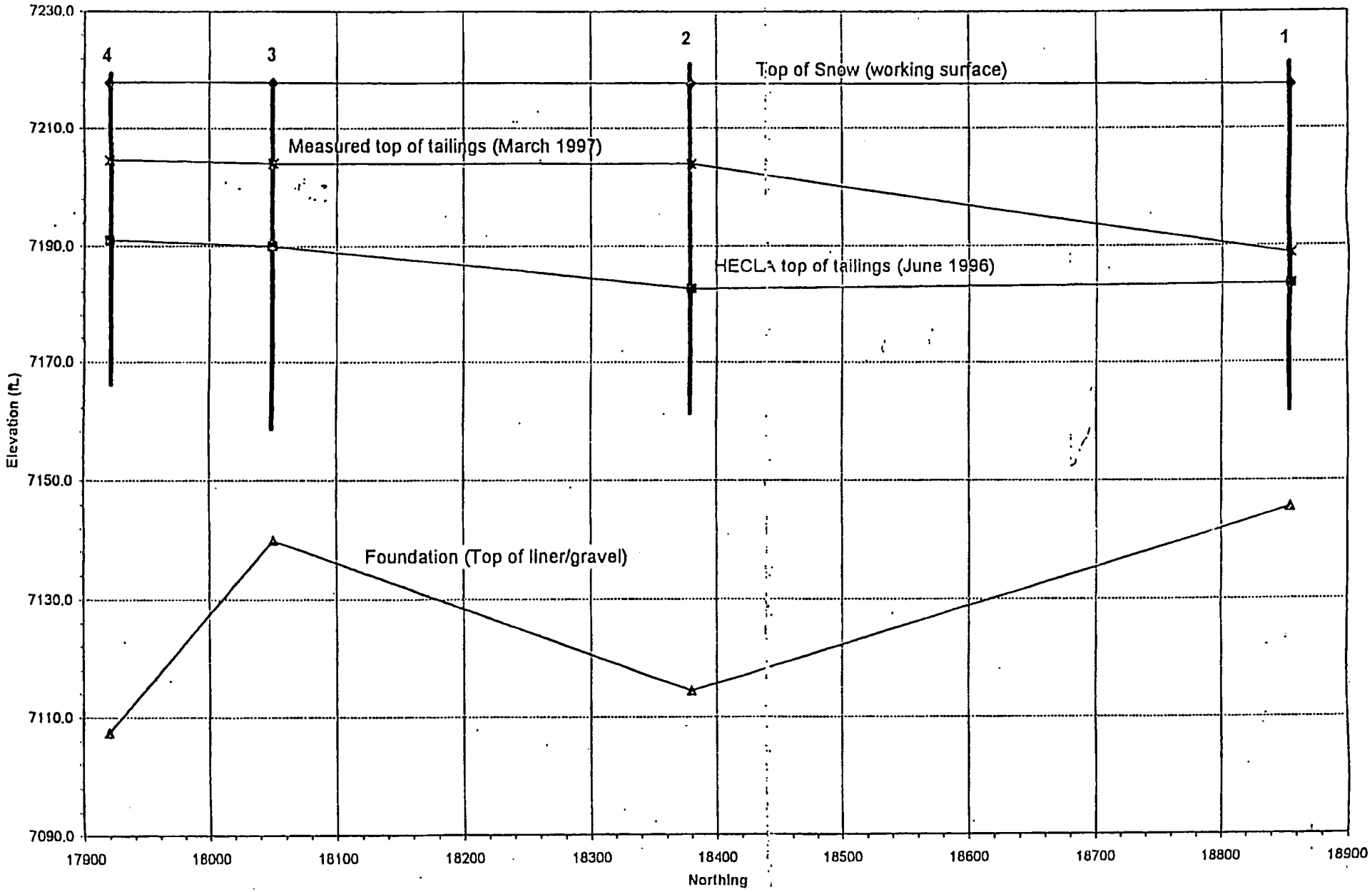
MARCH 22, 1997
Traveled to Idaho Falls, Idaho, returned rented equipment and shipped all samples to SRK's lab. Traveled from Idaho Falls to Denver. Arrive Denver at 19:30.

MARCH 25, 1997
Met with Rob Dorey at the SRK laboratory for sample review and selection for shipment to ACZ Labs. Attached to this report is a list of samples selected for testing.

MARCH 26, 1997
All selected samples were shipped via Fed Ex to ACZ Labs.

MARCH 27, 1997
Received survey information from Eric Lancaster. Prepared profiles showing surface elevations, tailings elevations at each site, and Hecla tailings elevations. These profiles are attached. Note that the actual depth to tailings varied considerably from the contour plan provided by Hecla. Figure No.1 presents sampling locations.

GROUSE CREEK SAMPLING PROGRAM

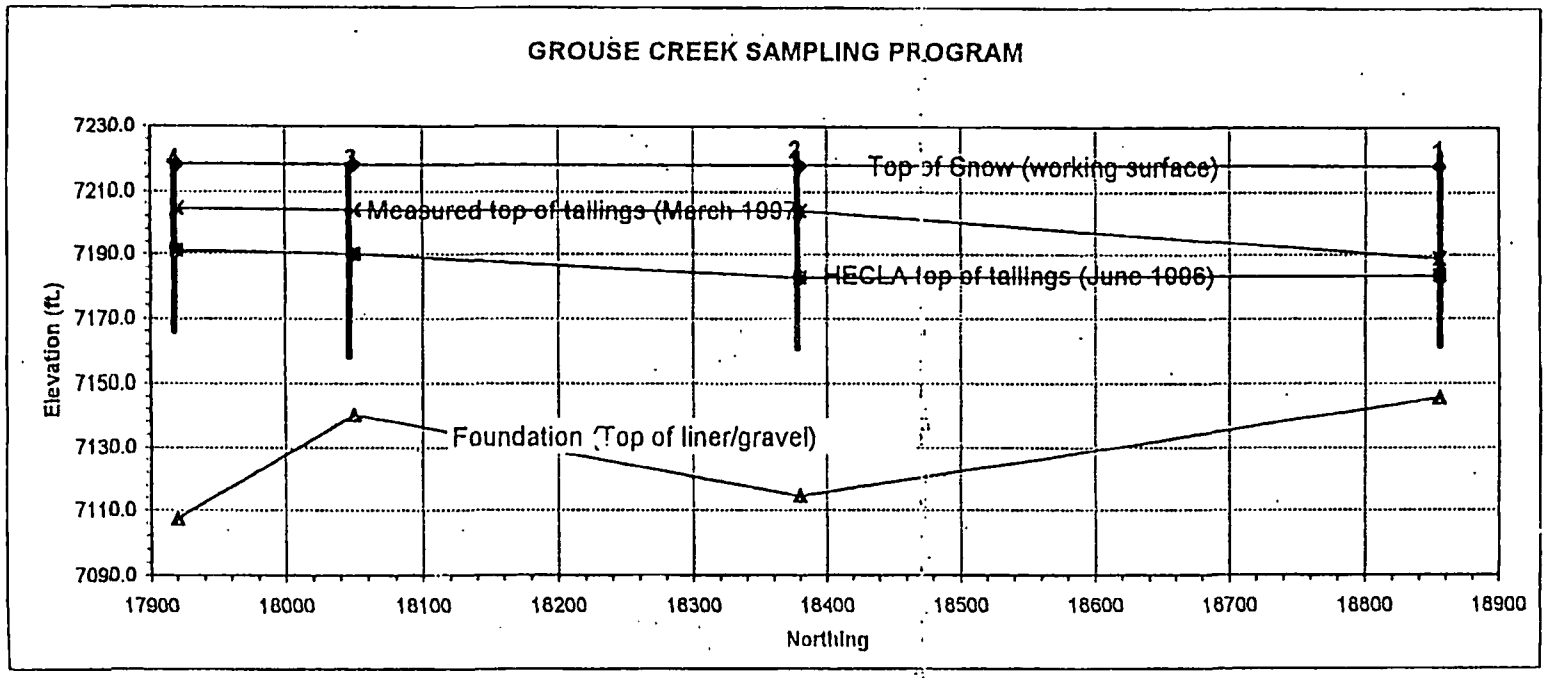


GROUSE CREEK
Sampling of Mine Tails

Hole No.	Surveyed Location Northing	Surveyed Location Easting	Surveyed Top of Snow Elevation	Extrapolated values from base map: Bottom of Tails Elev.	Depth of Tails (ft.)	Top of Tails Elevation	Top of Snow to Top of Tails (ft.)	Measured Depth to Top of Tails (ft.)	Top of Tails Elev. (measured)
1	18855	3772	7217.8	7145.5	38.0	7183.5	34.3	29	7188.8
2	18380	3450	7217.9	7114.5	68.0	7182.5	35.4	14	7203.9
3	18050	2700	7218.0	7140.0	50.0	7190.0	28.0	14	7204.0
4	17920	3030	7218.0	7107.5	83.5	7191.0	27.0	13.5	7204.5

South to North

Northing	Top of Snow Elevation	Top of Tails Elevation	Bottom of Tails Elev.	Measured Top of Tails	Hole No.	Feet of Casing pushed below surface	Bottom of Casing Elev.
18855	7217.8	7183.5	7145.5	7188.8	1	55	7162.8
18380	7217.9	7182.5	7114.5	7203.9	2	55	7162.9
18050	7218.0	7190.0	7140.0	7204	3	60	7158.0
17920	7218.0	7191.0	7107.5	7204.5	4	53	7165.0



GROUSE CREEK SAMPLES SELECTED FOR TESTING

HOLE NO.	SAMPLE N0.	TO ACZ	SRK LAB
1	2-6	X	
1	7		X
2	1-5	X	
2	6		X
2	7,8,9,12,15 & 18	X	
3	1-4	X	
3	10-16	X	
3	17-19		X
4	1-8	X	
4	12-17	X	
4	18-20		X

SAMPLES SENT TO ACZ WERE SENT IN GROUPS. ALL SAMPLES WITHIN A GROUP WILL BE COMPOSITED. THERE ARE 7 GROUPS. THERE WILL BE A TOTAL OF 7 SAMPLES TESTED.

CHAIN OF CUSTODY RECORD

Laboratory Sample Numbers (ACZ only):

COC # 237

ACZ Laboratories, Inc.
30400 Downhill Drive
Steamboat Springs, CO 80487
(970) 879-6590 • (800) 334-5493

Name to Appear on Report and Invoice:
Steffen Robertson & Kirsten
7175 West Jefferson Ave Suite 300
LAKEWOOD, CO
Attn: Gene Muller Tel:

cc: (Report) - (Invoice) to: (circle one or both)
Attn: Tel:

Project or P.O. #
GROUSE CREEK
22209

Shipped Via: FED X ✓ UPS ___ Hand ___ Other ___

ANALYSES REQUESTED: CALL GENE MULLER AT SRK

SAMPLE IDENTIFICATION	DATE	TIME	Sample Matrix *	# of CONTAINERS										REMARKS
HOLE 1 Samples 2-6	3/26/97		FAILS											*
HOLE 2 SAMPLES 1-5	"		"											*
HOLES 2 SAMPLES 7, 8, 9, 12, 15 & 18	"		"											*
HOLE 3 SAMPLES 10-16	"		"											*
HOLE 4 SAMPLES 12-17	"		"											*

* Matrix Options: SW (Surface water) • GW (Ground water) • WW (Wastewater) • DW (Drinking water) • SL (Sludge) • SOIL • OIL • Other (Specify)

SAMPLE DISPOSAL OPTIONS - *Please complete section A, or choose one option from sections B AND C. Proper charges will be assessed.*

(A) Long-term storage
Hold until _____ (date)
for future analysis.

(B) If Sample Is Non-Hazardous
1) Local Disposal
2) RCRA - Permitted Facility
3) Return to Client

(C) If Sample Is Hazardous
1) RCRA-Permitted Facility
2) Return to Client

COMMENTS
* ALL GROUPS OF SAMPLES TO BE COMPOSITED FOR TEST SAMPLE. 5 TOTAL SAMPLES THIS SHEET

RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME	PAGE #
H. Kirst Peter	3/26/97	09:30				___ OF ___

White - Return w/ sample Yellow - Return w/ sample Pink - Return w/ sample Gold - Keep for your records

Cl... 'STOD' RECORD | Lora Samp umb C | C | 38

ACZ Laboratories, Inc.
30400 Downhill Drive
Steamboat Springs, CO 80487
(970) 879-6590 • (800) 334-5493

Name to Appear on Report and Invoice:
Steffen Robertson & Kirsten
7175 West Jefferson Ave Suite 3000
LAKEWOOD, CO 80235
Attn: Gene Mueller Tel: 303-985-1333

cc: (Report) - (Invoice) to: (circle one or both)
Attn: Tel:

Project or P.O. #
GROUSE CREEK
22209

Shipped Via: FED X ✓ UPS ___ Hand ___ Other ___

SAMPLE IDENTIFICATION	DATE	TIME	Sample Matrix *	# of CONTAINERS	CALC	GENE	MILLER	AT			REMARKS
HOLE 3 SAMPLES	3/26/97		TAILS								
1-4											
Hole 4 SAMPLES	3/26/97		TAILS								
1-8											

ANALYSES REQUESTED: SR K

* Matrix Options: SW (Surface water) • GW (Ground water) • WW (Wastewater) • DW (Drinking water) • SL (Sludge) • SOIL • OIL • Other (Specify)

SAMPLE DISPOSAL OPTIONS - *Please complete section A, or choose one option from sections B AND C. Proper charges will be assessed.*

(A) Long-term storage
Hold until _____(date)
for future analysis.

(B) If Sample Is Non-Hazardous
1) Local Disposal
2) RCRA - Permitted Facility
3) Return to Client

(C) If Sample Is Hazardous
1) RCRA-Permitted Facility
2) Return to Client

COMMENTS
GROUPS OF SAMPLES TO BE COMPOSITED

RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME	PAGE #
H. Kent Pate	3/26/97	09:30				1 OF 1

White - Return w/ sample Yellow - Return w/ sample Pink - Return w/ sample Gold - Keep for your records

APPENDIX B

RINSING PROTOCOL Ph AND CONDUCTIVITY DATA

ORIGINAL

ACZ Laboratories, Inc.

May 8, 1997

Mr. Gene Muller
Stephen, Robertson & Kirsten
7175 W. Jefferson Ave., Suite 3000
Lakewood, CO 80235

RE: Case Narrative - SRK Inc. / Hecla Grouse Creek

Dear Mr. Muller:

ACZ Laboratories received several tailings samples from the Hecla Grouse Creek operation on March 31, 1997. As instructed in your "Request For Testing" letter, the samples were composited into seven different samples (HGCT1-7). Chain of Custody documentation accompanied the samples and no major problems were encountered during shipment and receipt of the samples.

The samples were then logged into ACZ's Laboratory Information Management System (LIMS) and assigned project numbers. These samples were logged in as seven (7) distinct batches and have the login project numbers L13221, L13222, L13223, L13224, L13225, L13226 & L13227. Each project represents a different tailings composite. Following is a brief summary of the analytical protocol for each sample within each project. I have also attached a database summary relating SRK/Grouse Creek sample identification to ACZ laboratory numbers.

- -01 initial pressure filtration through 0.45 micron filter to separate tailings liquids from solids.
- -02 filtrate (tailings liquids) generate in -01; analyzed for parameters on Attachment B from request for testing letter
- -03 rinsed solids , as specified in request for testing; see attached documentation for rinse water target pH & conductivity's. Samples were then run for a modified 1312 for Attachment A analytes, total metals and acid base accounting (ABA), or only ABA.
- -04 unrinsed solids sample run for same modified 1312 scope as above.

Please reference the aforementioned letter regarding which tailings needed each particular set of analysis. Not all tailings have all 4 sub-samples analyzed. All analysis was performed using EPA methods from Methods for Chemical Analysis of Water and Wastes, EPA 600/4-79-020, 1983 or equivalent procedures.

Items of Note:

Please reference individual analytical reports for Quality control anomalies.

If you have any questions please do not hesitate to call me at (800) 334-5493.

Sincerely,

S. Habermehl

Scott Habermehl
Project Manager

30400 Downhill Drive
Steamboat Springs, CO 80487-9400

Phone (800) 334-5493
FAX No. (970) 879-2216

ACCTNUM	MATNUM	SAMPLENUM	CLIENTID	COLLECTDATE	RECEIVEDATE	INVOICENUM
SRK-CO	SO	L13221-01	HGCT-1	26-Mar-97	31-Mar-97	11803
SRK-CO	LE	L13221-02	HGCT-1 Liquid	26-Mar-97	31-Mar-97	11803
SRK-CO	SO	L13221-03	HGCT-1 Solid Rinsed	26-Mar-97	31-Mar-97	11803
SRK-CO	SO	L13221-04	HGCT-1 Unrinsd Solid	26-Mar-97	31-Mar-97	11803
SRK-CO	SO	L13222-01	HGCT-2	26-Mar-97	31-Mar-97	11791
SRK-CO	SO	L13222-03	HGCT-2 Solid Rinsed	26-Mar-97	31-Mar-97	11791
SRK-CO	SO	L13223-01	HGCT-3	26-Mar-97	31-Mar-97	11792
SRK-CO	LE	L13223-02	HGCT-3 Liquid	26-Mar-97	31-Mar-97	11792
SRK-CO	SO	L13223-03	HGCT-3 Solid Rinsed	26-Mar-97	31-Mar-97	11792
SRK-CO	SO	L13224-01	HGCT-4	26-Mar-97	31-Mar-97	11793
SRK-CO	SO	L13224-03	HGCT-4 Solid Rinsed	26-Mar-97	31-Mar-97	11793
SRK-CO	SO	L13225-01	HGCT-5	26-Mar-97	31-Mar-97	11794
SRK-CO	LE	L13225-02	HGCT-5 Liquid	26-Mar-97	31-Mar-97	11794
SRK-CO	SO	L13225-03	HGCT-5 Solid Rinsed	26-Mar-97	31-Mar-97	11794
SRK-CO	SO	L13226-01	GGCT-6	26-Mar-97	31-Mar-97	11795
SRK-CO	LE	L 226-02	GGCT-6 Liquid	26-Mar-97	31-Mar-97	11795
SRK-CO	SO	L13226-03	GGCT-6 Solid Rinsed	26-Mar-97	31-Mar-97	11795
SRK-CO	SO	L13226-04	GGCT-6 Unrinsd Solid	26-Mar-97	31-Mar-97	11795
SRK-CO	SO	L13227-01	HGCT-7	26-Mar-97	31-Mar-97	11796
SRK-CO	SO	L13227-03	HGCT-7 Solid Rinsed	26-Mar-97	31-Mar-97	11796

STEFFEN ROBERTSON AND KIRSTEN
Consulting Engineers and Scientists

March 31, 1997
SRK Project No. 22209

ACZ Laboratories
30400 Downhill Drive
Steamboat Springs, Colorado 80487

Attention: Scott Habermill

RE: REQUEST FOR TESTING

A series of tailings samples will be shipped to ACZ from the Hecla Mining Company/ SRK, from the Grouse Creek Mine in Sunbeam, Idaho. The shipment consists of a series of individual samples that will be composited by ACZ. All samples will be saturated tailings that will require pressure filtration to separate the liquid and solids fractions. Testing will be conducted on selected liquid and solids samples, however, all samples should be filtered and preserved should testing of the remaining liquid be required.

SAMPLE COMPOSITING

The following samples will be received which should be composited by ACZ according to the following list:

Hole No.	Samples	Composite
1	2 - 6	HGCT 1
2	1 - 5	HGCT 2
2	7,8,9,12,15 & 18	HGCT 3
3	1 - 4	HGCT 4
3	10 - 16	HGCT 5
4	1 - 8	HGCT 6
4	12 - 17	HGCT 7

In presenting test results, please refer to the composite samples number assigned above. Solids should be referred to as HGCT-1 solids and liquids as HGCT-1 liquid.

Steffen Robertson and Kirsten (U.S.), Inc.
7175 W. Jefferson Avenue, Suite 3000, Lakewood, Colorado 80235
Tel. (303) 985-1333 Facsimile (303) 985-9947
Other offices in: U.S.A., Canada, United Kingdom, Africa, South America and Australia

SOLIDS HANDLING

Filtration

All samples should be subjected to pressure filtration to separate the liquid and solids fractions. A 0.45 micron filter should be used during pressure filtration. Following filtration, all solids samples should be air dried and stored in sealed containers in a cool environment.

Rinsing

Following filtration, approximately 200 grams of tailings solids from each sample will be rinsed in a batch type procedure with deionized water until the pH and specific conductance have stabilized. Rinsing will be accomplished by mixing each sample with deionized water at a ratio of 2:1 liquid to solids, followed by drainage and collection of the rinse water. Should additional rinsed solids be required to complete the defined testing, the volume of materials subjected to rinsing may be increased. The laboratory will record the pH and conductivity following each rinse cycle. A rinse water target conductivity of less than 100 µS and stable pH will be assumed for adequate rinsing of the tailings solids.

At the completion of rinsing, the tailings solids will be air dried. Subsamples will be spilt for the analyses described below. All rinsed solids in excess of those required for the defined testing program will be stored in a dark, cool environment in sealed, zero head space containers for future testing, as required.

SOLIDS ANALYSIS

Modified Method 1312 Leach Test

Samples of rinsed solids from composite samples HGCT-1, 3, 5 and 6 will be subjected to a modified method 1312 leach test. The test should include a 2:1 liquid to solids ratio, with deionized water adjusted with HCl to a pH of 4.5 as the leaching agent. The unrinsed solids from samples HGCT-1 and 6 should be subjected to the modified method 1312 leaching procedure.

Analytes for the modified method 1312 leach tests are listed in Attachment 1A.

Total Metals Analysis

The rinsed solids samples (samples HGCT -1, 3, 5 and 6) should be subjected to a Method 3050 or 3051 digestion and analyzed for the metals listed on Attachment 1A under total metals assay.

Acid Base Accounting

Samples of the rinsed solids from all composite solids samples should be subjected to analysis for total sulfur, neutralizing potential, and sulfate sulfur (HCL extractable) content.

LIQUIDS HANDLING

The liquid samples derived from composite samples HGC-1, 3, 5 and 6 will be tested for parameters listed in Attachment 1B. Liquid extracted from the remaining solids samples should be preserved and stored as required to enable future testing for the listed parameters if deemed necessary. Additional testing requirements will be assessed after completion of the work defined above.

If you have any questions concerning this request for testing, please contact Gene Muller or Rob Dorey at SRK.

Yours truly,

STEFFEN ROBERTSON AND KIRSTEN (U.S.), INC.

Gene Muller for Rob Dorey

Rob Dorey
Corporate Consultant

Gm/arb

ATTACHMENT 1A
PARAMETERS FOR TAILINGS *SOLIDS* ANALYSES
Hecla Mining Company - Grouse Creek Unit
Stanley, Idaho

Acid-Base Accounting Analyses

Sulfur *Total*
Sulfur *Sulfate(SO4)*
Neutralizing Potential (*NP*)

Total Metals Assay

Preparation
Digestion
Aluminum
Antimony[1]
Arsenic[1]
Barium
Bismuth
Beryllium
Boron
Cadmium[4]
Calcium
Chromium, Total
Cobalt
Copper
Gallium
Iron
Lead[4]
Lithium
Magnesium
Manganese
Mercury[2]
Molybdenum
Nickel
Potassium
Scandium
Selenium[3]
Silver
Sodium
Strontium
Thallium[1]
Tin
Titanium
Vanadium

Zinc

Modified EPA Method 1312 Leach

Preparation
Aluminum
Antimony[1]
Arsenic[1]
Barium
Bismuth
Beryllium
Boron
Cadmium[4]
Calcium
Chromium, Total
Cobalt
Copper
Gallium
Iron
Lead[4]
Lithium
Magnesium
Manganese
Mercury[2]
Molybdenum
Nickel
Potassium
Scandium
Selenium[3]
Silver
Sodium
Strontium
Thallium[1]
Tin
Titanium
Vanadium
Zinc

Acidity
Alkalinity, Bicarbonates
Alkalinity, Carbonates
Alkalinity, Hydroxide
Alkalinity, Total
Chloride
Fluoride
Nitrogen, Ammonia
Nitrogen, Nitrate
Nitrogen, Nitrate/Nitrite
Nitrogen, Nitrite
pH
Cyanide, WAD
Cyanide, Total
CNO
Phosphorous, ortho
Phosphorous, Total P
Specific Conductance
Sulfate
TDS
TSS

Notes:
[1] 7000 series ICP
[2] Cold vapor
[3] Hydride metals
[4] GFAA
All other metals by 6000 series ICP

ATTACHMENT 1B
PARAMETERS FOR TAILINGS *LIQUIDS* ANALYSES
Hecla Mining Company - Grouse Creek Unit, Stanley, Idaho

Tailings Pore Water Analysis

General Chemistry:

- Bicarbonate as $CaCO_3$
- Carbonate as $CaCO_3$
- Hydroxide as $CaCO_3$
- Total Alkalinity
- Chloride
- Conductivity @25 °C
- Cyanide, *total*
- Cyanide, *WAD*
- CNO
- Ammonia
- Nitrate as N, *dissolved*
- Nitrate/Nitrite as N, *dissolved*
- Nitrite as N, *dissolved*
- pH (lab)
- Residue, Filterable (*TDS*) @180 °C
- Sulfate
- TDS (calculated)
- Thiocyanate (*SCN*)

Metals (Dissolved):

- Aluminum
- Antimony[1]
- Arsenic[1]
- Barium
- Bismuth
- Beryllium
- Boron
- Cadmium[4]
- Calcium
- Chromium, Total
- Cobalt
- Copper
- Gallium
- Iron
- Lead[4]
- Lithium
- Magnesium
- Manganese
- Mercury[2]
- Molybdenum
- Nickel
- Potassium
- Scandium
- Selenium[3]
- Silver
- Sodium
- Strontium
- Thallium[1]
- Tin
- Titanium
- Vanadium
- Zinc

Notes:

1 ~~7000 series ICP~~ GF
2 Cold vapor
3 Hydride metals
4 GFAA
All other metals by 6000 series ICP

LABORATORIES, INC.

ytical Method: RINSING SRK

d Reference:

Analyst: AS/TW

Date: 4-14-97

Start Time:

End Time: 4-16-97

Project:

SDG#:

SOP#:

Instr:

Approved:

Approved:

#	Lab No.	Sample ID Sample gms	I H_2O vol ml	pH	uS/cm EC	Date	
	13221	700 gms	1400 ml	8.8	680.	4-14-97	
				8.8	165.3	4-15-97	
				8.8	78.5	4-16-97	
10	13223	700	1400	8.6	549.	4-14-97	
				8.6	158.8	4-15-97	
				8.6	82.5	4-16-97	
13							
14							
20	13225	1400 gms	2800 ml	8.9	518	4-15-97	
				8.9	134.8	4-16-97	
22							
23							
25							
26							
27							
28							
29							
30	13226	700	1400	8.6	581.	4-14-97	
31				8.6	180.7	4-15-97	
32				NA	NA	4-16-97	
33							
34							
35							
36							
37							
38							
39							

LABORATORIES, INC.
lytical Method: Rinsing SRK
thod Reference:

Analyst: AS
Date: 4-17-97
Start Time:
End Time: 4-17-97

Project:
SDG#:
SOP#:

Instr:

Approved:
Approved:

#	Lab No.	Sample ID Sample gms	I H2O Vol ml	pH	uS/cm EC	Date	
1	13227	200	400	8.4	656.	4-17-97	
2	2ND RINSE	200	400	8.5	191.	4-17-97	
3							
4							
5							
6							
7							
8							
9							
10	13224	200	400	8.2	634.	4-17-97	
11	2ND RINSE	200	400	8.7	181.	4-17-97	
12							
13							
14							
15							
16							
17							
18							
19							
20	13227	200	400	8.6	529	4-17-97	
21				8.6	167.9	4-17-97	
22							
23							
24							
25							
26							
27							
28							
29							
30							
31							
32							
33							
34							
35							
36							
37							
38							
39							
40							

APPENDIX C

DATA SHEETS FOR ANALYTICAL TEST RESULTS

ACZ

ORIGINAL

Analytical Results

ACZ Laboratories, Inc.
30400 Downhill Drive
Steamboat Springs, CO 80487
(800) 334-5493

Lab Sample ID: *L13227-01*
Client Sample ID: *HGCT-7*
Client Project ID: *Grouse Creek 22209*
ACZ Report ID: *RG42271*

Steffen Robertson & Kirsten
7175 W. Jefferson Ave. Suite 3000
Lakewood, CO 80235
Gene Muller

Date Sampled: *3/26/97 00:00*
Date Received: *3/31/97*
Date Reported: *4/29/97*

Sample Matrix: *Soil*

Soil Preparation

Parameter	Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972						4/10/97	as
Pressure Filter, 0.45um	***						4/4/97	as/tw

Interpretive Qualifiers (Based on CLP CLP-3/90)

U = Analyte was analyzed for but not detected at the indicated MDL

B = Analyte concentration detected at a value between MDL and PQL

PQL = Practical Quantitation Limit

RV Poulsen

Vice President of Operations: Ralph Poulsen

ACZ

Analytical Results

ACZ Laboratories, Inc.
30400 Downhill Drive
Steamboat Springs, CO 80487
(800) 334-5493

Lab Sample ID: *L13227-03*
Client Sample ID: *HGCT-7 Solid Rinsed*
Client Project ID: *Grouse Creek 22209*
ACZ Report ID: *RG42272*

Steffen Robertson & Kirsten
7175 W. Jefferson Ave. Suite 3000
Lakewood, CO 80235
Gene Muller

Date Sampled: *3/26/97 00:00*
Date Received: *3/31/97*
Date Reported: *4/29/97*

Sample Matrix: *Soil*

Soil Analysis

Parameter	EPA Method	Result	Flag	Units	MDL	PQL	Date	Analyst
Acid Generation Potential (calc)	M600/2-78-054 1.3	7		tons/KT	1	5	4/22/97	as
Acid Neutralization Potential (calc)	M600/2-78-054 1.3	2	B	tons/KT	1	5	4/22/97	as
Acid-Base Potential (calc)	M600/2-78-054 1.3	-5		tons/KT	1	5	4/22/97	as
Neutralization Potential as CaCO3	M600/2-78-054 3.2.3	0.2	B	%	0.1	0.5	4/22/97	sw
Sulfur Forms	M600/2-78-054 3.2.4							
Sulfur Sulfate (HCl extractable)		0.04	B	%	0.01	0.1	4/22/97	as
Sulfur Sulfide (residual)		0.22		%	0.01	0.1	4/22/97	as
Sulfur Total		0.26		%	0.01	0.1	4/22/97	as

Note: As requested the Acid-Base Accounting calculations are based on the Sulfur Sulfide (residual) value.

Footnote Qualifiers (based on EPA Code 1-70)

U = Analyte was analyzed for but not detected at the indicated MDL

B = Analyte concentration detected at a value between MDL and PQL

PQL = Practical Quantitation Limit

RPoulsen

Vice President of Operations: Ralph Poulsen

ACZ

Analytical Results

ACZ Laboratories, Inc.
30400 Downhill Drive
Steamboat Springs, CO 80487
(800) 334-5493

Lab Sample ID: *L13227-03*
Client Sample ID: *HGCT-7 Solid Rinsed*
Client Project ID: *Grouse Creek 22209*
ACZ Report ID: *RG42272*

Steffen Robertson & Kirsten
7175 W. Jefferson Ave. Suite 3000
Lakewood, CO 80235
Gene Muller

Date Sampled: *3/26/97 00:00*
Date Received: *3/31/97*
Date Reported: *4/29/97*

Sample Matrix: *Soil*

Soil Analysis

Parameter	Test Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Acid Generation Potential (calc)	M600/2-78-054 1.3	7		tons/KT	1	5	4/22/97	as
Acid Neutralization Potential (calc)	M600/2-78-054 1.3	2	B	tons/KT	1	5	4/22/97	as
Acid-Base Potential (calc)	M600/2-78-054 1.3	-5		tons/KT	1	5	4/22/97	as
Neutralization Potential as CaCO3	M600/2-78-054 3.2.3	0.2	B	%	0.1	0.5	4/22/97	sw
Sulfur Forms	M600/2-78-054 3.2.4							
Sulfur Sulfate (HCl extractable)		0.04	B	%	0.01	0.1	4/22/97	as
Sulfur Sulfide (residual)		0.22		%	0.01	0.1	4/22/97	as
Sulfur Total		0.26		%	0.01	0.1	4/22/97	as

Note: As requested the Acid-Base Accounting calculations are based on the Sulfur Sulfide (residual) value.

Laboratory Qualifiers (Reported on Page 2 of 3)

U = Analyte was analyzed for but not detected at the indicated MDL

B = Analyte concentration detected at a value between MDL and PQL

PQL = Practical Quantitation Limit

RPoulsen

Vice President of Operations: Ralph Poulsen

ACZ

ORIGINAL

Analytical Results

ACZ Laboratories, Inc.
30400 Downhill Drive
Steamboat Springs, CO 80487
(800) 334-5493

Lab Sample ID: *L13226-01*
Client Sample ID: *GGCT-6*
Client Project ID: *Grouse Creek 22209*
ACZ Report ID: *RG42267*

Steffen Robertson & Kirsten
7175 W. Jefferson Ave. Suite 3000
Lakewood, CO 80235
Gene Muller

Date Sampled: *3/26/97 00:00*
Date Received: *3/31/97*
Date Reported: *4/29/97*

Sample Matrix: *Soil*

Soil Preparation

Parameter	Method	Result	Analyst	Date	Notes
Air Dry at 34 Degrees C	USDA No. 1, 1972			4/9/97	as
Pressure Filter, 0.45um	***			4/4/97	as/tw

Inorganic Qualifiers (Inorganic Analysis Only)

U = Analyte was analyzed for but not detected at the indicated MDL

B = Analyte concentration detected at a value between MDL and PQL

PQL = Practical Quantitation Limit

RV Poulsen

Vice President of Operations: Ralph Poulsen

ACZ

Analytical Results

ACZ Laboratories, Inc.
30400 Downhill Drive
Steamboat Springs, CO 80487
(800) 334-5493

Lab Sample ID: *L13226-02*
Client Sample ID: *GGCT-6 Liquid*
Client Project ID: *Grouse Creek 22209*
ACZ Report ID: *RG42268*

Steffen Robertson & Kirsten
7175 W. Jefferson Ave. Suite 3000
Lakewood, CO 80235
Gene Muller

Date Sampled: *3/26/97 00:00*
Date Received: *3/31/97*
Date Reported: *4/29/97*

Sample Matrix: *Leachate*

Metals Analysis

Analyte	Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	0.48	B	mg/L	0.09	0.5	4/10/97	jaw
Antimony, dissolved	M204.2 GFAA	0.15		mg/L	0.01	0.05	4/10/97	sh
Arsenic, dissolved	M206.2 GFAA	4.1		mg/L	0.1	0.5	4/10/97	sh
Barium, dissolved	M200.7 ICP	0.014	B	mg/L	0.009	0.03	4/10/97	jaw
Beryllium, dissolved	M200.7 ICP		U	mg/L	0.006	0.03	4/10/97	jaw
Bismuth, dissolved	M200.7 ICP		U	mg/L	0.3	2	4/10/97	jaw
Boron, dissolved	M200.7 ICP	0.3	B	mg/L	0.1	0.5	4/10/97	jaw
Cadmium, dissolved	M220.2 GFAA		U	mg/L	0.003	0.01	4/9/97	sh
Calcium, dissolved	M200.7 ICP	222.0		mg/L	0.6	3	4/10/97	jaw
Chromium, dissolved	M200.7 ICP		U	mg/L	0.03	0.2	4/10/97	jaw
Cobalt, dissolved	M200.7 ICP	0.10	B	mg/L	0.03	0.2	4/10/97	jaw
Copper, dissolved	M200.7 ICP	0.39		mg/L	0.03	0.2	4/10/97	jaw
Gallium, dissolved	M200.7 ICP		U	mg/L	0.3	2	4/10/97	jaw
Iron, dissolved	M200.7 ICP	124.00		mg/L	0.03	0.2	4/10/97	jaw
Lead, dissolved	M239.2 GFAA	0.014	B	mg/L	0.005	0.03	4/10/97	sh
Lithium, dissolved	M200.7 ICP		U	mg/L	0.06	0.3	4/10/97	jaw
Magnesium, dissolved	M200.7 ICP	0.7	B	mg/L	0.6	3	4/10/97	jaw
Manganese, dissolved	M200.7 ICP		U	mg/L	0.02	0.08	4/10/97	jaw
Mercury, dissolved	M245.1 CVAA	0.0009	B	mg/L	0.0002	0.001	4/10/97	ch
Molybdenum, dissolved	M200.7 ICP	0.66		mg/L	0.03	0.2	4/10/97	jaw
Nickel, dissolved	M200.7 ICP	0.04	B	mg/L	0.03	0.2	4/10/97	jaw
Potassium, dissolved	M200.7 ICP	28.3		mg/L	0.9	3	4/10/97	jaw
Scandium, dissolved	M200.7 ICP		U	mg/L	0.3	2	4/10/97	jaw
Selenium, dissolved	SM 3500-Se C, AA-Hydride	0.35		mg/L	0.01	0.05	4/11/97	ch
Silver, dissolved	M200.7 ICP	0.17		mg/L	0.02	0.08	4/10/97	jaw
Sodium, dissolved	M200.7 ICP	435.0		mg/L	0.9	3	4/10/97	jaw
Strontium, dissolved	M200.7 ICP	0.15		mg/L	0.02	0.1	4/14/97	kr
Thallium, dissolved	M279.2 GFAA		U	mg/L	0.04	0.2	4/9/97	sh
Tin, dissolved	M200.7 ICP	0.1	B	mg/L	0.1	0.5	4/10/97	kr
Titanium, dissolved	M200.7 ICP		U	mg/L	0.02	0.08	4/10/97	jaw
Vanadium, dissolved	M200.7 ICP		U	mg/L	0.02	0.08	4/10/97	jaw
Zinc, dissolved	M200.7 ICP	0.11	B	mg/L	0.03	0.2	4/10/97	jaw

Notes and Definitions (Qualifiers, Comments, etc.)

U = Analyte was analyzed for but not detected at the indicated MDL

B = Analyte concentration detected at a value between MDL and PQL

PQL = Practical Quantitation Limit

Vice President of Operations: Ralph Poulsen

ACZ

Analytical Results

ACZ Laboratories, Inc.
30400 Downhill Drive
Steamboat Springs, CO 80487
(800) 334-5493

Lab Sample ID: *L13226-02*
Client Sample ID: *GGCT-6 Liquid*
Client Project ID: *Grouse Creek 22209*
ACZ Report ID: *RG42268*

Steffen Robertson & Kirsten
7175 W. Jefferson Ave. Suite 3000
Lakewood, CO 80235
Gene Muller

Date Sampled: *3/26/97 00 00*
Date Received: *3/31/97*
Date Reported: *4/29/97*

Sample Matrix: *Leachate*

Wet Chemistry

Parameter	Method	Result	Flag	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	M310.1							
Bicarbonate as CaCO3		80		mg/L	2	10	4/9/97	jb
Carbonate as CaCO3		36		mg/L	2	10	4/9/97	jb
Hydroxide as CaCO3			U	mg/L	2	10	4/9/97	jb
Total Alkalinity		116		mg/L	2	10	4/9/97	jb
Chloride	M325.2 - Colorimetric (RFA)	390		mg/L	10	50	4/14/97	hm
Conductivity @25C	M120.1 - Meter	2580		umhos/cm	1	10	4/9/97	jb
Cyanate	SM4500-CN L	56		mg/L	3	20	4/10/97	jb
Cyanide, total	M335.3 - Colorimetric w/ distillation	340		mg/L	10	50	4/11/97	jb
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	14		mg/L	1	5	4/11/97	jb
Nitrate as N, dissolved	M353.2 - Automated Cadmium Reduction	8.4		mg/L	0.2	1	4/9/97	jb
Nitrate/Nitrite as N, dissolved	M353.2 - Automated Cadmium Reduction	8.8		mg/L	0.2	1	4/9/97	jb
Nitrite as N, dissolved	M353.2 - Automated Cadmium Reduction	0.41		mg/L	0.01	0.05	4/9/97	jb
Nitrogen, ammonia	M350.1 - Automated Phenate	33		mg/L	1	5	4/16/97	hm
pH (lab)	M150.1 - Electrometric	9.1		units	0.1	0.1	4/9/97	jb
Residue, Filterable (TDS) @180C	M160.1 - Gravimetric	2070		mg/L	10	20	4/10/97	bgb
Sulfate	M375.3 - Gravimetric	790		mg/L	20	30	4/10/97	bgb
TDS (calculated)	Calculation	2120		mg/L	10	50	4/29/97	calc
TDS (ratio - measured/calculated)	Calculation	0.98					4/29/97	calc
Thiocyanate (SCN)	SM4500-CN M	40	B	mg/L	10	50	4/11/97	jk

Footnote Qualifiers (Based on EPA CLP 3/90)

U = Analyte was analyzed for but not detected at the indicated MDL

B = Analyte concentration detected at a value between MDL and PQL

PQL = Practical Quantitation Limit

RP

Vice President of Operations: Ralph Poulsen

ACZ

Analytical Results

ACZ Laboratories, Inc.
30400 Downhill Drive
Steamboat Springs, CO 80487
(800) 334-5493

Lab Sample ID: *L13226-03*
Client Sample ID: *GGCT-6 Solid Rinsed*
Client Project ID: *Grouse Creek 22209*
ACZ Report ID: *RG42269*

Steffen Robertson & Kirsten
7175 W. Jefferson Ave. Suite 3000
Lakewood, CO 80235
Gene Muller

Date Sampled: *3/26/97 00:00*
Date Received: *3/31/97*
Date Reported: *4/29/97*

Sample Matrix: *Soil*

Metals Analysis

Parameter	Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Aluminum (1312)	M200.7 ICP	0.30		mg/L	0.03	0.2	4/21/97	jaw
Aluminum, total (3051)	M6010 ICP	12400		mg/Kg	3	20	4/21/97	jaw
Antimony (1312)	M7041 GFAA	0.117		mg/L	0.008	0.04	4/21/97	sh
Antimony, total (3051)	M7041 GFAA		U	mg/Kg	1	5	4/21/97	sh
Arsenic (1312)	M200.7 ICP	5.01		mg/L	0.04	0.2	4/21/97	jaw
Arsenic, total (3051)	M6010 ICP	648		mg/Kg	4	20	4/21/97	jaw
Barium (1312)	M200.7 ICP		U	mg/L	0.003	0.01	4/21/97	jaw
Barium, total (3051)	M6010 ICP	102.0		mg/Kg	0.3	1	4/21/97	jaw
Beryllium (1312)	M200.7 ICP		U	mg/L	0.002	0.01	4/21/97	jaw
Beryllium, total (3051)	M6010 ICP	0.3	B	mg/Kg	0.2	1	4/21/97	jaw
Bismuth (1312)	M200.7 ICP		U	mg/L	0.1	0.5	4/21/97	jaw
Bismuth, total (3051)	M6010 ICP		U	mg/Kg	10	50	4/21/97	jaw
Boron (1312)	M6010 ICP	0.01	B	mg/L	0.01	0.05	4/21/97	jaw
Boron, total (3051)	M6010 ICP	10		mg/Kg	1	5	4/21/97	jaw
Cadmium (1312)	M7131 GFAA		U	mg/L	0.0006	0.003	4/23/97	sh
Cadmium, total (3051)	M7131 GFAA		U	mg/Kg	0.3	1	4/23/97	sh
Calcium (1312)	M200.7 ICP	14.6		mg/L	0.2	1	4/21/97	jaw
Calcium, total (3051)	M6010 ICP	1280		mg/Kg	20	100	4/21/97	jaw
Chromium (1312)	M200.7 ICP	0.01	B	mg/L	0.01	0.05	4/21/97	jaw
Chromium, total (3051)	M6010 ICP	7		mg/Kg	1	5	4/21/97	jaw
Cobalt (1312)	M200.7 ICP		U	mg/L	0.01	0.05	4/21/97	jaw
Cobalt, total (3051)	M6010 ICP		U	mg/Kg	1	5	4/21/97	jaw
Copper (1312)	M200.7 ICP	0.01	B	mg/L	0.01	0.05	4/21/97	jaw
Copper, total (3051)	M6010 ICP	7		mg/Kg	1	5	4/21/97	jaw
Gallium (1312)	M6010 ICP		U	mg/L	0.1	0.5	4/21/97	jaw
Gallium, total (3051)	M6010 ICP		U	mg/Kg	10	50	4/21/97	jaw
Iron (1312)	M200.7 ICP	1.01		mg/L	0.01	0.05	4/21/97	jaw
Iron, total (3051)	M6010 ICP	10000		mg/Kg	1	5	4/21/97	jaw
Lead (1312)	M7421 GFAA		U	mg/L	0.001	0.005	4/22/97	fp
Lead, total (3051)	M7421 GFAA	47		mg/Kg	3	10	4/22/97	fp
Lithium (1312)	M200.7 ICP		U	mg/L	0.02	0.1	4/21/97	jaw
Lithium, total (3051)	M6010 ICP		U	mg/Kg	2	10	4/21/97	jaw
Magnesium (1312)	M200.7 ICP	0.2	B	mg/L	0.2	1	4/21/97	jaw
Magnesium, total (3051)	M6010 ICP	340		mg/Kg	20	100	4/21/97	jaw
Manganese (1312)	M200.7 ICP		U	mg/L	0.005	0.03	4/21/97	jaw
Manganese, total (3051)	M6010 ICP	15.3		mg/Kg	0.5	1	4/21/97	jaw

Indicator Qualifiers (based on EPA Guidelines)

U = Analyte was analyzed for but not detected at the indicated MDL

B = Analyte concentration detected at a value between MDL and PQL

PQL = Practical Quantitation Limit

RV Poulsen

Vice President of Operations: Ralph Poulsen

ACZ

Analytical Results

ACZ Laboratories, Inc.
30400 Downhill Drive
Steamboat Springs, CO 80487
(800) 334-5493

Lab Sample ID: *L13226-03*
Client Sample ID: *GGCT-6 Solid Rinsed*
Client Project ID: *Grouse Creek 22209*
ACZ Report ID: *RG42269*

Steffen Robertson & Kirsten
7175 W. Jefferson Ave. Suite 3000
Lakewood, CO 80235
Gene Muller

Date Sampled: *3/26/97 00:00*
Date Received: *3/31/97*
Date Reported: *4/29/97*

Sample Matrix: *Soil*

Mercury, (1312)	M7470 CVAA		U	mg/L	0.0002	0.001	4/23/97	ch
Mercury, total	M7471 CVAA	0.07	B	mg/Kg	0.02	0.1	4/24/97	ch
Molybdenum (1312)	M200.7 ICP	0.02	B	mg/L	0.01	0.05	4/21/97	jaw
Molybdenum, total (3051)	M6010 ICP	6		mg/Kg	1	5	4/21/97	jaw
Nickel (1312)	M200.7 ICP	0.01	B	mg/L	0.01	0.05	4/21/97	jaw
Nickel, total (3051)	M6010 ICP	2	B	mg/Kg	1	5	4/21/97	jaw
Potassium (1312)	M200.7 ICP	27.2		mg/L	0.3	1	4/28/97	jaw
Potassium, total (3051)	M6010 ICP	5930		mg/Kg	30	100	4/21/97	jaw
Scandium (1312)	M6010 ICP		U	mg/L	0.1	0.5	4/21/97	jaw
Scandium, total (3051)	M6010 ICP		U	mg/Kg	10	50	4/21/97	jaw
Selenium, (1312)	M7742 Modified, AA-Hydride	0.031		mg/L	0.001	0.005	4/24/97	ch
Selenium, total (3051)	M7742 Modified, AA-Hydride	2.3		mg/Kg	0.4	2	4/24/97	ch
Silver (1312)	M200.7 ICP		U	mg/L	0.005	0.03	4/21/97	jaw
Silver, total (3051)	M6010 ICP	4.8		mg/Kg	0.5	3	4/21/97	jaw
Sodium (1312)	M200.7 ICP	16.9		mg/L	0.3	1	4/21/97	jaw
Sodium, total (3051)	M6010 ICP	150		mg/Kg	30	100	4/21/97	jaw
Strontium (1312)	M200.7 ICP	0.01	B	mg/L	0.01	0.05	4/21/97	jaw
Strontium, total (3051)	M6010 ICP	15		mg/Kg	1	5	4/21/97	jaw
Thallium (1312)	M7841 GFAA		U	mg/L	0.002	0.01	4/22/97	fp
Thallium, total (3051)	M7841 GFAA		U	mg/Kg	1	5	4/22/97	fp
Tin (1312)	M200.7 ICP	0.1	B	mg/L	0.1	0.5	4/21/97	jaw
Tin, total (3051)	M6010 ICP		U	mg/Kg	10	50	4/21/97	jaw
Titanium (1312)	M200.7 ICP		U	mg/L	0.005	0.03	4/21/97	jaw
Titanium, total (3051)	M6010 ICP	4.1		mg/Kg	0.5	3	4/21/97	jaw
Vanadium (1312)	M200.7 ICP		U	mg/L	0.005	0.03	4/21/97	jaw
Vanadium, total (3051)	M6010 ICP	2.2	B	mg/Kg	0.5	3	4/21/97	jaw
Zinc (1312)	M200.7 ICP	0.01	B	mg/L	0.01	0.05	4/21/97	jaw
Zinc, total (3051)	M6010 ICP	34		mg/Kg	1	5	4/21/97	jaw

Soil Analysis

Parameter	Analytical Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Acid Generation Potential (calc)	M600/2-78-054 1.3	7		tons/KT	1	5	4/22/97	as
Acid Neutralization Potential (calc)	M600/2-78-054 1.3	2	B	tons/KT	1	5	4/22/97	as
Acid-Base Potential (calc)	M600/2-78-054 1.3	-5		tons/KT	1	5	4/22/97	as
Conductivity @25C (1312)	M120.1 - Meter	0.208		mmhos/cm	0.001	0.01	4/23/97	sw
Neutralization Potential as CaCO3	M600/2-78-054 3.2.3	0.2	B	%	0.1	0.5	4/22/97	sw
pH, (1312)	M150.1	8.1		units	0.1	0.1	4/21/97	as
Solids, Percent	CLPSOW390, PART F, D-98	99.5		%	0.1	0.5	4/18/97	sw

Analytical Qualifiers (based on EPA CLP)

U = Analyte was analyzed for but not detected at the indicated MDL

B = Analyte concentration detected at a value between MDL and PQL

PQL = Practical Quantitation Limit

RVP

Vice President of Operations: Ralph Poulsen

ACZ

Analytical Results

ACZ Laboratories, Inc.
30400 Downhill Drive
Steamboat Springs, CO 80487
(800) 334-5493

Lab Sample ID: *L13226-03*
Client Sample ID: *GGCT-6 Solid Rinsed*
Client Project ID: *Grouse Creek 22209*
ACZ Report ID: *RG42269*

Steffen Robertson & Kirsten
7175 W. Jefferson Ave. Suite 3000
Lakewood, CO 80235
Gene Muller

Date Sampled: *3/26/97 00:00*
Date Received: *3/31/97*
Date Reported: *4/29/97*

Sample Matrix: *Soil*

Sulfur Forms	M600/2-78-054 3.2.4							
Sulfur Sulfate (HCl extractable)		0.02	B	%	0.01	0.1	4/22/97	as
Sulfur Sulfide (residual)		0.23		%	0.01	0.1	4/22/97	as
Sulfur Total		0.25		%	0.01	0.1	4/22/97	as

Soil Preparation

Parameter	Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Digestion - Microwave	M3051, HNO3						4/19/97	sw
Synthetic Precip. Leaching Procedure	M1312						4/24/97	sw

Wet Chemistry

Parameter	Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Acidity (1312)	M305.1		U	mg/L	2	10	4/23/97	bgb
Alkalinity (1312)	M310.1							
Bicarbonate as CaCO3		58		mg/L	2	10	4/22/97	jb
Carbonate as CaCO3			U	mg/L	2	10	4/22/97	jb
Hydroxide as CaCO3			U	mg/L	2	10	4/22/97	jb
Total Alkalinity		58		mg/L	2	10	4/22/97	jb
Chloride (1312)	M325.2 - Colorimetric (RFA)	7		mg/L	1	5	4/21/97	hm
Cyanate (1312)	SM4500-CN L		U	mg/L	0.2	0.8	4/22/97	hm
Cyanide, total (1312)	M9012 - Automated Colorimetric	3.3		mg/L	0.1	0.5	4/23/97	hm
Cyanide, WAD (1312)	SM4500-CN I-Colorimetric w/ distillation	0.07		mg/L	0.01	0.05	4/23/97	hm
Fluoride (1312)	M300.0	0.4	B	mg/L	0.1	0.5	4/22/97	bgb
Nitrate (1312)	M300.0	0.63		mg/L	0.02	0.1	4/21/97	hm
Nitrate/Nitrite as N (1312)	M353.2 - Automated Cadmium Reduction	0.77		mg/L	0.02	0.1	4/21/97	hm
Nitrite as N (1312)	M353.2 - Automated	0.14		mg/L	0.01	0.05	4/21/97	hm
Nitrogen, ammonia (1312)	M350.1 - Automated Phenate	0.33		mg/L	0.05	0.3	4/22/97	hm/jb
Phosphorus, ortho dissolved (1312)	M365.1 - Automated Ascorbic Acid	1.00		mg/L	0.05	0.3	4/22/97	hm
Phosphorus, Total (1312)	SM4500-P I	1.210		mg/L	0.005	0.03	4/22/97	jb
Residue, Filterable (TDS) @180C (1312)	M160.1 - Gravimetric	110		mg/L	10	20	4/22/97	bgb
Sulfate (1312)	M375.3 - Gravimetric	20	B	mg/L	10	20	4/22/97	bgb

Note: As requested, the 1312 extraction was modified to a liquid to solid ratio of 2:1 and the leachate was adjusted with HCL to a pH of 4.5 units; and the Acid-Base Accounting calculations are based on the Sulfur Sulfide (residual) value.

Inorganic Qualifiers (Based on ACELAP)

U = Analyte was analyzed for but not detected at the indicated MDL

B = Analyte concentration detected at a value between MDL and PQL

PQL = Practical Quantitation Limit

RVP

Vice President of Operations: Ralph Poulsen

ACZ

Analytical Results

ACZ Laboratories, Inc.
30400 Downhill Drive
Steamboat Springs, CO 80487
(800) 334-5493

Lab Sample ID: *L13226-04*
Client Sample ID: *GGCT-6 Unrinsd Solid*
Client Project ID: *Grouse Creek 22209*
ACZ Report ID: *RG42270*

Steffen Robertson & Kirsten
7175 W. Jefferson Ave. Suite 3000
Lakewood, CO 80235
Gene Muller

Date Sampled: *3/26/97*
Date Received: *3/31/97*
Date Reported: *4/29/97*

Sample Matrix: *Soil*

Metals Analysis

Parameter	Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Aluminum (1312)	M200.7 ICP	0.46		mg/L	0.03	0.2	4/16/97	jaw
Antimony (1312)	M7041 GFAA	0.10		mg/L	0.01	0.05	4/17/97	sh
Arsenic (1312)	M200.7 ICP	6.07		mg/L	0.04	0.2	4/16/97	jaw
Barium (1312)	M200.7 ICP		U	mg/L	0.003	0.01	4/16/97	jaw
Beryllium (1312)	M200.7 ICP		U	mg/L	0.002	0.01	4/16/97	jaw
Bismuth (1312)	M200.7 ICP		U	mg/L	0.1	0.5	4/16/97	jaw
Boron (1312)	M6010 ICP	0.01	B	mg/L	0.01	0.05	4/17/97	kr
Cadmium (1312)	M7131 GFAA		U	mg/L	0.0005	0.003	4/18/97	sh
Calcium (1312)	M200.7 ICP	21.7		mg/L	0.2	1	4/16/97	jaw
Chromium (1312)	M200.7 ICP		U	mg/L	0.01	0.05	4/16/97	jaw
Cobalt (1312)	M200.7 ICP	0.01	B	mg/L	0.01	0.05	4/16/97	jaw
Copper (1312)	M200.7 ICP	0.07		mg/L	0.01	0.05	4/16/97	jaw
Gallium (1312)	M6010 ICP		U	mg/L	0.1	0.5	4/16/97	jaw
Iron (1312)	M200.7 ICP	18.10		mg/L	0.01	0.05	4/16/97	jaw
Lead (1312)	M7421 GFAA	0.001	B	mg/L	0.001	0.005	4/17/97	sh
Lithium (1312)	M200.7 ICP		U	mg/L	0.02	0.1	4/16/97	jaw
Magnesium (1312)	M200.7 ICP		U	mg/L	0.2	1	4/16/97	jaw
Manganese (1312)	M200.7 ICP		U	mg/L	0.005	0.03	4/16/97	jaw
Mercury, (1312)	M7470 CVAA	0.0002	B	mg/L	0.0002	0.001	4/17/97	ch
Molybdenum (1312)	M200.7 ICP	0.16		mg/L	0.01	0.05	4/16/97	jaw
Nickel (1312)	M200.7 ICP	0.01	B	mg/L	0.01	0.05	4/16/97	jaw
Potassium (1312)	M200.7 ICP	7.4		mg/L	0.3	1	4/16/97	jaw
Scandium (1312)	M6010 ICP		U	mg/L	0.1	0.5	4/16/97	jaw
Selenium, (1312)	M7742 Modified, AA-Hydride	0.092		mg/L	0.004	0.02	4/16/97	ch
Silver (1312)	M200.7 ICP	0.011	B	mg/L	0.005	0.03	4/17/97	kr
Sodium (1312)	M200.7 ICP	79.6		mg/L	0.3	1	4/16/97	jaw
Strontium (1312)	M200.7 ICP	0.01	B	mg/L	0.01	0.05	4/16/97	jaw
Thallium (1312)	M7841 GFAA		U	mg/L	0.002	0.01	4/17/97	sh
Tin (1312)	M200.7 ICP		U	mg/L	0.1	0.5	4/16/97	jaw
Titanium (1312)	M200.7 ICP		U	mg/L	0.005	0.03	4/16/97	jaw
Vanadium (1312)	M200.7 ICP		U	mg/L	0.005	0.03	4/16/97	jaw
Zinc (1312)	M200.7 ICP	0.01	B	mg/L	0.01	0.05	4/19/97	ss

Soil Analysis

Parameter	Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Conductivity.@25C (1312)	M120.1 - Meter	0.604		mmhos/cm	0.001	0.01	4/23/97	sw
pH, (1312)	M150.1	8.6		units	0.1	0.1	4/14/97	as

Inorganic Qualifiers (based on EPA CLP 7/90)

U = Analyte was analyzed for but not detected at the indicated MDL

B = Analyte concentration detected at a value between MDL and PQL

PQL = Practical Quantitation Limit

RVPoulsen

Vice President of Operations: Ralph Poulsen

ACZ

Analytical Results

ACZ Laboratories, Inc.
30400 Downhill Drive
Steamboat Springs, CO 80487
(800) 334-5493

Lab Sample ID: *L13226-04*
Client Sample ID: *GGCT-6 Unrinsd Solid*
Client Project ID: *Grouse Creek 22209*
ACZ Report ID: *RG42270*

Steffen Robertson & Kirsten
7175 W. Jefferson Ave. Suite 3000
Lakewood, CO 80235
Gene Muller

Date Sampled: *3/26/97*
Date Received: *3/31/97*
Date Reported: *4/29/97*

Sample Matrix: *Soil*

Soil Preparation

Analyte	Lab Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Synthetic Precip. Leaching Procedure	M1312						4/17/97	as

Wet Chemistry

Analyte	Lab Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Acidity (1312)	M305.1		U	mg/L	2	10	4/23/97	bgb
Alkalinity (1312)	M310.1							
Bicarbonate as CaCO3		62		mg/L	2	10	4/22/97	jb
Carbonate as CaCO3			U	mg/L	2	10	4/22/97	jb
Hydroxide as CaCO3			U	mg/L	2	10	4/22/97	jb
Total Alkalinity		62		mg/L	2	10	4/22/97	jb
Chloride (1312)	M325.2 - Colorimetric (RFA)	50		mg/L	1	5	4/21/97	hm
Cyanate (1312)	SM4500-CN L	3.9		mg/L	0.3	2	4/22/97	hm
Cyanide, total (1312)	M9012 - Automated Colorimetric	57		mg/L	5	30	4/23/97	hm
Cyanide, WAD (1312)	SM4500-CN I-Colorimetric w/ distillation	0.7		mg/L	0.1	0.5	4/23/97	hm
Fluoride (1312)	M300.0	1.2		mg/L	0.1	0.5	4/16/97	jk
Nitrate (1312)	M300.0	0.83		mg/L	0.02	0.1	4/21/97	hm
Nitrate/Nitrite as N (1312)	M353.2 - Automated Cadmium Reduction	1.44		mg/L	0.02	0.1	4/21/97	hm
Nitrite as N (1312)	M353.2 - Automated	0.61		mg/L	0.01	0.05	4/21/97	hm
Nitrogen, ammonia (1312)	M350.1 - Automated Phenate	3.1		mg/L	0.1	0.5	4/22/97	hm/jb
Phosphorus, Total (1312)	SM4500-P I	1.000		mg/L	0.005	0.03	4/22/97	jb
Phosphorus, ortho dissolved (1312)	M365.1 - Automated Ascorbic Acid	0.91		mg/L	0.05	0.3	4/22/97	hm
Residue, Filterable (TDS) @180C (1312)	M160.1 - Gravimetric	370		mg/L	10	20	4/14/97	bgb
Sulfate (1312)	M375.3 - Gravimetric	100		mg/L	10	20	4/14/97	bgb

Note: As requested, the 1312 extraction was modified to a liquid to solid ratio of 2:1 and the leachate was adjusted with HCL to a pH of 4.5 units.

Note: Duplicate precision for Aluminum (1312) exceeds ACZ's QC criteria due to the inhomogenity of soil matrix.

Qualifier Definitions (Based on EPA Criteria)

U = Analyte was analyzed for but not detected at the indicated MDL

B = Analyte concentration detected at a value between MDL and PQL

PQL = Practical Quantitation Limit

RVP

Vice President of Operations: Ralph Poulsen

ORIGINAL

ACZ

Analytical Results

ACZ Laboratories, Inc.
30400 Downhill Drive
Steamboat Springs, CO 80487
(800) 334-5493

Lab Sample ID: *L13225-01*
Client Sample ID: *HGCT-5*
Client Project ID: *Grouse Creek 22209*
ACZ Report ID: *RG42264*

Steffen Robertson & Kirsten
7175 W. Jefferson Ave. Suite 3000
Lakewood, CO 80235
Gene Muller

Date Sampled: *3/26/97 00:00*
Date Received: *3/31/97*
Date Reported: *4/29/97*

Sample Matrix: *Soil*

Soil Preparation

Chemical	EPA Method	Result	Qual	Date	MDL	PQL	Unit	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972			4/9/97				as
Pressure Filter, 0.45um	***			4/4/97				as/tw

Laboratory Qualifiers (Based on EPA CLP 3000)

U = Analyte was analyzed for but not detected at the indicated MDL

B = Analyte concentration detected at a value between MDL and PQL

PQL = Practical Quantitation Limit

RV Poulsen

Vice President of Operations: Ralph Poulsen

ACZ

Analytical Results

ACZ Laboratories, Inc.
30400 Downhill Drive
Steamboat Springs, CO 80487
(800) 334-5493

Lab Sample ID: *L13225-02*
Client Sample ID: *HGCT-5 Liquid*
Client Project ID: *Grouse Creek 22209*
ACZ Report ID: *RG42265*

Steffen Robertson & Kirsten
7175 W. Jefferson Ave. Suite 3000
Lakewood, CO 80235
Gene Muller

Date Sampled: *3/26/97 00:00*
Date Received: *3/31/97*
Date Reported: *4/29/97*

Sample Matrix: *Leachate*

Metals Analysis

Analyte	Method	Result	Qual	Unit	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	0.78		mg/L	0.09	0.5	4/10/97	jaw
Antimony, dissolved	M204.2 GFAA	0.15		mg/L	0.01	0.05	4/10/97	sh
Arsenic, dissolved	M206.2 GFAA	2.4		mg/L	0.1	0.5	4/10/97	sh
Barium, dissolved	M200.7 ICP	0.014	B	mg/L	0.009	0.03	4/10/97	jaw
Beryllium, dissolved	M200.7 ICP		U	mg/L	0.006	0.03	4/10/97	jaw
Bismuth, dissolved	M200.7 ICP		U	mg/L	0.3	2	4/10/97	jaw
Boron, dissolved	M200.7 ICP	0.18	B	mg/L	0.03	0.2	4/10/97	jaw
Cadmium, dissolved	M220.2 GFAA		U	mg/L	0.003	0.01	4/9/97	sh
Calcium, dissolved	M200.7 ICP	287.0		mg/L	0.6	3	4/10/97	jaw
Chromium, dissolved	M200.7 ICP		U	mg/L	0.03	0.2	4/10/97	jaw
Cobalt, dissolved	M200.7 ICP	0.11	B	mg/L	0.03	0.2	4/10/97	jaw
Copper, dissolved	M200.7 ICP	0.19	B	mg/L	0.03	0.2	4/10/97	jaw
Gallium, dissolved	M200.7 ICP		U	mg/L	0.3	2	4/10/97	jaw
Iron, dissolved	M200.7 ICP	151.00		mg/L	0.03	0.2	4/10/97	jaw
Lead, dissolved	M239.2 GFAA		U	mg/L	0.005	0.03	4/10/97	sh
Lithium, dissolved	M200.7 ICP		U	mg/L	0.06	0.3	4/10/97	jaw
Magnesium, dissolved	M200.7 ICP	0.8	B	mg/L	0.6	3	4/10/97	jaw
Manganese, dissolved	M200.7 ICP		U	mg/L	0.02	0.08	4/10/97	jaw
Mercury, dissolved	M245.1 CVAA	0.0008	B	mg/L	0.0002	0.001	4/10/97	ch
Molybdenum, dissolved	M200.7 ICP	0.39		mg/L	0.03	0.2	4/10/97	jaw
Nickel, dissolved	M200.7 ICP		U	mg/L	0.03	0.2	4/10/97	jaw
Potassium, dissolved	M200.7 ICP	35.3		mg/L	0.9	3	4/10/97	jaw
Scandium, dissolved	M200.7 ICP		U	mg/L	0.3	2	4/10/97	jaw
Selenium, dissolved	SM 3500-Se C, AA-Hydride	0.32		mg/L	0.01	0.05	4/11/97	ch
Silver, dissolved	M200.7 ICP	0.12		mg/L	0.02	0.08	4/10/97	jaw
Sodium, dissolved	M200.7 ICP	529.0		mg/L	0.9	3	4/10/97	jaw
Strontium, dissolved	M200.7 ICP	0.19		mg/L	0.02	0.1	4/14/97	kr
Thallium, dissolved	M279.2 GFAA		U	mg/L	0.04	0.2	4/9/97	sh
Tin, dissolved	M200.7 ICP	0.1	B	mg/L	0.1	0.5	4/10/97	kr
Titanium, dissolved	M200.7 ICP		U	mg/L	0.02	0.08	4/10/97	jaw
Vanadium, dissolved	M200.7 ICP		U	mg/L	0.02	0.08	4/10/97	jaw
Zinc, dissolved	M200.7 ICP	0.14	B	mg/L	0.03	0.2	4/10/97	jaw

Laboratory Qualifiers (based on EC-QAP-700)

U = Analyte was analyzed for but not detected at the indicated MDL

B = Analyte concentration detected at a value between MDL and PQL

PQL = Practical Quantitation Limit

RV Poulsen

Vice President of Operations: Ralph Poulsen

ACZ

Analytical Results

ACZ Laboratories, Inc.
30400 Downhill Drive
Steamboat Springs, CO 80487
(800) 334-5493

Lab Sample ID: *L13225-02*
Client Sample ID: *HGCT-5 Liquid*
Client Project ID: *Grouse Creek 22209*
ACZ Report ID: *RG42265*

Steffen Robertson & Kirsten
7175 W. Jefferson Ave. Suite 3000
Lakewood, CO 80235
Gene Muller

Date Sampled: *3/26/97 00:00*
Date Received: *3/31/97*
Date Reported: *4/29/97*

Sample Matrix: *Leachate*

Wet Chemistry

Parameter	Test Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	M310.1							
Bicarbonate as CaCO3		59		mg/L	2	10	4/9/97	jb
Carbonate as CaCO3		56		mg/L	2	10	4/9/97	jb
Hydroxide as CaCO3			U	mg/L	2	10	4/9/97	jb
Total Alkalinity		115		mg/L	2	10	4/9/97	jb
Chloride	M325.2 - Colorimetric (RFA)	440		mg/L	10	50	4/14/97	hm
Conductivity @25C	M120.1 - Meter	3060		umhos/cm	1	10	4/9/97	jb
Cyanate	SM4500-CN L	57		mg/L	3	20	4/10/97	jb
Cyanide, total	M335.3 - Colorimetric w/ distillation	370		mg/L	10	50	4/11/97	jb
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	20		mg/L	1	5	4/11/97	jb
Nitrate as N, dissolved	M353.2 - Automated Cadmium Reduction	10.3		mg/L	0.2	1	4/9/97	jb
Nitrate/Nitrite as N, dissolved	M353.2 - Automated Cadmium Reduction	10.7		mg/L	0.2	1	4/9/97	jb
Nitrite as N, dissolved	M353.2 - Automated Cadmium Reduction	0.41		mg/L	0.01	0.05	4/9/97	jb
Nitrogen, ammonia	M350.1 - Automated Phenate	28		mg/L	1	5	4/16/97	hm
pH (lab)	M150.1 - Electrometric	9.3		units	0.1	0.1	4/9/97	jb
Residue, Filterable (TDS) @180C	M160.1 - Gravimetric	2540		mg/L	10	20	4/10/97	bgb
Sulfate	M375.3 - Gravimetric	1060		mg/L	10	20	4/10/97	bgb
TDS (calculated)	Calculation	2630		mg/L	10	50	4/29/97	calc
TDS (ratio - measured/calculated)	Calculation	0.96					4/29/97	calc
Thiocyanate (SCN)	SM4500-CN M	40	B	mg/L	10	50	4/11/97	jk

Inorganic Qualifiers (Based on EPA Guidelines)

U = Analyte was analyzed for but not detected at the indicated MDL

B = Analyte concentration detected at a value between MDL and PQL

PQL = Practical Quantitation Limit

RP

Vice President of Operations: Ralph Poulsen

ACZ

Analytical Results

ACZ Laboratories, Inc.
30400 Downhill Drive
Steamboat Springs, CO 80487
(800) 334-5493

Lab Sample ID: *L13225-03*
Client Sample ID: *HGCT-5 Solid Rinsed*
Client Project ID: *Grouse Creek 22209*
ACZ Report ID: *RG42266*

Steffen Robertson & Kirsten
7175 W. Jefferson Ave. Suite 3000
Lakewood, CO 80235
Gene Muller

Date Sampled: *3/26/97*
Date Received: *3/31/97*
Date Reported: *4/29/97*

Sample Matrix: *Soil*

Metals Analysis

Parameter	Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Aluminum (1312)	M200.7 ICP	0.32		mg/L	0.03	0.2	4/21/97	jaw
Aluminum, total (3051)	M6010 ICP	8030		mg/Kg	3	20	4/21/97	jaw
Antimony (1312)	M7041 GFAA	0.084		mg/L	0.008	0.04	4/21/97	sh
Antimony, total (3051)	M7041 GFAA		U	mg/Kg	1	5	4/21/97	sh
Arsenic (1312)	M200.7 ICP	2.41		mg/L	0.04	0.2	4/21/97	jaw
Arsenic, total (3051)	M6010 ICP	427		mg/Kg	4	20	4/21/97	jaw
Barium (1312)	M200.7 ICP		U	mg/L	0.003	0.01	4/21/97	jaw
Barium, total (3051)	M6010 ICP	63.5		mg/Kg	0.3	1	4/21/97	jaw
Beryllium (1312)	M200.7 ICP		U	mg/L	0.002	0.01	4/21/97	jaw
Beryllium, total (3051)	M6010 ICP	0.2	B	mg/Kg	0.2	1	4/21/97	jaw
Bismuth (1312)	M200.7 ICP		U	mg/L	0.1	0.5	4/21/97	jaw
Bismuth, total (3051)	M6010 ICP		U	mg/Kg	10	50	4/21/97	jaw
Boron (1312)	M6010 ICP	0.02	B	mg/L	0.01	0.05	4/21/97	jaw
Boron, total (3051)	M6010 ICP	7		mg/Kg	1	5	4/21/97	jaw
Cadmium (1312)	M7131 GFAA		U	mg/L	0.0006	0.003	4/23/97	sh
Cadmium, total (3051)	M7131 GFAA		U	mg/Kg	0.3	1	4/23/97	sh
Calcium (1312)	M200.7 ICP	13.0		mg/L	0.2	1	4/21/97	jaw
Calcium, total (3051)	M6010 ICP	930		mg/Kg	20	100	4/21/97	jaw
Chromium (1312)	M200.7 ICP	0.01	B	mg/L	0.01	0.05	4/21/97	jaw
Chromium, total (3051)	M6010 ICP	4	B	mg/Kg	1	5	4/21/97	jaw
Cobalt (1312)	M200.7 ICP		U	mg/L	0.01	0.05	4/21/97	jaw
Cobalt, total (3051)	M6010 ICP		U	mg/Kg	1	5	4/21/97	jaw
Copper (1312)	M200.7 ICP	0.02	B	mg/L	0.01	0.05	4/21/97	jaw
Copper, total (3051)	M6010 ICP	4	B	mg/Kg	1	5	4/21/97	jaw
Gallium (1312)	M6010 ICP		U	mg/L	0.1	0.5	4/21/97	jaw
Gallium, total (3051)	M6010 ICP		U	mg/Kg	10	50	4/21/97	jaw
Iron (1312)	M200.7 ICP	0.72		mg/L	0.01	0.05	4/21/97	jaw
Iron, total (3051)	M6010 ICP	6920		mg/Kg	1	5	4/21/97	jaw
Lead (1312)	M7421 GFAA	0.001	B	mg/L	0.001	0.005	4/22/97	fp
Lead, total (3051)	M7421 GFAA	30		mg/Kg	3	10	4/22/97	fp
Lithium (1312)	M200.7 ICP		U	mg/L	0.02	0.1	4/21/97	jaw
Lithium, total (3051)	M6010 ICP		U	mg/Kg	2	10	4/21/97	jaw
Magnesium (1312)	M200.7 ICP	0.2	B	mg/L	0.2	1	4/21/97	jaw
Magnesium, total (3051)	M6010 ICP	230		mg/Kg	20	100	4/21/97	jaw
Manganese (1312)	M200.7 ICP		U	mg/L	0.005	0.03	4/21/97	jaw
Manganese, total (3051)	M6010 ICP	8.9		mg/Kg	0.5	1	4/21/97	jaw

Reporting Qualifiers Defined (EPA Qualifiers)

U = Analyte was analyzed for but not detected at the indicated MDL

B = Analyte concentration detected at a value between MDL and PQL

PQL = Practical Quantitation Limit

Vice President of Operations: Ralph Poulsen

ACZ

Analytical Results

ACZ Laboratories, Inc.
30400 Downhill Drive
Steamboat Springs, CO 80487
(800) 334-5493

Lab Sample ID: *L13225-03*
Client Sample ID: *HGCT-5 Solid Rinsed*
Client Project ID: *Grouse Creek 22209*
ACZ Report ID: *RG42266*

Steffen Robertson & Kirsten
7175 W. Jefferson Ave. Suite 3000
Lakewood, CO 80235
Gene Muller

Date Sampled: *3/26/97*
Date Received: *3/31/97*
Date Reported: *4/29/97*

Sample Matrix: *Soil*

Mercury, (1312)	M7470 CVAA		U	mg/L	0.0002	0.001	4/23/97	ch
Mercury, total	M7471 CVAA	0.07	B	mg/Kg	0.02	0.1	4/24/97	ch
Molybdenum (1312)	M200.7 ICP	0.02	B	mg/L	0.01	0.05	4/21/97	jaw
Molybdenum, total (3051)	M6010 ICP	5		mg/Kg	1	5	4/21/97	jaw
Nickel (1312)	M200.7 ICP		U	mg/L	0.01	0.05	4/21/97	jaw
Nickel, total (3051)	M6010 ICP	1	B	mg/Kg	1	5	4/21/97	jaw
Potassium (1312)	M200.7 ICP	4.6		mg/L	0.3	1	4/28/97	jaw
Potassium, total (3051)	M6010 ICP	3720		mg/Kg	30	100	4/21/97	jaw
Scandium (1312)	M6010 ICP		U	mg/L	0.1	0.5	4/21/97	jaw
Scandium, total (3051)	M6010 ICP		U	mg/Kg	10	50	4/21/97	jaw
Selenium, (1312)	M7742 Modified, AA-Hydride	0.023		mg/L	0.001	0.005	4/24/97	ch
Selenium, total (3051)	M7742 Modified, AA-Hydride	2.0		mg/Kg	0.1	0.5	4/24/97	ch
Silver (1312)	M200.7 ICP		U	mg/L	0.005	0.03	4/21/97	jaw
Silver, total (3051)	M6010 ICP	3.7		mg/Kg	0.5	3	4/21/97	jaw
Sodium (1312)	M200.7 ICP	12.0		mg/L	0.3	1	4/21/97	jaw
Sodium, total (3051)	M6010 ICP	90	B	mg/Kg	30	100	4/21/97	jaw
Strontium (1312)	M200.7 ICP	0.01	B	mg/L	0.01	0.05	4/21/97	jaw
Strontium, total (3051)	M6010 ICP	10		mg/Kg	1	5	4/21/97	jaw
Thallium (1312)	M7841 GFAA		U	mg/L	0.002	0.01	4/22/97	fp
Thallium, total (3051)	M7841 GFAA		U	mg/Kg	1	5	4/22/97	fp
Tin (1312)	M200.7 ICP		U	mg/L	0.1	0.5	4/21/97	jaw
Tin, total (3051)	M6010 ICP		U	mg/Kg	10	50	4/21/97	jaw
Titanium (1312)	M200.7 ICP		U	mg/L	0.005	0.03	4/21/97	jaw
Titanium, total (3051)	M6010 ICP	4.3		mg/Kg	0.5	3	4/21/97	jaw
Vanadium (1312)	M200.7 ICP		U	mg/L	0.005	0.03	4/21/97	jaw
Vanadium, total (3051)	M6010 ICP	1.2	B	mg/Kg	0.5	3	4/21/97	jaw
Zinc (1312)	M200.7 ICP	0.02	B	mg/L	0.01	0.05	4/21/97	jaw
Zinc, total (3051)	M6010 ICP	20		mg/Kg	1	5	4/21/97	jaw

Soil Analysis

Parameter	Method	Result	Qualifier	Units	MDL	PQL	Date	Analyst
Acid Generation Potential (calc)	M600/2-78-054 1.3	5		tons/KT	1	5	4/22/97	as
Acid Neutralization Potential (calc)	M600/2-78-054 1.3	1	B	tons/KT	1	5	4/22/97	as
Acid-Base Potential (calc)	M600/2-78-054 1.3	-4		tons/KT	1	5	4/22/97	as
Conductivity @25C (1312)	M120.1 - Meter	0.170		mmhos/cm	0.001	0.01	4/23/97	sw
Neutralization Potential as CaCO3	M600/2-78-054 3.2.3	0.1	B	%	0.1	0.5	4/22/97	sw
pH, (1312)	M150.1	8.1		units	0.1	0.1	4/21/97	as
Solids, Percent	CLPSOW390, PART F, D-98	100.0		%	0.1	0.5	4/18/97	sw

Indicate Qualifiers Observed: EPA CLP 390

U = Analyte was analyzed for but not detected at the indicated MDL

B = Analyte concentration detected at a value between MDL and PQL

PQL = Practical Quantitation Limit

Vice President of Operations: Ralph Poulsen

ACZ — Analytical Results

ACZ Laboratories, Inc.
30400 Downhill Drive
Steamboat Springs, CO 80487
(800) 334-5493

Lab Sample ID: *L13225-03*
Client Sample ID: *HGCT-5 Solid Rinsed*
Client Project ID: *Grouse Creek 22209*
ACZ Report ID: *RG42266*

Steffen Robertson & Kirsten
7175 W. Jefferson Ave. Suite 3000
Lakewood, CO 80235
Gene Muller

Date Sampled: *3/26/97*
Date Received: *3/31/97*
Date Reported: *4/29/97*

Sample Matrix: *Soil*

Sulfur Forms	M600/2-78-054 3.2.4							
Sulfur Sulfate (HCl extractable)		0.06	B	%	0.01	0.1	4/22/97	as
Sulfur Sulfide (residual)		0.15		%	0.01	0.1	4/22/97	as
Sulfur Total		0.21		%	0.01	0.1	4/22/97	as

Soil Preparation

Parameter	Method	Result	Qualifier	Units	MDL	PQL	Date	Analyst
Digestion - Microwave	M3051, HNO3						4/19/97	sw
Synthetic Precip. Leaching Procedure	M1312						4/24/97	sw

Wet Chemistry

Parameter	Method	Result	Qualifier	Units	MDL	PQL	Date	Analyst
Acidity (1312)	M305.1		U	mg/L	2	10	4/23/97	bgb
Alkalinity (1312)	M310.1							
Bicarbonate as CaCO3		47		mg/L	2	10	4/22/97	jb
Carbonate as CaCO3			U	mg/L	2	10	4/22/97	jb
Hydroxide as CaCO3			U	mg/L	2	10	4/22/97	jb
Total Alkalinity		47		mg/L	2	10	4/22/97	jb
Chloride (1312)	M325.2 - Colorimetric (RFA)	5		mg/L	1	5	4/21/97	hm
Cyanate (1312)	SM4500-CN L		U	mg/L	0.2	0.8	4/22/97	hm
Cyanide, total (1312)	M9012 - Automated Colorimetric	2.1		mg/L	0.1	0.5	4/23/97	hm
Cyanide, WAD (1312)	SM4500-CN I-Colorimetric w/ distillation	0.04	B	mg/L	0.01	0.05	4/23/97	hm
Fluoride (1312)	M300.0	0.3	B	mg/L	0.1	0.5	4/22/97	bgb
Nitrate (1312)	M300.0	0.54		mg/L	0.02	0.1	4/21/97	hm
Nitrate/Nitrite as N (1312)	M353.2 - Automated Cadmium Reduction	0.61		mg/L	0.02	0.1	4/21/97	hm
Nitrite as N (1312)	M353.2 - Automated	0.07		mg/L	0.01	0.05	4/21/97	hm
Nitrogen, ammonia (1312)	M350.1 - Automated Phenate	0.29		mg/L	0.05	0.3	4/22/97	hm/jb
Phosphorus, Total (1312)	SM4500-P I	0.790		mg/L	0.005	0.03	4/22/97	jb
Phosphorus, ortho dissolved (1312)	M365.1 - Automated Ascorbic Acid	0.84		mg/L	0.03	0.1	4/22/97	hm
Residue, Filterable (TDS) @180C (1312)	M160.1 - Gravimetric	90		mg/L	10	20	4/22/97	bgb
Sulfate (1312)	M375.3 - Gravimetric	10	B	mg/L	10	20	4/22/97	bgb

Note: As requested, the 1312 extraction was modified to a liquid to solid ratio of 2:1 and the leachate was adjusted with HCL to a pH of 4.5 units; and the Acid-Base Accounting calculations are based on the Sulfur Sulfide (residual) value.

Note: Duplicate precision for Aluminum (1312 & 3051), Barium (3051), Potassium (1312 & 3051) and Zinc (3051) exceeds ACZ's QC criteria due to the inhomogenity of soil matrix.

Qualifier Definitions (Based on EPA CLP)

U = Analyte was analyzed for but not detected at the indicated MDL

B = Analyte concentration detected at a value between MDL and PQL

PQL = Practical Quantitation Limit

RVP

Vice President of Operations: Ralph Poulsen

ACZ

ORIGINAL

Analytical Results

ACZ Laboratories, Inc.
30400 Downhill Drive
Steamboat Springs, CO 80487
(800) 334-5493

Lab Sample ID: *L13224-01*
Client Sample ID: *HGCT-4*
Client Project ID: *Grouse Creek 22209*
ACZ Report ID: *RG42262*

Steffen Robertson & Kirsten
7175 W. Jefferson Ave. Suite 3000
Lakewood, CO 80235
Gene Muller

Date Sampled: *3/26/97 00:00*
Date Received: *3/31/97*
Date Reported: *4/29/97*

Sample Matrix: *Soil*

Soil Preparation

Parameter	Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972						4/10/97	as
Pressure Filter, 0.45um	***						4/4/97	as/tw

Laboratory Qualifiers (based on CLP SOW)

U = Analyte was analyzed for but not detected at the indicated MDL

B = Analyte concentration detected at a value between MDL and PQL

PQL = Practical Quantitation Limit

RVPoulsen

Vice President of Operations: Ralph Poulsen

ACZ

Analytical Results

ACZ Laboratories, Inc.
30400 Downhill Drive
Steamboat Springs, CO 80487
(800) 334-5493

Lab Sample ID: *L13224-03*
Client Sample ID: *HGCT-4 Solid Rinsed*
Client Project ID: *Grouse Creek 22209*
ACZ Report ID: *RG42263*

Steffen Robertson & Kirsten
7175 W. Jefferson Ave. Suite 3000
Lakewood, CO 80235
Gene Muller

Date Sampled: *3/26/97 00:00*
Date Received: *3/31/97*
Date Reported: *4/29/97*

Sample Matrix: *Soil*

Soil Analysis

Method Description	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Acid Generation Potential (calc)	M600/2-78-054 1.3	4	B	tons/KT	1	5	4/22/97	as
Acid Neutralization Potential (calc)	M600/2-78-054 1.3	2	B	tons/KT	1	5	4/22/97	as
Acid-Base Potential (calc)	M600/2-78-054 1.3	-2		tons/KT	1	5	4/22/97	as
Neutralization Potential as CaCO3	M600/2-78-054 3.2.3	0.2	B	%	0.1	0.5	4/22/97	sw
Sulfur Forms	M600/2-78-054 3.2.4							
Sulfur Sulfate (HCl extractable)		0.04	B	%	0.01	0.1	4/22/97	as
Sulfur Sulfide (residual)		0.14		%	0.01	0.1	4/22/97	as
Sulfur Total		0.18		%	0.01	0.1	4/22/97	as

Note: As requested the Acid-Base Accounting calculations are based on the Sulfur Sulfide (residual) value.

Indicate Qualifiers (Qualifiers Are Bold)

U = Analyte was analyzed for but not detected at the indicated MDL

B = Analyte concentration detected at a value between MDL and PQL

PQL = Practical Quantitation Limit

Vice President of Operations: Ralph Poulsen

ORIGINAL

ACZ

Analytical Results

ACZ Laboratories, Inc.
30400 Downhill Drive
Steamboat Springs, CO 80487
(800) 334-5493

Lab Sample ID: *L13223-01*
Client Sample ID: *HGCT-3*
Client Project ID: *Grouse Creek 22209*
ACZ Report ID: *RG42259*

Steffen Robertson & Kirsten
7175 W. Jefferson Ave. Suite 3000
Lakewood, CO 80235
Gene Muller

Date Sampled: *3/26/97 00:00*
Date Received: *3/31/97*
Date Reported: *4/29/97*

Sample Matrix: *Soil*

Soil Preparation

Parameter	Prep Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972						4/9/97	as
Pressure Filter, 0.45um	***						4/4/97	as/tw

Informative Qualifiers (Based on CLP-CLP-MDL)

U = Analyte was analyzed for but not detected at the indicated MDL

B = Analyte concentration detected at a value between MDL and PQL

PQL = Practical Quantitation Limit

RPoulsen

Vice President of Operations: Ralph Poulsen

ACZ **Analytical Results**

ACZ Laboratories, Inc.
30400 Downhill Drive
Steamboat Springs, CO 80487
(800) 334-5493

Lab Sample ID: *L13223-02*
Client Sample ID: *HGCT-3 Liquid*
Client Project ID: *Grouse Creek 22209*
ACZ Report ID: *RG42260*

Steffen Robertson & Kirsten
7175 W. Jefferson Ave. Suite 3000
Lakewood, CO 80235
Gene Muller

Date Sampled: *3/26/97 00:00*
Date Received: *3/31/97*
Date Reported: *4/29/97*

Sample Matrix: *Leachate*

Metals Analysis

Parameter	Method	Result	Qualifier	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	0.16	B	mg/L	0.09	0.5	4/10/97	jaw
Antimony, dissolved	M204.2 GFAA	0.17		mg/L	0.01	0.05	4/10/97	sh
Arsenic, dissolved	M206.2 GFAA	13		mg/L	1	5	4/10/97	sh
Barium, dissolved	M200.7 ICP	0.013	B	mg/L	0.009	0.03	4/10/97	jaw
Beryllium, dissolved	M200.7 ICP		U	mg/L	0.006	0.03	4/10/97	jaw
Bismuth, dissolved	M200.7 ICP		U	mg/L	0.3	2	4/10/97	jaw
Boron, dissolved	M200.7 ICP	0.12	B	mg/L	0.03	0.2	4/10/97	jaw
Cadmium, dissolved	M220.2 GFAA		U	mg/L	0.003	0.01	4/9/97	sh
Calcium, dissolved	M200.7 ICP	189.0		mg/L	0.6	3	4/10/97	jaw
Chromium, dissolved	M200.7 ICP		U	mg/L	0.03	0.2	4/10/97	jaw
Cobalt, dissolved	M200.7 ICP	0.09	B	mg/L	0.03	0.2	4/10/97	jaw
Copper, dissolved	M200.7 ICP	0.51		mg/L	0.03	0.2	4/10/97	jaw
Gallium, dissolved	M200.7 ICP		U	mg/L	0.3	2	4/10/97	jaw
Iron, dissolved	M200.7 ICP	114.00		mg/L	0.03	0.2	4/10/97	jaw
Lead, dissolved	M239.2 GFAA		U	mg/L	0.005	0.03	4/10/97	sh
Lithium, dissolved	M200.7 ICP		U	mg/L	0.06	0.3	4/10/97	jaw
Magnesium, dissolved	M200.7 ICP	1.5	B	mg/L	0.6	3	4/10/97	jaw
Manganese, dissolved	M200.7 ICP		U	mg/L	0.02	0.08	4/10/97	jaw
Mercury, dissolved	M245.1 CVAA	0.0006	B	mg/L	0.0002	0.001	4/10/97	ch
Molybdenum, dissolved	M200.7 ICP	1.03		mg/L	0.03	0.2	4/10/97	jaw
Nickel, dissolved	M200.7 ICP	0.05	B	mg/L	0.03	0.2	4/10/97	jaw
Potassium, dissolved	M200.7 ICP	26.0		mg/L	0.9	3	4/10/97	jaw
Scandium, dissolved	M200.7 ICP		U	mg/L	0.3	2	4/10/97	jaw
Selenium, dissolved	SM 3500-Se C, AA-Hydride	0.27		mg/L	0.01	0.05	4/11/97	ch
Silver, dissolved	M200.7 ICP	0.04	B	mg/L	0.02	0.08	4/10/97	jaw
Sodium, dissolved	M200.7 ICP	421.0		mg/L	0.9	3	4/10/97	jaw
Strontium, dissolved	M200.7 ICP	0.10		mg/L	0.02	0.1	4/14/97	kr
Thallium, dissolved	M279.2 GFAA		U	mg/L	0.04	0.2	4/9/97	sh
Tin, dissolved	M200.7 ICP	0.1	B	mg/L	0.1	0.5	4/10/97	kr
Titanium, dissolved	M200.7 ICP		U	mg/L	0.02	0.08	4/10/97	jaw
Vanadium, dissolved	M200.7 ICP		U	mg/L	0.02	0.08	4/10/97	jaw
Zinc, dissolved	M200.7 ICP		U	mg/L	0.03	0.2	4/10/97	jaw

Analytical Qualifiers (Based on EPA CLP)

U = Analyte was analyzed for but not detected at the indicated MDL

B = Analyte concentration detected at a value between MDL and PQL

PQL = Practical Quantitation Limit

RPoulsen

Vice President of Operations: Ralph Poulsen

ACZ

Analytical Results

ACZ Laboratories, Inc.
30400 Downhill Drive
Steamboat Springs, CO 80487
(800) 334-5493

Lab Sample ID: *L13223-02*
Client Sample ID: *HGCT-3 Liquid*
Client Project ID: *Grouse Creek 22209*
ACZ Report ID: *RG42260*

Steffen Robertson & Kirsten
7175 W. Jefferson Ave. Suite 3000
Lakewood, CO 80235
Gene Muller

Date Sampled: *3/26/97 00:00*
Date Received: *3/31/97*
Date Reported: *4/29/97*

Sample Matrix: *Leachate*

Wet Chemistry

Analyte	Method	Result	Qualifier	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	M310.1							
Bicarbonate as CaCO3		127		mg/L	2	10	4/9/97	jb
Carbonate as CaCO3		21		mg/L	2	10	4/9/97	jb
Hydroxide as CaCO3			U	mg/L	2	10	4/9/97	jb
Total Alkalinity		148		mg/L	2	10	4/9/97	jb
Chloride	M325.2 - Colorimetric (RFA)	300		mg/L	5	30	4/14/97	hm
Conductivity @25C	M120.1 - Meter	2420		umhos/cm	1	10	4/9/97	jb
Cyanate	SM4500-CN L	18		mg/L	3	20	4/10/97	jb
Cyanide, total	M335.3 - Colorimetric w/ distillation	250		mg/L	10	50	4/11/97	jb
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	6		mg/L	1	5	4/11/97	jb
Nitrate as N, dissolved	M353.2 - Automated Cadmium Reduction	4.2		mg/L	0.2	1	4/9/97	jb
Nitrate/Nitrite as N, dissolved	M353.2 - Automated Cadmium Reduction	4.5		mg/L	0.2	1	4/9/97	jb
Nitrite as N, dissolved	M353.2 - Automated Cadmium Reduction	0.35		mg/L	0.01	0.05	4/9/97	jb
Nitrogen, ammonia	M350.1 - Automated Phenate	16.7		mg/L	0.5	3	4/16/97	hm
pH (lab)	M150.1 - Electrometric	8.7		units	0.1	0.1	4/9/97	jb
Residue, Filterable (TDS) @180C	M160.1 - Gravimetric	1960		mg/L	10	20	4/10/97	bgb
Sulfate	M375.3 - Gravimetric	780		mg/L	10	20	4/10/97	bgb
TDS (calculated)	Calculation	1950		mg/L	10	50	4/29/97	calc
TDS (ratio - measured/calculated)	Calculation	1.00					4/29/97	calc
Thiocyanate (SCN)	SM4500-CN M	50		mg/L	10	50	4/11/97	jk

Analytical Qualifiers (reference PQL and MDL)

U = Analyte was analyzed for but not detected at the indicated MDL

B = Analyte concentration detected at a value between MDL and PQL

PQL = Practical Quantitation Limit

RVP

Vice President of Operations: Ralph Poulsen

ACZ

Analytical Results

ACZ Laboratories, Inc.
30400 Downhill Drive
Steamboat Springs, CO 80487
(800) 334-5493

Lab Sample ID: *L13223-03*
Client Sample ID: *HGCT-3 Solid Rinsed*
Client Project ID: *Grouse Creek 22209*
ACZ Report ID: *RG42261*

Steffen Robertson & Kirsten
7175 W. Jefferson Ave. Suite 3000
Lakewood, CO 80235
Gene Muller

Date Sampled: *3/26/97 00:00*
Date Received: *3/31/97*
Date Reported: *4/29/97*

Sample Matrix: *Soil*

Metals Analysis

Analyte	Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Aluminum (1312)	M200.7 ICP	0.16	B	mg/L	0.03	0.2	4/21/97	jaw
Aluminum, total (3051)	M6010 ICP	8330		mg/Kg	3	20	4/21/97	jaw
Antimony (1312)	M7041 GFAA	0.069		mg/L	0.008	0.04	4/21/97	sh
Antimony, total (3051)	M7041 GFAA		U	mg/Kg	1	5	4/21/97	sh
Arsenic (1312)	M200.7 ICP	5.62		mg/L	0.04	0.2	4/21/97	jaw
Arsenic, total (3051)	M6010 ICP	640		mg/Kg	4	20	4/21/97	jaw
Barium (1312)	M200.7 ICP		U	mg/L	0.003	0.01	4/21/97	jaw
Barium, total (3051)	M6010 ICP	81.0		mg/Kg	0.3	1	4/21/97	jaw
Beryllium (1312)	M200.7 ICP		U	mg/L	0.002	0.01	4/21/97	jaw
Beryllium, total (3051)	M6010 ICP	0.2	B	mg/Kg	0.2	1	4/21/97	jaw
Bismuth (1312)	M200.7 ICP		U	mg/L	0.1	0.5	4/21/97	jaw
Bismuth, total (3051)	M6010 ICP		U	mg/Kg	10	50	4/21/97	jaw
Boron (1312)	M6010 ICP	0.01	B	mg/L	0.01	0.05	4/21/97	jaw
Boron, total (3051)	M6010 ICP	10		mg/Kg	1	5	4/21/97	jaw
Cadmium (1312)	M7131 GFAA		U	mg/L	0.0006	0.003	4/23/97	sh
Cadmium, total (3051)	M7131 GFAA	0.4	B	mg/Kg	0.3	1	4/23/97	sh
Calcium (1312)	M200.7 ICP	19.0		mg/L	0.2	1	4/21/97	jaw
Calcium, total (3051)	M6010 ICP	1510		mg/Kg	20	100	4/21/97	jaw
Chromium (1312)	M200.7 ICP	0.01	B	mg/L	0.01	0.05	4/21/97	jaw
Chromium, total (3051)	M6010 ICP	7		mg/Kg	1	5	4/21/97	jaw
Cobalt (1312)	M200.7 ICP		U	mg/L	0.01	0.05	4/21/97	jaw
Cobalt, total (3051)	M6010 ICP	1	B	mg/Kg	1	5	4/21/97	jaw
Copper (1312)	M200.7 ICP	0.01	B	mg/L	0.01	0.05	4/21/97	jaw
Copper, total (3051)	M6010 ICP	8		mg/Kg	1	5	4/21/97	jaw
Gallium (1312)	M6010 ICP		U	mg/L	0.1	0.5	4/21/97	jaw
Gallium, total (3051)	M6010 ICP		U	mg/Kg	10	50	4/21/97	jaw
Iron (1312)	M200.7 ICP	0.35		mg/L	0.01	0.05	4/21/97	jaw
Iron, total (3051)	M6010 ICP	10900		mg/Kg	1	5	4/21/97	jaw
Lead (1312)	M7421 GFAA		U	mg/L	0.001	0.005	4/22/97	fp
Lead, total (3051)	M7421 GFAA	58		mg/Kg	3	10	4/22/97	fp
Lithium (1312)	M200.7 ICP		U	mg/L	0.02	0.1	4/21/97	jaw
Lithium, total (3051)	M6010 ICP		U	mg/Kg	2	10	4/21/97	jaw
Magnesium (1312)	M200.7 ICP	0.3	B	mg/L	0.2	1	4/21/97	jaw
Magnesium, total (3051)	M6010 ICP	230		mg/Kg	20	100	4/21/97	jaw
Manganese (1312)	M200.7 ICP		U	mg/L	0.005	0.03	4/21/97	jaw
Manganese, total (3051)	M6010 ICP	13.9		mg/Kg	0.5	1	4/21/97	jaw

Qualifiers (based on EPA CLP)

U = Analyte was analyzed for but not detected at the indicated MDL

B = Analyte concentration detected at a value between MDL and PQL

PQL = Practical Quantitation Limit

R Poulsen

Vice President of Operations: Ralph Poulsen

ACZ

Analytical Results

ACZ Laboratories, Inc.
30400 Downhill Drive
Steamboat Springs, CO 80487
(800) 334-5493

Lab Sample ID: *L13223-03*
Client Sample ID: *HGCT-3 Solid Rinsed*
Client Project ID: *Grouse Creek 22209*
ACZ Report ID: *RG42261*

Steffen Robertson & Kirsten
7175 W. Jefferson Ave. Suite 3000
Lakewood, CO 80235
Gene Muller

Date Sampled: *3/26/97 00:00*
Date Received: *3/31/97.*
Date Reported: *4/29/97*

Sample Matrix: *Soil*

Mercury, (1312)	M7470 CVAA		U	mg/L	0.0002	0.001	4/23/97	ch
Mercury, total	M7471 CVAA	0.09	B	mg/Kg	0.02	0.1	4/24/97	ch
Molybdenum (1312)	M200.7 ICP	0.01	B	mg/L	0.01	0.05	4/21/97	jaw
Molybdenum, total (3051)	M6010 ICP	6		mg/Kg	1	5	4/21/97	jaw
Nickel (1312)	M200.7 ICP		U	mg/L	0.01	0.05	4/21/97	jaw
Nickel, total (3051)	M6010 ICP	2	B	mg/Kg	1	5	4/21/97	jaw
Potassium (1312)	M200.7 ICP	5.2		mg/L	0.3	1	4/28/97	jaw
Potassium, total (3051)	M6010 ICP	4410		mg/Kg	30	100	4/21/97	jaw
Scandium (1312)	M6010 ICP		U	mg/L	0.1	0.5	4/21/97	jaw
Scandium, total (3051)	M6010 ICP		U	mg/Kg	10	50	4/21/97	jaw
Selenium, (1312)	M7742 Modified, AA-Hydride	0.016		mg/L	0.001	0.005	4/24/97	ch
Selenium, total (3051)	M7742 Modified, AA-Hydride	1.6		mg/Kg	0.1	0.5	4/24/97	ch
Silver (1312)	M200.7 ICP	0.007	B	mg/L	0.005	0.03	4/21/97	jaw
Silver, total (3051)	M6010 ICP	4.6		mg/Kg	0.5	3	4/21/97	jaw
Sodium (1312)	M200.7 ICP	6.3		mg/L	0.3	1	4/21/97	jaw
Sodium, total (3051)	M6010 ICP	90	B	mg/Kg	30	100	4/21/97	jaw
Strontium (1312)	M200.7 ICP	0.01	B	mg/L	0.01	0.05	4/21/97	jaw
Strontium, total (3051)	M6010 ICP	14		mg/Kg	1	5	4/21/97	jaw
Thallium (1312)	M7841 GFAA		U	mg/L	0.002	0.01	4/22/97	fp
Thallium, total (3051)	M7841 GFAA		U	mg/Kg	1	5	4/22/97	fp
Tin (1312)	M200.7 ICP	0.1	B	mg/L	0.1	0.5	4/21/97	jaw
Tin, total (3051)	M6010 ICP		U	mg/Kg	10	50	4/21/97	jaw
Titanium (1312)	M200.7 ICP		U	mg/L	0.005	0.03	4/21/97	jaw
Titanium, total (3051)	M6010 ICP	3.8		mg/Kg	0.5	3	4/21/97	jaw
Vanadium (1312)	M200.7 ICP		U	mg/L	0.005	0.03	4/21/97	jaw
Vanadium, total (3051)	M6010 ICP	2.0	B	mg/Kg	0.5	3	4/21/97	jaw
Zinc (1312)	M200.7 ICP	0.01	B	mg/L	0.01	0.05	4/21/97	jaw
Zinc, total (3051)	M6010 ICP	33		mg/Kg	1	5	4/21/97	jaw

Soil Analysis

Parameter	Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Acid Generation Potential (calc)	M600/2-78-054 1.3	10		tons/KT	1	5	4/22/97	as
Acid Neutralization Potential (calc)	M600/2-78-054 1.3	2	B	tons/KT	1	5	4/22/97	as
Acid-Base Potential (calc)	M600/2-78-054 1.3	-8		tons/KT	1	5	4/22/97	as
Conductivity @25C (1312)	M120.1 - Meter	0.184		mmhos/cm	0.001	0.01	4/23/97	sw
Neutralization Potential as CaCO3	M600/2-78-054 3.2.3	0.2	B	%	0.1	0.5	4/22/97	sw
pH, (1312)	M150.1	7.9		units	0.1	0.1	4/21/97	as
Solids, Percent	CLPSOW390, PART F, D-98	100.0		%	0.1	0.5	4/18/97	sw

Qualifiers (Qual) - Definitions

U = Analyte was analyzed for but not detected at the indicated MDL

B = Analyte concentration detected at a value between MDL and PQL

PQL = Practical Quantitation Limit

RVP

Vic President of Operations: Ralph Poulsen

ACZ **Analytical Results**

ACZ Laboratories, Inc.
30400 Downhill Drive
Steamboat Springs, CO 80487
(800) 334-5493

Lab Sample ID: *L13223-03*
Client Sample ID: *HGCT-3 Solid Rinsed*
Client Project ID: *Grouse Creek 22209*
ACZ Report ID: *RG42261*

Steffen Robertson & Kirsten
7175 W. Jefferson Ave. Suite 3000
Lakewood, CO 80235
Gene Muller

Date Sampled: *3/26/97 00:00*
Date Received: *3/31/97*
Date Reported: *4/29/97*

Sample Matrix: *Soil*

Sulfur Forms	M600/2-78-054 3.2.4							
Sulfur Sulfate (HCl extractable)		0.03	B	%	0.01	0.1	4/22/97	as
Sulfur Sulfide (residual)		0.33		%	0.01	0.1	4/22/97	as
Sulfur Total		0.36		%	0.01	0.1	4/22/97	as

Soil Preparation

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Digestion - Microwave	M3051, HNO3						4/19/97	sw
Synthetic Precip. Leaching Procedure	M1312						4/24/97	sw

Wet Chemistry

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Acidity (1312)	M305.1		U	mg/L	2	10	4/23/97	bgb
Alkalinity (1312)	M310.1							
Bicarbonate as CaCO3		47		mg/L	2	10	4/22/97	jb
Carbonate as CaCO3			U	mg/L	2	10	4/22/97	jb
Hydroxide as CaCO3			U	mg/L	2	10	4/22/97	jb
Total Alkalinity		47		mg/L	2	10	4/22/97	jb
Chloride (1312)	M325.2 - Colorimetric (RFA)	6		mg/L	1	5	4/21/97	hm
Cyanate (1312)	SM4500-CN L		U	mg/L	0.2	0.8	4/22/97	hm
Cyanide, total (1312)	M9012 - Automated Colorimetric	1.8		mg/L	0.1	0.5	4/23/97	hm
Cyanide, WAD (1312)	SM4500-CN I-Colorimetric w/ distillation	0.02	B	mg/L	0.01	0.05	4/23/97	hm
Fluoride (1312)	M300.0	0.2	B	mg/L	0.1	0.5	4/22/97	bgb
Nitrate (1312)	M300.0	0.56		mg/L	0.02	0.1	4/21/97	hm
Nitrate/Nitrite as N (1312)	M353.2 - Automated Cadmium Reduction	0.64		mg/L	0.02	0.1	4/21/97	hm
Nitrite as N (1312)	M353.2 - Automated	0.08		mg/L	0.01	0.05	4/21/97	hm
Nitrogen, ammonia (1312)	M350.1 - Automated Phenate	0.31		mg/L	0.05	0.3	4/22/97	hm/jb
Phosphorus, ortho dissolved (1312)	M365.1 - Automated Ascorbic Acid	1.37		mg/L	0.05	0.3	4/22/97	hm
Phosphorus, Total (1312)	SM4500-P I	1.320		mg/L	0.005	0.03	4/22/97	jb
Residue, Filterable (TDS) @180C (1312)	M160.1 - Gravimetric	70		mg/L	10	20	4/22/97	bgb
Sulfate (1312)	M375.3 - Gravimetric	10	B	mg/L	10	20	4/22/97	bgb

Note: As requested, the 1312 extraction was modified to a liquid to solid ratio of 2:1 and the leachate was adjusted with HCL to a pH of 4.5 units; and the Acid-Base Accounting calculations are based on the Sulfur Sulfide (residual) value.

Indicating Qualifiers (Based on EPA Guidelines)

U = Analyte was analyzed for but not detected at the indicated MDL

B = Analyte concentration detected at a value between MDL and PQL

PQL = Practical Quantitation Limit

RP

Vice President of Operations: Ralph Poulsen

ACZ

ORIGINAL

Analytical Results

ACZ Laboratories, Inc.
30400 Downhill Drive
Steamboat Springs, CO 80487
(800) 334-5493

Lab Sample ID: *L13222-01*
Client Sample ID: *HGCT-2*
Client Project ID: *Grouse Creek 22209*
ACZ Report ID: *RG42257*

Steffen Robertson & Kirsten
7175 W. Jefferson Ave. Suite 3000
Lakewood, CO 80235
Gene Muller

Date Sampled: *3/26/97 00:00*
Date Received: *3/31/97*
Date Reported: *4/29/97*

Sample Matrix: *Soil*

Soil Preparation

Method	Reference	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972	4/9/97	as
Pressure Filter, 0.45um	•••	4/4/97	as/tw

U = Analyte was analyzed for but not detected at the indicated MDL
B = Analyte concentration detected at a value between MDL and PQL
PQL = Practical Quantitation Limit

RV Poulsen

Vice President of Operations: Ralph Poulsen

ACZ

Analytical Results

ACZ Laboratories, Inc.
30400 Downhill Drive
Steamboat Springs, CO 80487
(800) 334-5493

Lab Sample ID: *L13222-03*
Client Sample ID: *HGCT-2 Solid Rinsed*
Client Project ID: *Grouse Creek 22209*
ACZ Report ID: *RG42258*

Steffen Robertson & Kirsten
7175 W. Jefferson Ave. Suite 3000
Lakewood, CO 80235
Gene Muller

Date Sampled: *3/26/97 00:00*
Date Received: *3/31/97*
Date Reported: *4/29/97*

Sample Matrix: *Soil*

Soil Analysis

Chemical	Method	Result	Qualifier	Units	MDL	PQL	Date	Analyst
Acid Generation Potential (calc)	M600/2-78-054 1.3	6		tons/KT	1	5	4/22/97	as
Acid Neutralization Potential (calc)	M600/2-78-054 1.3	-3	B	tons/KT	1	5	4/22/97	as
Acid-Base Potential (calc)	M600/2-78-054 1.3	-3		tons/KT	1	5	4/22/97	as
Neutralization Potential as CaCO3	M600/2-78-054 3.2.3	0.3	B	%	0.1	0.5	4/22/97	sw
Sulfur Forms	M600/2-78-054 3.2.4							
Sulfur Sulfate (HCl extractable)		0.04	B	%	0.01	0.1	4/22/97	as
Sulfur Sulfide (residual)		0.18		%	0.01	0.1	4/22/97	as
Sulfur Total		0.22		%	0.01	0.1	4/22/97	as

Note: As requested the Acid-Base Accounting calculations are based on the Sulfur Sulfide (residual) value.

Qualifiers (Qualifiers Defined)

U = Analyte was analyzed for but not detected at the indicated MDL

B = Analyte concentration detected at a value between MDL and PQL

PQL = Practical Quantitation Limit

RV Poulsen

Vice President of Operations: Ralph Poulsen

ORIGINAL

ACZ

Analytical Results

ACZ Laboratories, Inc.
30400 Downhill Drive
Steamboat Springs, CO 80487
(800) 334-5493

Lab Sample ID: *L13221-01*
Client Sample ID: *HGCT-1*
Client Project ID: *Grouse Creek 22209*
ACZ Report ID: *RG42253*

Steffen Robertson & Kirsten
7175 W. Jefferson Ave. Suite 3000
Lakewood, CO 80235
Gene Muller

Date Sampled: *3/26/97 00:00*
Date Received: *3/31/97*
Date Reported: *4/29/97*

Sample Matrix: *Soil*

Soil Preparation

Method	Citation	Result	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972					4/9/97	as
Pressure Filter, 0.45um						4/4/97	as/tw

Important Qualifiers & Definitions (EPA CLP, SW)

U = Analyte was analyzed for but not detected at the indicated MDL

B = Analyte concentration detected at a value between MDL and PQL

PQL = Practical Quantitation Limit

Vice President of Operations: Ralph Poulsen

ACZ

Analytical Results

ACZ Laboratories, Inc.
30400 Downhill Drive
Steamboat Springs, CO 80487
(800) 334-5493

Lab Sample ID: *L13221-02*
Client Sample ID: *HGCT-1 Liquid*
Client Project ID: *Grouse Creek 22209*
ACZ Report ID: *RG42254*

Steffen Robertson & Kirsten
7175 W. Jefferson Ave. Suite 3000
Lakewood, CO 80235
Gene Muller

Date Sampled: *3/26/97 00:00*
Date Received: *3/31/97*
Date Reported: *4/29/97*

Sample Matrix: *Leachate*

Metals Analysis

Parameter	Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Aluminum, dissolved	M200.7 ICP	2.00		mg/L	0.09	0.5	4/10/97	jaw
Antimony, dissolved	M204.2 GFAA	0.18		mg/L	0.01	0.05	4/10/97	sh
Arsenic, dissolved	M206.2 GFAA	2.4		mg/L	0.1	0.5	4/10/97	sh
Barium, dissolved	M200.7 ICP	0.019	B	mg/L	0.009	0.03	4/10/97	jaw
Beryllium, dissolved	M200.7 ICP		U	mg/L	0.006	0.03	4/10/97	jaw
Bismuth, dissolved	M200.7 ICP		U	mg/L	0.3	2	4/10/97	jaw
Boron, dissolved	M200.7 ICP	0.18	B	mg/L	0.03	0.2	4/10/97	jaw
Cadmium, dissolved	M220.2 GFAA		U	mg/L	0.003	0.01	4/9/97	sh
Calcium, dissolved	M200.7 ICP	322.0		mg/L	0.6	3	4/10/97	jaw
Chromium, dissolved	M200.7 ICP		U	mg/L	0.03	0.2	4/10/97	jaw
Cobalt, dissolved	M200.7 ICP	0.11	B	mg/L	0.03	0.2	4/10/97	jaw
Copper, dissolved	M200.7 ICP	0.24		mg/L	0.03	0.2	4/10/97	jaw
Gallium, dissolved	M200.7 ICP		U	mg/L	0.3	2	4/10/97	jaw
Iron, dissolved	M200.7 ICP	150.00		mg/L	0.03	0.2	4/10/97	jaw
Lead, dissolved	M239.2 GFAA		U	mg/L	0.005	0.03	4/10/97	sh
Lithium, dissolved	M200.7 ICP		U	mg/L	0.06	0.3	4/10/97	jaw
Magnesium, dissolved	M200.7 ICP		U	mg/L	0.6	3	4/10/97	jaw
Manganese, dissolved	M200.7 ICP		U	mg/L	0.02	0.08	4/10/97	jaw
Mercury, dissolved	M245.1 CVAA	0.0008	B	mg/L	0.0002	0.001	4/10/97	ch
Molybdenum, dissolved	M200.7 ICP	0.43		mg/L	0.03	0.2	4/10/97	jaw
Nickel, dissolved	M200.7 ICP	0.03	B	mg/L	0.03	0.2	4/10/97	jaw
Potassium, dissolved	M200.7 ICP	33.0		mg/L	0.9	3	4/10/97	jaw
Scandium, dissolved	M200.7 ICP		U	mg/L	0.3	2	4/10/97	jaw
Selenium, dissolved	SM 3500-Se C, AA-Hydride	0.28		mg/L	0.01	0.05	4/11/97	ch
Silver, dissolved	M200.7 ICP	0.15		mg/L	0.02	0.08	4/10/97	jaw
Sodium, dissolved	M200.7 ICP	528.0		mg/L	0.9	3	4/10/97	jaw
Strontium, dissolved	M200.7 ICP	0.2	B	mg/L	0.1	0.5	4/10/97	jaw
Thallium, dissolved	M279.2 GFAA		U	mg/L	0.04	0.2	4/9/97	sh
Tin, dissolved	M200.7 ICP		U	mg/L	0.2	1	4/10/97	kr
Titanium, dissolved	M200.7 ICP		U	mg/L	0.02	0.08	4/10/97	jaw
Vanadium, dissolved	M200.7 ICP		U	mg/L	0.02	0.08	4/10/97	jaw
Zinc, dissolved	M200.7 ICP	0.14	B	mg/L	0.03	0.2	4/10/97	jaw

Laboratory Qualifiers (based on EPA CLP 3/90)

U = Analyte was analyzed for but not detected at the indicated MDL

B = Analyte concentration detected at a value between MDL and PQL

PQL = Practical Quantitation Limit

R V Poulsen

Vice President of Operations: Ralph Poulsen

ACZ

Analytical Results

ACZ Laboratories, Inc.
30400 Downhill Drive
Steamboat Springs, CO 80487
(800) 334-5493

Lab Sample ID: *L13221-02*
Client Sample ID: *HGCT-1 Liquid*
Client Project ID: *Grouse Creek 22209*
ACZ Report ID: *RG42254*

Steffen Robertson & Kirsten
7175 W. Jefferson Ave. Suite 3000
Lakewood, CO 80235
Gene Muller

Date Sampled: *3/26/97 00:00*
Date Received: *3/31/97*
Date Reported: *4/29/97*

Sample Matrix: *Leachate*

Wet Chemistry

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	M310.1							
Bicarbonate as CaCO3		59		mg/L	2	10	4/5/97	jb
Carbonate as CaCO3		94		mg/L	2	10	4/5/97	jb
Hydroxide as CaCO3			U	mg/L	2	10	4/5/97	jb
Total Alkalinity		153		mg/L	2	10	4/5/97	jb
Chloride	M325.2 - Colorimetric (RFA)	355		mg/L	5	30	4/14/97	hm
Conductivity @25C	M120.1 - Meter	2810		umhos/cm	1	10	4/5/97	jb
Cyanate	SM4500-CN L	58		mg/L	3	20	4/10/97	jb
Cyanide, total	M335.3 - Colorimetric w/ distillation	310		mg/L	10	50	4/11/97	jb
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	20		mg/L	1	5	4/11/97	jb
Nitrate as N, dissolved	M353.2 - Automated Cadmium Reduction	10.1		mg/L	0.2	1	4/5/97	jb
Nitrate/Nitrite as N, dissolved	M353.2 - Automated Cadmium Reduction	12.5		mg/L	0.2	1	4/5/97	jb
Nitrite as N, dissolved	M353.2 - Automated Cadmium Reduction	2.4		mg/L	0.1	0.5	4/5/97	jb
Nitrogen, ammonia	M350.1 - Automated Phenate	23		mg/L	1	5	4/16/97	hm
pH (lab)	M150.1 - Electrometric	9.6		units	0.1	0.1	4/5/97	jb
Residue, Filterable (TDS) @180C	M160.1 - Gravimetric	2810		mg/L	10	20	4/10/97	bgb
Sulfate	M375.3 - Gravimetric	1130		mg/L	10	20	4/10/97	bgb
TDS (calculated)	Calculation	2690		mg/L	10	50	4/29/97	calc
TDS (ratio - measured/calculated)	Calculation	1.05					4/29/97	calc
Thiocyanate (SCN)	SM4500-CN M	70		mg/L	10	50	4/11/97	jk

Inorganic Qualifiers (Based on EPA CLP 3/90)

U = Analyte was analyzed for but not detected at the indicated MDL

B = Analyte concentration detected at a value between MDL and PQL

PQL = Practical Quantitation Limit

RVP

Vice President of Operations: Ralph Poulsen

ACZ

Analytical Results

ACZ Laboratories, Inc.
30400 Downhill Drive
Steamboat Springs, CO 80487
(800) 334-5493

Lab Sample ID: *L13221-03*
Client Sample ID: *HGCT-1 Solid Rinsed*
Client Project ID: *Grouse Creek 22209*
ACZ Report ID: *RG42255*

Steffen Robertson & Kirsten
7175 W. Jefferson Ave. Suite 3000
Lakewood, CO 80235
Gene Muller

Date Sampled: *3/26/97 00:00*
Date Received: *3/31/97*
Date Reported: *4/30/97*

Sample Matrix: *Soil*

Metals Analysis

Parameter	Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Aluminum (1312)	M200.7 ICP	0.45		mg/L	0.03	0.2	4/21/97	jaw
Aluminum, total (3051)	M6010 ICP	1890		mg/Kg	3	20	4/21/97	jaw
Antimony (1312)	M7041 GFAA	0.094		mg/L	0.008	0.04	4/21/97	sh
Antimony, total (3051)	M7041 GFAA		U	mg/Kg	1	5	4/21/97	sh
Arsenic (1312)	M200.7 ICP	1.94		mg/L	0.04	0.2	4/21/97	jaw
Arsenic, total (3051)	M6010 ICP	428		mg/Kg	4	20	4/21/97	jaw
Barium (1312)	M200.7 ICP		U	mg/L	0.003	0.01	4/21/97	jaw
Barium, total (3051)	M6010 ICP	19.2		mg/Kg	0.3	1	4/21/97	jaw
Beryllium (1312)	M200.7 ICP		U	mg/L	0.002	0.01	4/21/97	jaw
Beryllium, total (3051)	M6010 ICP		U	mg/Kg	0.2	1	4/21/97	jaw
Bismuth (1312)	M200.7 ICP		U	mg/L	0.1	0.5	4/21/97	jaw
Bismuth, total (3051)	M6010 ICP		U	mg/Kg	10	50	4/21/97	jaw
Boron (1312)	M6010 ICP	0.01	B	mg/L	0.01	0.05	4/21/97	jaw
Boron, total (3051)	M6010 ICP	6		mg/Kg	1	5	4/21/97	jaw
Cadmium (1312)	M7131 GFAA		U	mg/L	0.0006	0.003	4/23/97	sh
Cadmium, total (3051)	M7131 GFAA	0.3	B	mg/Kg	0.3	1	4/23/97	sh
Calcium (1312)	M200.7 ICP	17.0		mg/L	0.2	1	4/21/97	jaw
Calcium, total (3051)	M6010 ICP	1100		mg/Kg	20	100	4/21/97	jaw
Chromium (1312)	M200.7 ICP	0.01	B	mg/L	0.01	0.05	4/21/97	jaw
Chromium, total (3051)	M6010 ICP	5		mg/Kg	1	5	4/21/97	jaw
Cobalt (1312)	M200.7 ICP		U	mg/L	0.01	0.05	4/21/97	jaw
Cobalt, total (3051)	M6010 ICP		U	mg/Kg	1	5	4/21/97	jaw
Copper (1312)	M200.7 ICP	0.01	B	mg/L	0.01	0.05	4/21/97	jaw
Copper, total (3051)	M6010 ICP	6		mg/Kg	1	5	4/21/97	jaw
Gallium (1312)	M6010 ICP	0.1	B	mg/L	0.1	0.5	4/21/97	jaw
Gallium, total (3051)	M6010 ICP		U	mg/Kg	10	50	4/21/97	jaw
Iron (1312)	M200.7 ICP	0.48		mg/L	0.01	0.05	4/21/97	jaw
Iron, total (3051)	M6010 ICP	7220		mg/Kg	1	5	4/21/97	jaw
Lead (1312)	M7421 GFAA		U	mg/L	0.001	0.005	4/22/97	fp
Lead, total (3051)	M7421 GFAA	33		mg/Kg	3	10	4/22/97	fp
Lithium (1312)	M200.7 ICP		U	mg/L	0.02	0.1	4/21/97	jaw
Lithium, total (3051)	M6010 ICP		U	mg/Kg	2	10	4/21/97	jaw
Magnesium (1312)	M200.7 ICP	0.2	B	mg/L	0.2	1	4/21/97	jaw
Magnesium, total (3051)	M6010 ICP	90	B	mg/Kg	20	100	4/21/97	jaw
Manganese (1312)	M200.7 ICP		U	mg/L	0.005	0.03	4/21/97	jaw
Manganese, total (3051)	M6010 ICP	10.3		mg/Kg	0.5	1	4/21/97	jaw

Indicator Qualifiers (based on DLA CLP 3/90)

U = Analyte was analyzed for but not detected at the indicated MDL

B = Analyte concentration detected at a value between MDL and PQL

PQL = Practical Quantitation Limit

RPoulsen

Vice President of Operations: Ralph Poulsen

ACZ

Analytical Results

ACZ Laboratories, Inc.
30400 Downhill Drive
Steamboat Springs, CO 80487
(800) 334-5493

Lab Sample ID: L13221-03
Client Sample ID: HGCT-1 Solid Rinsed
Client Project ID: Grouse Creek-22209
ACZ Report ID: RG42255

Steffen Robertson & Kirsten
7175 W. Jefferson Ave. Suite 3000
Lakewood, CO 80235
Gene Muller

Date Sampled: 3/26/97 00:00
Date Received: 3/31/97
Date Reported: 4/30/97

Sample Matrix: Soil

Mercury, (1312)	M7470 CVAA		U	mg/L	0.0002	0.001	4/23/97	ch
Mercury, total	M7471 CVAA	0.08	B	mg/Kg	0.02	0.1	4/24/97	ch
Molybdenum (1312)	M200.7 ICP	0.02	B	mg/L	0.01	0.05	4/21/97	jaw
Molybdenum, total (3051)	M6010 ICP	5		mg/Kg	1	5	4/21/97	jaw
Nickel (1312)	M200.7 ICP	0.01	B	mg/L	0.01	0.05	4/21/97	jaw
Nickel, total (3051)	M6010 ICP	1	B	mg/Kg	1	5	4/21/97	jaw
Potassium (1312)	M200.7 ICP	8.2		mg/L	0.3	1	4/28/97	jaw
Potassium, total (3051)	M6010 ICP	990		mg/Kg	30	100	4/21/97	jaw
Scandium (1312)	M6010 ICP		U	mg/L	0.1	0.5	4/21/97	jaw
Scandium, total (3051)	M6010 ICP		U	mg/Kg	10	50	4/21/97	jaw
Selenium, (1312)	M7742 Modified, AA-Hydride	0.019		mg/L	0.001	0.005	4/24/97	ch
Selenium, total (3051)	M7742 Modified, AA-Hydride	2.1		mg/Kg	0.1	0.5	4/24/97	ch
Silver (1312)	M200.7 ICP	0.008	B	mg/L	0.005	0.03	4/21/97	jaw
Silver, total (3051)	M6010 ICP	4.3		mg/Kg	0.5	3	4/21/97	jaw
Sodium (1312)	M200.7 ICP	7.0		mg/L	0.3	1	4/21/97	jaw
Sodium, total (3051)	M6010 ICP	40	B	mg/Kg	30	100	4/21/97	jaw
Strontium (1312)	M200.7 ICP	0.01	B	mg/L	0.01	0.05	4/21/97	jaw
Strontium, total (3051)	M6010 ICP	7		mg/Kg	1	5	4/21/97	jaw
Thallium (1312)	M7841 GFAA		U	mg/L	0.002	0.01	4/22/97	fp
Thallium, total (3051)	M7841 GFAA		U	mg/Kg	1	5	4/22/97	fp
Tin (1312)	M200.7 ICP	0.1	B	mg/L	0.1	0.5	4/21/97	jaw
Tin, total (3051)	M6010 ICP		U	mg/Kg	10	50	4/21/97	jaw
Titanium (1312)	M200.7 ICP		U	mg/L	0.005	0.03	4/21/97	jaw
Titanium, total (3051)	M6010 ICP		U	mg/Kg	0.5	3	4/21/97	jaw
Vanadium (1312)	M200.7 ICP		U	mg/L	0.005	0.03	4/21/97	jaw
Vanadium, total (3051)	M6010 ICP	0.5	B	mg/Kg	0.5	3	4/21/97	jaw
Zinc (1312)	M200.7 ICP		U	mg/L	0.01	0.05	4/21/97	jaw
Zinc, total (3051)	M6010 ICP	27		mg/Kg	1	5	4/21/97	jaw

Soil Analysis

Parameter	EPA Method	Result	Qual	Unit	MDL	PQL	Date	Analyst
Acid Generation Potential (calc)	M600/2-78-054 1.3	5		tons/KT	1	5	4/22/97	as
Acid Neutralization Potential (calc)	M600/2-78-054 1.3	2	B	tons/KT	1	5	4/22/97	as
Acid-Base Potential (calc)	M600/2-78-054 1.3	-3		tons/KT	1	5	4/22/97	as
Conductivity @25C (1312)	M120.1 - Meter	0.179		mmhos/cm	0.001	0.01	4/23/97	sw
Neutralization Potential as CaCO3	M600/2-78-054 3.2.3	0.2	B	%	0.1	0.5	4/22/97	sw
pH, (1312)	M150.1	8.3		units	0.1	0.1	4/21/97	as
Solids, Percent	CLPSOW390, PART F, D-98	99.6		%	0.1	0.5	4/18/97	sw

Laboratory Qualifiers (Based on EPA Guidelines)

U = Analyte was analyzed for but not detected at the indicated MDL

B = Analyte concentration detected at a value between MDL and PQL

PQL = Practical Quantitation Limit

RVP

Vice President of Operations: Ralph Poulsen

United States Department of Agriculture
Forest Service
Yankee Fork Ranger District
Salmon-Challis National Forest
HC/67 Box 650
Clayton, ID 83227

File Code: 2810

Date: April 22, 1999

Mr. Doug Wollant, General Manager
Hecla–Grouse Creek Unit
P.O. Box 647
Challis, Idaho 83226

Dear Doug:

We received the 1998 Summary of Water Quality for the Hecla Grouse Creek Unit on April 2, 1999. The data indicate pervasive exceedances of chronic levels of WAD cyanide in Jordan Creek (chronic exposure criteria for cold water biota). On April 22, 1999, Pete Peters of my staff notified the following agencies/individuals by direct telephone conversation or answering machine of our concerns : IDEQ, Catherine Reno; NMFS/Dale Bregge; USF&W, Kaz Thea; IDF&G, Jim Lukens; and USEPA, Dave Tomten. Pete also discussed our potential concerns with Eric Lancaster of your staff during the week of April 12, 1999. We are aware of your previous negotiations with IDEQ regarding the July release into Washout Creek and the subsequent settlement. Our concern now is with the instream station S-4 itself and other reported monitoring data related to WAD cyanide. Based on reasonable and prudent alternatives included in the Biological Opinion issued by the National Marine Fisheries Service for the Grouse Creek Mine in 1997, exceedances of cold water biota surface water criteria may be cause for reinitiation of consultation pursuant to Section 7 of the Endangered Species Act.

We expect that you will be able to share the results of the on-going study of the groundwater system at the mine site as soon as possible in the expectation that the exceedances in Jordan Creek can be stopped. We anticipate arranging a meeting with you and your staff in the near future as soon as we have evaluation and comments from the relevant Interagency Task Force members.

Sincerely,

for: RENE' M. MABE
District Ranger

cc: S.O.
B.Machado
T.Montoya
South Minerals Zone
Catherine Reno, IDEQ, IDaho Falls
Joe Baldwin, IDEQ, Boise
Dale Bregge, NMFS, Boise
Kaz Thea, USF&WS, Pocatello
Jim Lukens, IDF&G, Salmon
Dave Tomten, EPA, Boise

Hecla
MINING COMPANY

RECEIVED

MAY 05 1999

RANGER DISTRICT

Rene' Mabe
District Ranger
USFS, Salmon-Challis National Forest
HC/67 Box 650
Clayton, Idaho 83227

May 5, 1999

RE: Hecla Mining Company's Preliminary Plan to Address USFS Concerns with Jordan Creek Water Quality.

Dear Rene':

On April 28, 1999, Eric Lancaster and I (Hecla) met with Barbara Machado, Tom Montoya, Pete Peters, Leon Jadlowski and you (USFS) to discuss the Jordan Creek water quality data that was presented in Hecla Mining Company's 1998 Annual Water Quality Report.

At this meeting, you asked for Hecla to respond in writing concerning our preliminary plan to address short and long term actions that Hecla would consider appropriate to pursue to correct the water quality in Jordan Creek at the surface monitoring sites S-2, S-3, S-4, S-5 and S-11. Hecla believes that the plan stated below will assist in identifying and locating the problem and will result in helping to define the appropriate corrective action.

Hecla is working with the IDEQ on a plan to investigate the cause(s) of these recent "hits" in sampling events and implement appropriate corrective actions under our Cyanidation Permit No. CN-000022. At the request of IDEQ on April 29, 1999, Hecla began daily sampling at surface monitoring sites S-2, S-3, S-4, S-5 and S-11 on April 30,1999. Hecla will be meeting with the IDEQ on May 12, 1999 to discuss and hopefully obtain agreement of this plan. Hecla will of course provide a copy of the final plan to the USFS.

SHORT TERM ACTIONS:

1. Hecla collected grab samples at surface monitoring sites S-2, S-3, S-4, S-5 and S-11 on April 27, 1999. These samples are to be analyzed for total and WAD cyanide. The first outside analytical lab reported the results stated in the table below. A second outside analytical lab is performing an independent analysis on each of these samples and the results will be forwarded to the IDEQ and USFS when they are received.

Sample Collection Date	Surface Monitoring Site	Total Cyanide (ppm)	WAD Cyanide (ppm)
April 27, 1999	S-2	0.05	0.03
April 27, 1999	S-3	0.04	0.03
April 27, 1999	S-4	0.05	0.03
April 27, 1999	S-5	0.03	0.02
April 27, 1999	S-11	0.02	0.01

2. Hecla collected the acute samples (three samples per site for one day; each sample 20 minutes apart) for the surface monitoring sites S-2, S-3, S-4, S-5 and S-11 on April 30, 1999. Hecla took the chronic samples (two samples per day for four consecutive days) for these surface monitoring sites from April

Grouse Creek Unit • P.O. Box 647 • Challis, ID 83226 • (208) 879-2304 • Fax (208) 879-5529

30 through May 3, 1999. This sampling was conducted in accordance with the IDEQ acute and chronic protocol. The results will be forwarded to the IDEQ and USFS when they are received.

3. Hecla will submit the physical data and cyanide analysis of the new monitoring wells (MW-15, MW-17, MW-19, MW-20, MW-23, MW-24, MW-25, MW-26, MW-27, MW-28) to the IDEQ and USFS in the hydrogeologic report on or before May 21, 1999.

4. Hecla will submit the most recent results of the analytical analysis from the older monitoring wells (MW-1, MW-3, MW-7, MW-10, MW-11, MW-12, MW-13, MW-14, MW-16) to the IDEQ and USFS by May 12, 1999.

5. Hecla will submit the final hydrogeologic report, currently being prepared by Golder Associates, to the IDEQ and USFS. Hecla anticipates that this report will be finalized with in the next two weeks and can be forwarded to the IDEQ and USFS on or before May 21, 1999.

6. Hecla has been in compliance with our NPDES permit limits at Outfall 002. Hecla implemented these short-term actions listed below to further improve the quality of our effluent at Outfall 002. Hecla began to implement the short-term actions listed below on April 30, 1999.
   - Reduced the use of process water from the Jordan Creek pump station;
   - Temporarily pump Pond 6 (underdrain waters) to Pond 1 (tailing impoundment);
   - Temporarily discharge the treated effluent from the water treatment plant to Pond 3;
   - Pumping well MW-26 to the water treatment plant;
   - Temporarily increased the carbon advance schedule in the Granular Activated Carbon (GAC) columns; and
   - Routed Pond 4 waters to the water treatment plant for treatment.

7. Hecla plans to drill additional wells at the North Embankment area to verify the ground water flow directions and the position of the apparent ground water divide east of the embankment. These wells also may have the potential to be used for ground water quality control. The number and location of these wells will be based on the recommendations in Golder's hydrogeologic report. These wells are scheduled to be drilled in early June or sooner if site conditions allow.

8. Hecla plans to drill additional wells at the South Embankment area to provide additional ground water elevation, water quality information and ground water flow directions. These wells also may have the potential to be used for ground water quality control. The number and location of these wells will be based on the recommendations in Golder's hydrogeologic report. These wells are scheduled to be drilled in early June or sooner if site conditions allow.

9. Hecla will attempt to place a HDPE synthetic liner in the rock sump area of Pond 4 and tie it into the existing HDPE liner in the Pond 4 extension. This work is scheduled to commence during the period of low ground water flows of August through October 1999.

10. Hecla will collect samples in the existing BMPs located down stream of the North Embankment area and from the streams on Estes Mountain side between surface monitoring sites S-2 and S-3 to determine if these areas are possible sources. This work will commence as soon as the snow recedes and allows access to these sites.

11. Hecla has operated a mechanical aeration/evaporation system in the tailing impoundment during 1996, 1997 and 1998. This system enhances the natural cyanide degradation process. Hecla plans on operating the mechanical aeration/evaporation system in 1999.

12. Hecla will conduct a laboratory test of using a hydrogen peroxide treatment on the tailing impoundment supernatant to see if this is a feasible option to reduce the WAD cyanide concentration. This test work is expected to be conducted in May / June 1999.

LONG TERM ACTIONS:

13. Hecla has applied for a grant with the U.S. Department of Energy, Federal Energy Technology Center to study enhancement of cyanide degradation in tailing impoundments by stimulating indigenous microorganisms. If Hecla is successful in obtaining this grant, the study would commence in June 1999. The purpose of this study is to try to identify any indigenous microorganisms that destroy cyanide and to stimulate them within the tailing impoundment.

14. The natural attenuation process occurring within the tailing impoundment has significantly reduced the level of cyanide since the initiation of the temporary suspension of operations. The natural attenuation process is expected to continue over the next several years and further reduce the cyanide levels.

Date Sampled	Tailings Impoundment Total cyanide (ppm)	Tailings Impoundment WAD cyanide (ppm)
January 14, 1997	-	38
April 6, 1997	430	-
November 11, 1997	180	6.2
May 29, 1998	170	12.8
August 12, 1998	-	1.4
October 20, 1998	76	-

15. Hecla has previously applied for the renewal of the NPDES permit at the Grouse Creek Unit. In this renewal, Hecla has requested the ability to treat and discharge the supernatant from the tailing impoundment. The ability to treat and discharge the tailing impoundment supernatant is crucial in de-watering the impoundment so reclamation can occur in the shortest time frame possible.

Hecla believes these actions will assist in identifying and locating the problem and will result in helping to define the appropriate corrective action. Hecla takes this situation very seriously and is committed to solving any problems. If you have any questions, please contact me at (208) 879-2304, ext. 530.

Sincerely,

Douglas G. Wollant

Douglas G. Wollant
Hecla Mining Company
Unit Manager Grouse Creek Unit

Cc: C. Reno (IDEQ)

Hecla
MINING COMPANY

RECEIVED
YANKEE FORK R.D.
MAY - 6 '99

DFR	✓		
SSS			
RWW			
RA			
FISH	✓		
SZM			
CC:	CCRath		
FAX			

Rene' Mabe
District Ranger
USFS, Salmon-Challis National Forest
HC/67 Box 650
Clayton, Idaho 83227

May 5, 1999

RE: Hecla Mining Company's Preliminary Plan to Address USFS Concerns with Jordan Creek Water Quality.

Dear Rene':

On April 28, 1999, Eric Lancaster and I (Hecla) met with Barbara Machado, Tom Montoya, Pete Peters, Leon Jadlowski and you (USFS) to discuss the Jordan Creek water quality data that was presented in Hecla Mining Company's 1998 Annual Water Quality Report.

At this meeting, you asked for Hecla to respond in writing concerning our preliminary plan to address short and long term actions that Hecla would consider appropriate to pursue to correct the water quality in Jordan Creek at the surface monitoring sites S-2, S-3, S-4, S-5 and S-11. Hecla believes that the plan stated below will assist in identifying and locating the problem and will result in helping to define the appropriate corrective action.

Hecla is working with the IDEQ on a plan to investigate the cause(s) of these recent "hits" in sampling events and implement appropriate corrective actions under our Cyanidation Permit No. CN-000022. At the request of IDEQ on April 29, 1999, Hecla began daily sampling at surface monitoring sites S-2, S-3, S-4, S-5 and S-11 on April 30, 1999. Hecla will be meeting with the IDEQ on May 12, 1999 to discuss and hopefully obtain agreement of this plan. Hecla will of course provide a copy of the final plan to the USFS.

SHORT TERM ACTIONS:

1. Hecla collected grab samples at surface monitoring sites S-2, S-3, S-4, S-5 and S-11 on April 27, 1999. These samples are to be analyzed for total and WAD cyanide. The first outside analytical lab reported the results stated in the table below. A second outside analytical lab is performing an independent analysis on each of these samples and the results will be forwarded to the IDEQ and USFS when they are received.

Sample Collection Date	Surface Monitoring Site	Total Cyanide (ppm)	WAD Cyanide (ppm)
April 27, 1999	S-2	0.05	0.03
April 27, 1999	S-3	0.04	0.03
April 27, 1999	S-4	0.05	0.03
April 27, 1999	S-5	0.03	0.02
April 27, 1999	S-11	0.02	0.01

2. Hecla collected the acute samples (three samples per site for one day; each sample 20 minutes apart) for the surface monitoring sites S-2, S-3, S-4, S-5 and S-11 on April 30, 1999. Hecla took the chronic samples (two samples per day for four consecutive days) for these surface-monitoring sites from April

Grouse Creek Unit • P.O. Box 647 • Challis, ID 83226 • (208) 879-2304 • Fax (208) 879-5529

30 through May 3, 1999. This sampling was conducted in accordance with the IDEQ acute and chronic protocol. The results will be forwarded to the IDEQ and USFS when they are received.

3. Hecla will submit the physical data and cyanide analysis of the new monitoring wells (MW-15, MW-17, MW-19, MW-20, MW-23, MW-24, MW-25, MW-26, MW-27, MW-28) to the IDEQ and USFS in the hydrogeologic report on or before May 21, 1999.

4. Hecla will submit the most recent results of the analytical analysis from the older monitoring wells (MW-1, MW-3, MW-7, MW-10, MW-11, MW-12, MW-13, MW-14, MW-16) to the IDEQ and USFS by May 12, 1999.

5. Hecla will submit the final hydrogeologic report, currently being prepared by Golder Associates, to the IDEQ and USFS. Hecla anticipates that this report will be finalized with in the next two weeks and can be forwarded to the IDEQ and USFS on or before May 21, 1999.

6. Hecla has been in compliance with our NPDES permit limits at Outfall 002. Hecla implemented these short-term actions listed below to further improve the quality of our effluent at Outfall 002. Hecla began to implement the short-term actions listed below on April 30, 1999.
   - Reduced the use of process water from the Jordan Creek pump station;
   - Temporarily pump Pond 6 (underdrain waters) to Pond 1 (tailing impoundment);
   - Temporarily discharge the treated effluent from the water treatment plant to Pond 3;
   - Pumping well MW-26 to the water treatment plant;
   - Temporarily increased the carbon advance schedule in the Granular Activated Carbon (GAC) columns; and
   - Routed Pond 4 waters to the water treatment plant for treatment.

7. Hecla plans to drill additional wells at the North Embankment area to verify the ground water flow directions and the position of the apparent ground water divide east of the embankment. These wells also may have the potential to be used for ground water quality control. The number and location of these wells will be based on the recommendations in Golder's hydrogeologic report. These wells are scheduled to be drilled in early June or sooner if site conditions allow.

8. Hecla plans to drill additional wells at the South Embankment area to provide additional ground water elevation, water quality information and ground water flow directions. These wells also may have the potential to be used for ground water quality control. The number and location of these wells will be based on the recommendations in Golder's hydrogeologic report. These wells are scheduled to be drilled in early June or sooner if site conditions allow.

9. Hecla will attempt to place a HDPE synthetic liner in the rock sump area of Pond 4 and tie it into the existing HDPE liner in the Pond 4 extension. This work is scheduled to commence during the period of low ground water flows of August through October 1999.

10. Hecla will collect samples in the existing BMPs located down stream of the North Embankment area and from the streams on Estes Mountain side between surface monitoring sites S-2 and S-3 to determine if these areas are possible sources. This work will commence as soon as the snow recedes and allows access to these sites.

11. Hecla has operated a mechanical aeration/evaporation system in the tailing impoundment during 1996, 1997 and 1998. This system enhances the natural cyanide degradation process. Hecla plans on operating the mechanical aeration/evaporation system in 1999.

12. Hecla will conduct a laboratory test of using a hydrogen peroxide treatment on the tailing impoundment supernatant to see if this is a feasible option to reduce the WAD cyanide concentration. This test work is expected to be conducted in May / June 1999.

LONG TERM ACTIONS:

13. Hecla has applied for a grant with the U.S. Department of Energy, Federal Energy Technology Center to study enhancement of cyanide degradation in tailing impoundments by stimulating indigenous microorganisms. If Hecla is successful in obtaining this grant, the study would commence in June 1999. The purpose of this study is to try to identify any indigenous microorganisms that destroy cyanide and to stimulate them within the tailing impoundment.

14. The natural attenuation process occurring within the tailing impoundment has significantly reduced the level of cyanide since the initiation of the temporary suspension of operations. The natural attenuation process is expected to continue over the next several years and further reduce the cyanide levels.

Date Sampled	Tailings Impoundment Total cyanide (ppm)	Tailings Impoundment WAD cyanide (ppm)
January 14, 1997	-	38
April 6, 1997	430	-
November 11, 1997	180	6.2
May 29, 1998	170	12.8
August 12, 1998	-	1.4
October 20, 1998	76	-

15. Hecla has previously applied for the renewal of the NPDES permit at the Grouse Creek Unit. In this renewal, Hecla has requested the ability to treat and discharge the supernatant from the tailing impoundment. The ability to treat and discharge the tailing impoundment supernatant is crucial in de-watering the impoundment so reclamation can occur in the shortest time frame possible.

Hecla believes these actions will assist in identifying and locating the problem and will result in helping to define the appropriate corrective action. Hecla takes this situation very seriously and is committed to solving any problems. If you have any questions, please contact me at (208) 879-2304, ext. 530.

Sincerely,

Douglas G. Wollant

Douglas G. Wollant
Hecla Mining Company
Unit Manager Grouse Creek Unit

Cc: C. Reno (IDEQ)

Hecla
MINING COMPANY

RECEIVED
MAY 10 1999
DEQ-IDAHO FALLS

May 5, 1999

Ms. Catherine Reno
Idaho D.E.Q.
900 North Skyline
Idaho Falls, ID 83403-1718

RE: **Hecla Mining Company - Grouse Creek Unit Cyanidation Permit No. CN-000022 Groundwater and Tailing Pond Water Quarterly Report – 1st Quarter 1999**

Dear Ms. Reno:

In response to DEQ Permit No. CN-000022, parts C.5. and C.7., I have enclosed the laboratory reports with groundwater and surface water results for the 1st quarter of 1999. Also enclosed are additional total cyanide sample analyses for groundwater wells MW-10, MW-11 (Pond 4), MW-13, and MW-14, which were sampled more frequently than required by the above permit. Groundwater well MW-10 was dry until the final week of March 1999. The quarterly groundwater sample is the only MW-10 sample collected during first quarter.

The first quarter 1999 cyanide tracking spreadsheet for the site underdrain complex is also enclosed, along with the first and second quarter 1998 spreadsheet, and the third and fourth quarter 1998 spreadsheet, which were inadvertently omitted from the 1998 quarterly reports.

In accordance with the letter from the DEQ dated May 19, 1997, sampling of the tailings impoundment supernatant is only required on a monthly basis, May through October, during the temporary suspension of operations. Hecla did not conduct any monitoring of the tailings pond during the first quarter of 1999. Monthly monitoring will resume in May.

If you have any questions regarding this information, feel free to contact me at (208)879-2304, extension 530.

Sincerely,

Douglas G. Wollant
Hecla Mining Company
Unit Manager, Grouse Creek Unit

C: Eric Lancaster
Eileen Steilman
Gary Gamble

Grouse Creek Unit • P.O. Box 647 • Challis, ID 83226 • (208) 879-2304 • Fax (208) 879-5529

ACZ

Analytical Results

ACZ Laboratories, Inc.
2773 Downhill Drive
Steamboat Springs, CO 80487
(800) 334-5493

Lab Sample ID: L22555-01
Client Sample ID: S-2
Client Project ID:
ACZ Report ID: RG90225

Hecla Mining Co.-Grouse Creek Unit
P.O. Box 647
Challis, ID 83226
Eileen Steilman

Date Sampled: 3/29/99 13:20
Date Received: 4/1/99
Date Reported: 4/16/99

Sample Matrix: Surface Water

Metals Analysis

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Arsenic, dissolved	M206.2 GFAA		U	mg/L	0.001	0.005	4/3/99	jb
Arsenic, total recoverable	M206.2 GFAA	0.001	B	mg/L	0.001	0.005	4/6/99	jl
Cadmium, dissolved	M200.7 ICP		U	mg/L	0.003	0.02	4/6/99	kr
Cadmium, total recoverable	M200.7 ICP		U	mg/L	0.003	0.02	4/12/99	kr
Copper, dissolved	M200.7 ICP		U	mg/L	0.01	0.05	4/6/99	kr
Copper, total recoverable	M200.7 ICP		U	mg/L	0.01	0.05	4/12/99	kr
Lead, dissolved	M200.7 ICP		U	mg/L	0.04	0.2	4/6/99	kr
Lead, total recoverable	M200.7 ICP		U	mg/L	0.04	0.2	4/10/99	jb
Mercury, dissolved	M245.1 CVAA		U	mg/L	0.0002	0.001	4/10/99	ms
Mercury, total recoverable	M245.1 CVAA		U	mg/L	0.0002	0.001	4/10/99	ms
Selenium, dissolved	SM 3500-Se C, AA-Hydride		U	mg/L	0.001	0.005	4/8/99	ms
Selenium, total recoverable	SM 3500-Se C, AA-Hydride		U	mg/L	0.001	0.005	4/9/99	ms
Silver, dissolved	M200.7 ICP		U	mg/L	0.005	0.03	4/7/99	kr
Silver, total recoverable	M200.7 ICP		U	mg/L	0.005	0.03	4/16/99	jb
Zinc, dissolved	M200.7 ICP	0.01	B	mg/L	0.01	0.05	4/6/99	kr
Zinc, total recoverable	M200.7 ICP	0.01	B	mg/L	0.01	0.05	4/10/99	jb

Metals Prep

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Total Recoverable Digestion	M3005 ICP						4/9/99	td
Total Recoverable Digestion	M3005 GFAA						4/5/99	laa

Wet Chemistry

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	M310.1							
Bicarbonate as CaCO3		29		mg/L	2	10	4/1/99	cd
Carbonate as CaCO3			U	mg/L	2	10	4/1/99	cd
Hydroxide as CaCO3			U	mg/L	2	10	4/1/99	cd
Total Alkalinity		29		mg/L	2	10	4/1/99	cd
Chloride	M325.2 - Colorimetric (RFA)	1	B	mg/L	1	5	4/3/99	bg
Conductivity @25C	M120.1 - Meter	92		umhos/cm	1	10	4/1/99	cd
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.06		mg/L	0.01	0.05	4/13/99	bg
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	0.03	B	mg/L	0.01	0.05	4/8/99	bg
Lab Filtration	***						4/1/99	ss
Lab Filtration & Acidification	***						4/2/99	cc
Nitrate as N, dissolved	Calculation: NO3NO2 minus NO2	0.08	B	mg/L	0.02	0.1	4/16/99	calc
Nitrate/Nitrite as N, dissolved	M353.2 - H2SO4 preserved	0.08	B	mg/L	0.02	0.1	4/3/99	bg
Nitrite as N, dissolved	M353.2 - Automated Cadmium Reduction		U	mg/L	0.01	0.05	4/1/99	ss
Nitrogen, ammonia	M350.1 - Automated Phenate		U	mg/L	0.05	0.3	4/1/99	bg

Qualifiers/Abbreviations: GFAA = Graphite Furnace AA
U = Analyte was analyzed for but not detected at the indicated MDL
B = Analyte concentration detected at a value between MDL and PQL
PQL = Practical Quantitation Limit

Vice President of Operations: Ralph Poulsen

ACZ

Analytical Results

ACZ Laboratories, Inc.
2773 Downhill Drive
Steamboat Springs, CO 80487
(800) 334-5493

Lab Sample ID: L22555-02
Client Sample ID: S-3
Client Project ID:
ACZ Report ID: RG90226

Hecla Mining Co.-Grouse Creek Unit
P.O. Box 647
Challis, ID 83226
Eileen Steilman

Date Sampled: 3/29/99 14:00
Date Received: 4/1/99
Date Reported: 4/16/99

Sample Matrix: Surface Water

Metals Analysis

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Arsenic, dissolved	M206.2 GFAA	0.001	B	mg/L	0.001	0.005	4/3/99	jb
Arsenic, total recoverable	M206.2 GFAA	0.001	B	mg/L	0.001	0.005	4/6/99	jl
Cadmium, dissolved	M200.7 ICP		U	mg/L	0.003	0.02	4/6/99	kr
Cadmium, total recoverable	M200.7 ICP		U	mg/L	0.003	0.02	4/12/99	kr
Copper, dissolved	M200.7 ICP		U	mg/L	0.01	0.05	4/6/99	kr
Copper, total recoverable	M200.7 ICP		U	mg/L	0.01	0.05	4/12/99	kr
Lead, dissolved	M200.7 ICP		U	mg/L	0.04	0.2	4/6/99	kr
Lead, total recoverable	M200.7 ICP		U	mg/L	0.04	0.2	4/10/99	jb
Mercury, dissolved	M245.1 CVAA		U	mg/L	0.0002	0.001	4/10/99	ms
Mercury, total recoverable	M245.1 CVAA		U	mg/L	0.0002	0.001	4/10/99	ms
Selenium, dissolved	SM 3500-Se C, AA-Hydride		U	mg/L	0.001	0.005	4/8/99	ms
Selenium, total recoverable	SM 3500-Se C, AA-Hydride		U	mg/L	0.001	0.005	4/9/99	ms
Silver, dissolved	M200.7 ICP		U	mg/L	0.005	0.03	4/7/99	kr
Silver, total recoverable	M200.7 ICP		U	mg/L	0.005	0.03	4/16/99	jb
Zinc, dissolved	M200.7 ICP		U	mg/L	0.01	0.05	4/6/99	kr
Zinc, total recoverable	M200.7 ICP		U	mg/L	0.01	0.05	4/10/99	jb

Metals Prep

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Total Recoverable Digestion	M3005 ICP						4/9/99	idr
Total Recoverable Digestion	M3005 GFAA						4/5/99	laa

Wet Chemistry

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	M310.1							
Bicarbonate as CaCO3		38		mg/L	2	10	4/1/99	cd
Carbonate as CaCO3			U	mg/L	2	10	4/1/99	cd
Hydroxide as CaCO3			U	mg/L	2	10	4/1/99	cd
Total Alkalinity		38		mg/L	2	10	4/1/99	cd
Chloride	M325.2 - Colorimetric (RFA)		U	mg/L	1	5	4/5/99	bg
Conductivity @25C	M120.1 - Meter	108		umhos/cm	1	10	4/1/99	cd
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.08		mg/L	0.01	0.05	4/13/99	bg
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	0.05		mg/L	0.01	0.05	4/8/99	bg
Lab Filtration	***						4/1/99	ss
Lab Filtration & Acidification	***						4/2/99	cc
Nitrate as N, dissolved	Calculation: NO3NO2 minus NO2	0.21		mg/L	0.02	0.1	4/16/99	calc
Nitrate/Nitrite as N, dissolved	M353.2 - H2SO4 preserved	0.21		mg/L	0.02	0.1	4/3/99	bg
Nitrite as N, dissolved	M353.2 - Automated Cadmium Reduction		U	mg/L	0.01	0.05	4/1/99	ss
Nitrogen, ammonia	M350.1 - Automated Phenate		U	mg/L	0.05	0.3	4/1/99	bg

Qualifiers: Definitions and Abbreviations

U = Analyte was analyzed for but not detected at the indicated MDL

B = Analyte concentration detected at a value between MDL and PQL

PQL = Practical Quantitation Limit

RVPoulsen

Vice President of Operations: Ralph Poulsen

ACZ

Analytical Results

ACZ Laboratories, Inc.
2773 Downhill Drive
Steamboat Springs, CO 80487
(800) 334-5493

Lab Sample ID: *L22555-02*
Client Sample ID: *S-3*
Client Project ID:
ACZ Report ID: *RG90226*

Hecla Mining Co.-Grouse Creek Unit
P.O. Box 647
Challis, ID 83226
Eileen Steilman

Date Sampled: *3/29/99 14:00*
Date Received: *4/1/99*
Date Reported: *4/16/99*

Sample Matrix: *Surface Water*

Oxygen, dissolved (Laboratory)	M360.1	7		mg/L	1	5	4/1/99	cd
pH (lab)	M150.1 - Electrometric	6.6		units	0.1	0.1	4/1/99	cd
Residue, Non-Filterable (TSS) @103-5C	M160.2 - Gravimetric		U	mg/L	5	20	4/1/99	cd
Turbidity	M180.1 - Nephelometric	1.3		NTU	0.1	0.5	4/1/99	cd

J = Analyte was analyzed for but not detected at the indicated MDL
B = Analyte concentration detected at a value between MDL and PQL
PQL = Practical Quantitation Limit

RWP

Vice President of Operations: Ralph Poulsen

ACZ

Analytical Results

ACZ Laboratories, Inc.
2773 Downhill Drive
Steamboat Springs, CO 80487
(800) 334-5493

Lab Sample ID: *L22555-03*
Client Sample ID: *S-4*
Client Project ID:
ACZ Report ID: *RG90227*

Hecla Mining Co.-Grouse Creek Unit
P.O. Box 647
Challis, ID 83226
Eileen Steilman

Date Sampled: *3/29/99 09:59*
Date Received: *4/1/99*
Date Reported: *4/16/99*

Sample Matrix: *Surface Water*

Metals Analysis

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Arsenic, dissolved	M206.2 GFAA	0.001	B	mg/L	0.001	0.005	4/3/99	jb
Arsenic, total recoverable	M206.2 GFAA	0.008		mg/L	0.001	0.005	4/6/99	jl
Cadmium, dissolved	M200.7 ICP		U	mg/L	0.003	0.02	4/6/99	kr
Cadmium, total recoverable	M200.7 ICP	0.004	B	mg/L	0.003	0.02	4/12/99	kr
Copper, dissolved	M200.7 ICP		U	mg/L	0.01	0.05	4/6/99	kr
Copper, total recoverable	M200.7 ICP	0.01	B	mg/L	0.01	0.05	4/12/99	kr
Lead, dissolved	M200.7 ICP		U	mg/L	0.04	0.2	4/6/99	kr
Lead, total recoverable	M200.7 ICP		U	mg/L	0.04	0.2	4/10/99	jb
Mercury, dissolved	M245.1 CVAA		U	mg/L	0.0002	0.001	4/10/99	ms
Mercury, total recoverable	M245.1 CVAA		U	mg/L	0.0002	0.001	4/10/99	ms
Selenium, dissolved	SM 3500-Se C, AA-Hydride	0.002	B	mg/L	0.001	0.005	4/8/99	ms
Selenium, total recoverable	SM 3500-Se C, AA-Hydride	0.001	B	mg/L	0.001	0.005	4/9/99	ms
Silver, dissolved	M200.7 ICP		U	mg/L	0.005	0.03	4/7/99	kr
Silver, total recoverable	M200.7 ICP		U	mg/L	0.005	0.03	4/16/99	jb
Zinc, dissolved	M200.7 ICP	0.01	B	mg/L	0.01	0.05	4/6/99	kr
Zinc, total recoverable	M200.7 ICP	0.02	B	mg/L	0.01	0.05	4/10/99	jb

Metals Prep

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Total Recoverable Digestion	M3005 ICP						4/9/99	tdr
Total Recoverable Digestion	M3005 GFAA						4/5/99	lma

Wet Chemistry

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	M310.1							
Bicarbonate as CaCO3		30		mg/L	2	10	4/1/99	cd
Carbonate as CaCO3			U	mg/L	2	10	4/1/99	cd
Hydroxide as CaCO3			U	mg/L	2	10	4/1/99	cd
Total Alkalinity		30		mg/L	2	10	4/1/99	cd
Chloride	M325.2 - Colorimetric (RFA)		U	mg/L	1	5	4/3/99	bg
Conductivity @25C	M120.1 - Meter	224		umhos/cm	1	10	4/1/99	cd
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.09		mg/L	0.01	0.05	4/13/99	bg
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	0.06		mg/L	0.01	0.05	4/8/99	bg
Lab Filtration	***						4/1/99	ss
Lab Filtration & Acidification	***						4/2/99	cc
Nitrate as N, dissolved	Calculation: NO3NO2 minus NO2	0.31		mg/L	0.02	0.1	4/16/99	calc
Nitrate/Nitrite as N, dissolved	M353.2 - H2SO4 preserved	0.34		mg/L	0.02	0.1	4/3/99	bg
Nitrite as N, dissolved	M353.2 - Automated Cadmium Reduction	0.03	B	mg/L	0.01	0.05	4/1/99	ss
Nitrogen, ammonia	M350.1 - Automated Phenate	0.07	B	mg/L	0.05	0.3	4/1/99	bg

Qualifiers/Definitions (Qual):

U = Analyte was analyzed for but not detected at the indicated MDL

B = Analyte concentration detected at a value between MDL and PQL

PQL = Practical Quantitation Limit

Vice President of Operations: Ralph Poulsen

ACZ

Analytical Results

ACZ Laboratories, Inc.
2773 Downhill Drive
Steamboat Springs, CO 80487
(800) 334-5493

Lab Sample ID: *L22555-03*
Client Sample ID: *S-4*
Client Project ID:
ACZ Report ID: *RG90227*

Hecla Mining Co.-Grouse Creek Unit
P.O. Box 647
Challis, ID 83226
Eileen Steilman

Date Sampled: *3/29/99 09:59*
Date Received: *4/1/99*
Date Reported: *4/16/99*

Sample Matrix: *Surface Water*

Oxygen, dissolved (Laboratory)	M360.1	7		mg/L	1	5	4/1/99	cd
pH (lab)	M150.1 - Electrometric	6.5		units	0.1	0.1	4/1/99	cd
Residue, Non-Filterable (TSS) @103-5C	M160.2 - Gravimetric	16	B	mg/L	5	20	4/1/99	cd
Turbidity	M180.1 - Nephelometric	6.5		NTU	0.1	0.5	4/1/99	cd

U = Analyte was analyzed for but not detected at the indicated MDL
B = Analyte concentration detected at a value between MDL and PQL
PQL = Practical Quantitation Limit

RWP

Vice President of Operations: Ralph Poulsen

ACZ

Analytical Results

ACZ Laboratories, Inc.
2773 Downhill Drive
Steamboat Springs, CO 80487
(800) 334-5493

Lab Sample ID: L22555-04
Client Sample ID: S-5
Client Project ID:
ACZ Report ID: RG90228

Hecla Mining Co.-Grouse Creek Unit
P.O. Box 647
Challis, ID 83226
Eileen Steilman

Date Sampled: 3/29/99 09:39
Date Received: 4/1/99
Date Reported: 4/16/99

Sample Matrix: Surface Water

Metals Analysis

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Arsenic, dissolved	M206.2 GFAA	0.002	B	mg/L	0.001	0.005	4/3/99	jb
Arsenic, total recoverable	M206.2 GFAA	0.004	B	mg/L	0.001	0.005	4/6/99	jl
Cadmium, dissolved	M200.7 ICP		U	mg/L	0.003	0.02	4/6/99	kr
Cadmium, total recoverable	M200.7 ICP	0.004	B	mg/L	0.003	0.02	4/12/99	kr
Copper, dissolved	M200.7 ICP		U	mg/L	0.01	0.05	4/6/99	kr
Copper, total recoverable	M200.7 ICP		U	mg/L	0.01	0.05	4/12/99	kr
Lead, dissolved	M200.7 ICP		U	mg/L	0.04	0.2	4/6/99	kr
Lead, total recoverable	M200.7 ICP		U	mg/L	0.04	0.2	4/10/99	jb
Mercury, dissolved	M245.1 CVAA		U	mg/L	0.0002	0.001	4/10/99	ms
Mercury, total recoverable	M245.1 CVAA		U	mg/L	0.0002	0.001	4/10/99	ms
Selenium, dissolved	SM 3500-Se C, AA-Hydride	0.002	B	mg/L	0.001	0.005	4/8/99	ms
Selenium, total recoverable	SM 3500-Se C, AA-Hydride		U	mg/L	0.001	0.005	4/9/99	ms
Silver, dissolved	M200.7 ICP		U	mg/L	0.005	0.03	4/7/99	kr
Silver, total recoverable	M200.7 ICP		U	mg/L	0.005	0.03	4/16/99	jb
Zinc, dissolved	M200.7 ICP		U	mg/L	0.01	0.05	4/6/99	kr
Zinc, total recoverable	M200.7 ICP	0.01	B	mg/L	0.01	0.05	4/10/99	jb

Metals Prep

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Total Recoverable Digestion	M3005 ICP						4/9/99	tdr
Total Recoverable Digestion	M3005 GFAA						4/5/99	lan

Wet Chemistry

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	M310.1							
Bicarbonate as CaCO3		33		mg/L	2	10	4/1/99	cd
Carbonate as CaCO3			U	mg/L	2	10	4/1/99	cd
Hydroxide as CaCO3			U	mg/L	2	10	4/1/99	cd
Total Alkalinity		33		mg/L	2	10	4/1/99	cd
Chloride	M325.2 - Colorimetric (RFA)	1	B	mg/L	1	5	4/3/99	bg
Conductivity @25C	M120.1 - Meter	195		umhos/cm	1	10	4/1/99	cd
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.06		mg/L	0.01	0.05	4/13/99	bg
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	0.04	B	mg/L	0.01	0.05	4/8/99	bg
Lab Filtration	***						4/1/99	ss
Lab Filtration & Acidification	***						4/2/99	cr
Nitrate as N, dissolved	Calculation: NO3NO2 minus NO2	0.27		mg/L	0.02	0.1	4/16/99	calc
Nitrate/Nitrite as N, dissolved	M353.2 - H2SO4 preserved	0.29		mg/L	0.02	0.1	4/3/99	bg
Nitrite as N, dissolved	M353.2 - Automated Cadmium Reduction	0.02	B	mg/L	0.01	0.05	4/1/99	ss
Nitrogen, ammonia	M350.1 - Automated Phenate		U	mg/L	0.05	0.3	4/1/99	bg

Qualifiers: U = Analyte was analyzed for but not detected at the indicated MDL
B = Analyte concentration detected at a value between MDL and PQL
PQL = Practical Quantitation Limit

Vice President of Operations: Ralph Poulsen

ACZ

Analytical Results

ACZ Laboratories, Inc.
2773 Downhill Drive
Steamboat Springs, CO 80487
(800) 334-5493

Lab Sample ID: L22555-04
Client Sample ID: S-5
Client Project ID:
ACZ Report ID: RG90228

Hecla Mining Co.-Grouse Creek Unit
P.O. Box 647
Challis, ID 83226
Eileen Steilman

Date Sampled: 3/29/99 09:39
Date Received: 4/1/99
Date Reported: 4/16/99

Sample Matrix: Surface Water

Oxygen, dissolved (Laboratory)	M360.1	7		mg/L	1	5	4/1/99	cd
pH (lab)	M150.1 - Electrometric	6.5		units	0.1	0.1	4/1/99	cd
Residue, Non-Filterable (TSS) @103-5C	M160.2 - Gravimetric		U	mg/L	5	20	4/1/99	cd
Turbidity	M180.1 - Nephelometric	2.3		NTU	0.1	0.5	4/1/99	cd

U = Analyte was analyzed for but not detected at the indicated MDL
B = Analyte concentration detected at a value between MDL and PQL
PQL = Practical Quantitation Limit

RVP

Vice President of Operations: Ralph Poulsen

ACZ — **Analytical Results**

ACZ Laboratories, Inc.
2773 Downhill Drive
Steamboat Springs, CO 80487
(800) 334-5493

Lab Sample ID: *L22555-05*
Client Sample ID: *S-10*
Client Project ID:
ACZ Report ID: *RG90229*

Hecla Mining Co.-Grouse Creek Unit
P.O. Box 647
Challis, ID 83226
Eileen Steilman

Date Sampled: *3/29/99 09:00*
Date Received: *4/1/99*
Date Reported: *4/16/99*

Sample Matrix: *Surface Water*

Metals Analysis

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Arsenic, dissolved	M206.2 GFAA	0.001	B	mg/L	0.001	0.005	4/3/99	jb
Arsenic, total recoverable	M206.2 GFAA	0.001	B	mg/L	0.001	0.005	4/6/99	jl
Cadmium, dissolved	M200.7 ICP		U	mg/L	0.003	0.02	4/8/99	gg
Cadmium, total recoverable	M200.7 ICP		U	mg/L	0.003	0.02	4/16/99	jb
Copper, dissolved	M200.7 ICP		U	mg/L	0.01	0.05	4/7/99	kr
Copper, total recoverable	M200.7 ICP		U	mg/L	0.01	0.05	4/12/99	kr
Lead, dissolved	M200.7 ICP		U	mg/L	0.04	0.2	4/8/99	gg
Lead, total recoverable	M200.7 ICP		U	mg/L	0.04	0.2	4/10/99	jb
Mercury, dissolved	M245.1 CVAA		U	mg/L	0.0002	0.001	4/10/99	ms
Mercury, total recoverable	M245.1 CVAA		U	mg/L	0.0002	0.001	4/10/99	ms
Selenium, dissolved	SM 3500-Se C, AA-Hydride		U	mg/L	0.001	0.005	4/8/99	ms
Selenium, total recoverable	SM 3500-Se C, AA-Hydride		U	mg/L	0.001	0.005	4/9/99	ms
Silver, dissolved	M200.7 ICP		U	mg/L	0.005	0.03	4/13/99	kr
Silver, total recoverable	M200.7 ICP		U	mg/L	0.005	0.03	4/16/99	jb
Zinc, dissolved	M200.7 ICP		U	mg/L	0.01	0.05	4/8/99	gg
Zinc, total recoverable	M200.7 ICP		U	mg/L	0.01	0.05	4/10/99	jb

Metals Prep

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Total Recoverable Digestion	M3005 ICP						4/9/99	tdr
Total Recoverable Digestion	M3005 GFAA						4/5/99	laa

Wet Chemistry

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	M310.1							
Bicarbonate as CaCO3		34		mg/L	2	10	4/1/99	cd
Carbonate as CaCO3			U	mg/L	2	10	4/1/99	cd
Hydroxide as CaCO3			U	mg/L	2	10	4/1/99	cd
Total Alkalinity		34		mg/L	2	10	4/1/99	cd
Chloride	M325.2 - Colorimetric (RFA)		U	mg/L	1	5	4/3/99	bg
Conductivity @25C	M120.1 - Meter	91		umhos/cm	1	10	4/1/99	cd
Cyanide, total	M335.4 - Colorimetric w/ distillation		U	mg/L	0.01	0.05	4/13/99	bg
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation		U	mg/L	0.01	0.05	4/8/99	bg
Lab Filtration	***						4/1/99	ss
Lab Filtration & Acidification	***						4/2/99	cc
Nitrate as N, dissolved	Calculation: NO3NO2 minus NO2	0.07	B	mg/L	0.02	0.1	4/16/99	calc
Nitrate/Nitrite as N, dissolved	M353.2 - H2SO4 preserved	0.07	B	mg/L	0.02	0.1	4/3/99	bg
Nitrite as N, dissolved	M353.2 - Automated Cadmium Reduction		U	mg/L	0.01	0.05	4/1/99	ss
Nitrogen, ammonia	M350.1 - Automated Phenate		U	mg/L	0.05	0.3	4/1/99	bg

Interpretation Guide (based on EPA GLP's)

U = Analyte was analyzed for but not detected at the indicated MDL

B = Analyte concentration detected at a value between MDL and PQL

PQL = Practical Quantitation Limit

R V Poulsen

Vice President of Operations: Ralph Poulsen

ACZ

Analytical Results

ACZ Laboratories, Inc.
2773 Downhill Drive
Steamboat Springs, CO 80487
(800) 334-5493

Lab Sample ID: L2255S-05
Client Sample ID: S-10
Client Project ID:
ACZ Report ID: RG90229

Hecla Mining Co.-Grouse Creek Unit
P.O. Box 647
Challis, ID 83226
Eileen Steilman

Date Sampled: 3/29/99 09:00
Date Received: 4/1/99
Date Reported: 4/16/99

Sample Matrix: Surface Water

Oxygen, dissolved (Laboratory)	M360.1	7		mg/L	1	5	4/1/99	cd
pH (lab)	M150.1 - Electrometric	6.7		units	0.1	0.1	4/1/99	cd
Residue, Non-Filterable (TSS) @103-5C	M160.2 - Gravimetric		U	mg/L	5	20	4/1/99	cd
Turbidity	M180.1 - Nephelometric	3.9		NTU	0.1	0.5	4/1/99	cd

U = Analyte was analyzed for but not detected at the indicated MDL
B = Analyte concentration detected at a value between MDL and PQL
PQL = Practical Quantitation Limit

RVP

Vice President of Operations: Ralph Poulsen

ACZ

Analytical Results

ACZ Laboratories, Inc.
2773 Downhill Drive
Steamboat Springs, CO 80487
(800) 334-5493

Lab Sample ID: *L22555-06*
Client Sample ID: *S-11*
Client Project ID:
ACZ Report ID: *RG90230*

Hecla Mining Co.-Grouse Creek Unit
P.O. Box 647
Challis, ID 83226
Eileen Steilman

Date Sampled: *3/29/99 09:17*
Date Received: *4/1/99*
Date Reported: *4/16/99*

Sample Matrix: *Surface Water*

Metals Analysis

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Arsenic, dissolved	M206.2 GFAA	0.001	B	mg/L	0.001	0.005	4/3/99	jb
Arsenic, total recoverable	M206.2 GFAA	0.003	B	mg/L	0.001	0.005	4/6/99	jl
Cadmium, dissolved	M200.7 ICP		U	mg/L	0.003	0.02	4/8/99	gg
Cadmium, total recoverable	M200.7 ICP		U	mg/L	0.003	0.02	4/16/99	jb
Copper, dissolved	M200.7 ICP		U	mg/L	0.01	0.05	4/7/99	kr
Copper, total recoverable	M200.7 ICP		U	mg/L	0.01	0.05	4/12/99	kr
Lead, dissolved	M200.7 ICP		U	mg/L	0.04	0.2	4/8/99	gg
Lead, total recoverable	M200.7 ICP		U	mg/L	0.04	0.2	4/10/99	jb
Mercury, dissolved	M245.1 CVAA		U	mg/L	0.0002	0.001	4/10/99	ms
Mercury, total recoverable	M245.1 CVAA		U	mg/L	0.0002	0.001	4/10/99	ms
Selenium, dissolved	SM 3500-Se C, AA-Hydride		U	mg/L	0.001	0.005	4/8/99	ms
Selenium, total recoverable	SM 3500-Se C, AA-Hydride		U	mg/L	0.001	0.005	4/9/99	ms
Silver, dissolved	M200.7 ICP		U	mg/L	0.005	0.03	4/13/99	kr
Silver, total recoverable	M200.7 ICP		U	mg/L	0.005	0.03	4/16/99	jb
Zinc, dissolved	M200.7 ICP		U	mg/L	0.01	0.05	4/8/99	gg
Zinc, total recoverable	M200.7 ICP	0.01	B	mg/L	0.01	0.05	4/10/99	jb

Metals Prep

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Total Recoverable Digestion	M3005 ICP						4/9/99	tdr
Total Recoverable Digestion	M3005 GFAA						4/5/99	laa

Wet Chemistry

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	M310.1							
Bicarbonate as CaCO3		36		mg/L	2	10	4/1/99	cd
Carbonate as CaCO3			U	mg/L	2	10	4/1/99	cd
Hydroxide as CaCO3			U	mg/L	2	10	4/1/99	cd
Total Alkalinity		36		mg/L	2	10	4/1/99	cd
Chloride	M325.2 - Colorimetric (RFA)	1	B	mg/L	1	5	4/3/99	bg
Conductivity @25C	M120.1 - Meter	180		umhos/cm	1	10	4/1/99	cd
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.03	B	mg/L	0.01	0.05	4/13/99	bg
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	0.02	B	mg/L	0.01	0.05	4/8/99	bg
Lab Filtration	***						4/1/99	ss
Lab Filtration & Acidification	***						4/2/99	cc
Nitrate as N, dissolved	Calculation: NO3NO2 minus NO2	0.24		mg/L	0.02	0.1	4/16/99	calc
Nitrate/Nitrite as N, dissolved	M353.2 - H2SO4 preserved	0.25		mg/L	0.02	0.1	4/3/99	bg
Nitrite as N, dissolved	M353.2 - Automated Cadmium Reduction	0.01	B	mg/L	0.01	0.05	4/1/99	ss
Nitrogen, ammonia	M350.1 - Automated Phenate		U	mg/L	0.05	0.3	4/1/99	bg

Qualifiers (Defined by EPA CLP SOW)

U = Analyte was analyzed for but not detected at the indicated MDL

B = Analyte concentration detected at a value between MDL and PQL

PQL = Practical Quantitation Limit

RVPoulsen

Vice President of Operations: Ralph Poulsen

ACZ

Analytical Results

ACZ Laboratories, Inc.
2773 Downhill Drive
Steamboat Springs, CO 80487
(800) 334-5493

Lab Sample ID: L22555-06
Client Sample ID: S-11
Client Project ID:
ACZ Report ID: RG90230

Hecla Mining Co.-Grouse Creek Unit
P.O. Box 647
Challis, ID 83226
Eileen Steilman

Date Sampled: 3/29/99 09:17
Date Received: 4/1/99
Date Reported: 4/16/99

Sample Matrix: Surface Water

Oxygen, dissolved (Laboratory)	M360.1	7		mg/L	1	5	4/1/99	cd
pH (lab)	M150.1 - Electrometric	6.5		units	0.1	0.1	4/1/99	cd
Residue, Non-Filterable (TSS) @103-5C	M160.2 - Gravimetric		U	mg/L	5	20	4/1/99	cd
Turbidity	M180.1 - Nephelometric	3.5		NTU	0.1	0.5	4/1/99	cd

U = Analyte was analyzed for but not detected at the indicated MDL
B = Analyte concentration detected at a value between MDL and PQL
PQL = Practical Quantitation Limit

RP

Vice President of Operations: Ralph Poulsen

ACZ

Analytical Results

ACZ Laboratories, Inc.
2773 Downhill Drive
Steamboat Springs, CO 80487
(800) 334-5493

Lab Sample ID: *L22555-09*
Client Sample ID: *MW3*
Client Project ID:
ACZ Report ID: *RG90233*

Hecla Mining Co.-Grouse Creek Unit
P.O. Box 647
Challis, ID 83226
Eileen Steilman

Date Sampled: *3/29/99 12:20*
Date Received: *4/1/99*
Date Reported: *4/16/99*

Sample Matrix: *Ground Water*

Metals Analysis

Parameter	Prep Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Arsenic, dissolved	M206.2 GFAA	0.002	B	mg/L	0.001	0.005	4/3/99	jb
Arsenic, total recoverable	M206.2 GFAA	0.007		mg/L	0.001	0.005	4/6/99	jl
Lead, dissolved	M200.7 ICP		U	mg/L	0.04	0.2	4/8/99	gg
Lead, total recoverable	M200.7 ICP		U	mg/L	0.04	0.2	4/10/99	jb
Silver, dissolved	M200.7 ICP		U	mg/L	0.005	0.03	4/13/99	kr
Silver, total recoverable	M200.7 ICP		U	mg/L	0.005	0.03	4/16/99	jb
Zinc, dissolved	M200.7 ICP	0.01	B	mg/L	0.01	0.05	4/8/99	gg
Zinc, total recoverable	M200.7 ICP	0.04	B	mg/L	0.01	0.05	4/10/99	jb

Metals Prep

Parameter	Prep Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Total Recoverable Digestion	M3005 ICP						4/9/99	tdr
Total Recoverable Digestion	M3005 GFAA						4/5/99	laa

Wet Chemistry

Parameter	Prep Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Ikalinity as CaCO3	M2320B							
Bicarbonate as CaCO3		78		mg/L	2	10	4/1/99	cd
Carbonate as CaCO3			U	mg/L	2	10	4/1/99	cd
Hydroxide as CaCO3			U	mg/L	2	10	4/1/99	cd
Total Alkalinity		78		mg/L	2	10	4/1/99	cd
Cyanide, total	M335.4 - Colorimetric w/ distillation		U	mg/L	0.01	0.05	4/13/99	bg
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation		U	mg/L	0.01	0.05	4/8/99	bg
Lab Filtration	WG78605						4/2/99	SREV
Lab Filtration & Acidification	***						4/3/99	tdr
pH (lab)	M150.1 - Electrometric	6.9		units	0.1	0.1	4/1/99	cd
Residue, Filterable (TDS) @180C	M160.1 - Gravimetric	220		mg/L	10	20	4/2/99	cc/cd 300
Residue, Non-Filterable (TSS) @103-5C	M160.2 - Gravimetric	358		mg/L	5	20	4/1/99	cd

Qualifiers, Definitions & Abbreviations

U = Analyte was analyzed for but not detected at the indicated MDL

B = Analyte concentration detected at a value between MDL and PQL

PQL = Practical Quantitation Limit

RVP

Vice President of Operations: Ralph Poulsen

ACZ

Analytical Results

ACZ Laboratories, Inc.
2773 Downhill Drive
Steamboat Springs, CO 80487
(800) 334-5493

Lab Sample ID: L22555-10
Client Sample ID: MW16
Client Project ID:
ACZ Report ID: RG90234

Hecla Mining Co.-Grouse Creek Unit
P.O. Box 647
Challis, ID 83226
Eileen Steilman

Date Sampled: 3/29/99 11:45
Date Received: 4/1/99
Date Reported: 4/16/99

Sample Matrix: Ground Water

Metals Analysis

Analyte	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Arsenic, dissolved	M206.2 GFAA	0.010		mg/L	0.001	0.005	4/3/99	jb
Arsenic, total recoverable	M206.2 GFAA	0.018		mg/L	0.001	0.005	4/6/99	jl
Lead, dissolved	M200.7 ICP		U	mg/L	0.04	0.2	4/8/99	gg
Lead, total recoverable	M200.7 ICP		U	mg/L	0.04	0.2	4/10/99	jb
Silver, dissolved	M200.7 ICP		U	mg/L	0.005	0.03	4/13/99	kr
Silver, total recoverable	M200.7 ICP		U	mg/L	0.005	0.03	4/16/99	jb
Zinc, dissolved	M200.7 ICP		U	mg/L	0.01	0.05	4/8/99	gg
Zinc, total recoverable	M200.7 ICP	0.01	B	mg/L	0.01	0.05	4/10/99	jb

Metals Prep

Analyte	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Total Recoverable Digestion	M3005 ICP						4/9/99	tdr
Total Recoverable Digestion	M3005 GFAA						4/5/99	laa

Wet Chemistry

Analyte	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	M2320B							
Bicarbonate as CaCO3		208		mg/L	2	10	4/1/99	cd
Carbonate as CaCO3			U	mg/L	2	10	4/1/99	cd
Hydroxide as CaCO3			U	mg/L	2	10	4/1/99	cd
Total Alkalinity		208		mg/L	2	10	4/1/99	cd
Cyanide, total	MG35.4 - Colorimetric w/ distillation		U	mg/L	0.01	0.05	4/13/99	bg
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation		U	mg/L	0.01	0.05	4/8/99	bg
Lab Filtration	***						4/2/99	cc
Lab Filtration & Acidification	***						4/3/99	tdr
pH (lab)	M150.1 - Electrometric	7.8		units	0.1	0.1	4/1/99	cd
Residue, Filterable (TDS) @180C	M160.1 - Gravimetric	240		mg/L	10	20	4/2/99	cc/cd
Residue, Non-Filterable (TSS) @103-5C	M160.2 - Gravimetric	14	B	mg/L	5	20	4/1/99	cd

Qualifiers (Effective Date: 2/10/99)

U = Analyte was analyzed for but not detected at the indicated MDL
B = Analyte concentration detected at a value between MDL and PQL
PQL = Practical Quantitation Limit

RPoulsen

Vice President of Operations: Ralph Poulsen

ACZ

Analytical Results

ACZ Laboratories, Inc.
2773 Downhill Drive
Steamboat Springs, CO 80487
(800) 334-5493

Lab Sample ID: *L22555-11*
Client Sample ID: *MW10*
Client Project ID:
ACZ Report ID: *RG90235*

Hecla Mining Co.-Grouse Creek Unit
P.O. Box 647
Challis, ID 83226
Eileen Steilman

Date Sampled: *3/29/99 14:00*
Date Received: *4/1/99*
Date Reported: *4/16/99*

Sample Matrix: *Ground Water*

Metals Analysis

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst	
Arsenic, dissolved	M206.2 GFAA	0.002	B	mg/L	0.001	0.005	4/5/99	jb	.25
Arsenic, total recoverable	M206.2 GFAA	* 0.198		mg/L	0.005	0.05	4/10/99	jl	CHRONIC
Lead, dissolved	M200.7 ICP		U	mg/L	0.04	0.2	4/8/99	gg	
Lead, total recoverable	M200.7 ICP	0.05	B	mg/L	0.04	0.2	4/10/99	jb	
Silver, dissolved	M200.7 ICP		U	mg/L	0.005	0.03	4/13/99	kr	
Silver, total recoverable	M200.7 ICP	0.008	B	mg/L	0.005	0.03	4/16/99	jb	
Zinc, dissolved	M200.7 ICP	0.08		mg/L	0.01	0.05	4/8/99	gg	
Zinc, total recoverable	M200.7 ICP	0.96		mg/L	0.01	0.05	4/10/99	jb	5.0

Metals Prep

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Total Recoverable Digestion	M3005 ICP						4/9/99	tdr
Total Recoverable Digestion	M3005 GFAA						4/9/99	tdr

Wet Chemistry

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst	
Alkalinity as CaCO3	M2320B								
Bicarbonate as CaCO3		19		mg/L	2	10	4/1/99	cd	
Carbonate as CaCO3			U	mg/L	2	10	4/1/99	cd	
Hydroxide as CaCO3			U	mg/L	2	10	4/1/99	cd	
Total Alkalinity		19		mg/L	2	10	4/1/99	cd	
Cyanide, total	M335.4 - Colorimetric w/ distillation	* 1.2		mg/L	0.1	0.5	4/13/99	bg	.7
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	0.05		mg/L	0.01	0.05	4/8/99	bg	NA
Lab Filtration	***						4/2/99	cc	
Lab Filtration & Acidification	***						4/3/99	tdr	
pH (lab)	M150.1 - Electrometric	6.1		units	0.1	0.1	4/1/99	cd	6.5
Residue, Filterable (TDS) @180C	M160.1 - Gravimetric	290		mg/L	10	20	4/2/99	cc/cd	
Residue, Non-Filterable (TSS) @103-5C	M160.2 - Gravimetric	2940		mg/L	5	20	4/1/99	cd	

Qualifiers (Qual) Defined as Follows:

- Analyte was analyzed for but not detected at the indicated MDL
= Analyte concentration detected at a value between MDL and PQL
PQL = Practical Quantitation Limit

RPoulsen

Vice President of Operations: Ralph Poulsen

ACZ

Analytical Results

ACZ Laboratories, Inc.
2773 Downhill Drive
Steamboat Springs, CO 80487
(800) 334-5493

Lab Sample ID: L22555-12
Client Sample ID: MW11
Client Project ID:
ACZ Report ID: RG90236

Hecla Mining Co.-Grouse Creek Unit
P.O. Box 647
Challis, ID 83226
Eileen Steilman

Date Sampled: 3/29/99 11:00
Date Received: 4/1/99
Date Reported: 4/16/99

Sample Matrix: Ground Water

Metals Analysis

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Arsenic, dissolved	M206.2 GFAA	0.001	B	mg/L	0.001	0.005	4/3/99	jb
Arsenic, total recoverable	M206.2 GFAA	0.002	B	mg/L	0.001	0.005	4/10/99	jl
Lead, dissolved	M200.7 ICP		U	mg/L	0.04	0.2	4/8/99	gg
Lead, total recoverable	M200.7 ICP		U	mg/L	0.04	0.2	4/10/99	jb
Silver, dissolved	M200.7 ICP		U	mg/L	0.005	0.03	4/13/99	kr
Silver, total recoverable	M200.7 ICP		U	mg/L	0.005	0.03	4/16/99	jb
Zinc, dissolved	M200.7 ICP	0.02	B	mg/L	0.01	0.05	4/8/99	gg
Zinc, total recoverable	M200.7 ICP	0.04	B	mg/L	0.01	0.05	4/10/99	jb

Metals Prep

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Total Recoverable Digestion	M3005 ICP						4/9/99	tdr
Total Recoverable Digestion	M3005 GFAA						4/9/99	tdr

Wet Chemistry

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	M2320B							
Bicarbonate as CaCO3		49		mg/L	2	10	4/1/99	cd
Carbonate as CaCO3			U	mg/L	2	10	4/1/99	cd
Hydroxide as CaCO3			U	mg/L	2	10	4/1/99	cd
Total Alkalinity		49		mg/L	2	10	4/1/99	cd
Cyanide, total	M335.4 - Colorimetric w/ distillation	2.4		mg/L	0.1	0.5	4/13/99	bg
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	0.7		mg/L	0.1	0.5	4/8/99	bg
Lab Filtration	***						4/2/99	cc
Lab Filtration & Acidification	***						4/3/99	tdr
pH (lab)	M150.1 Electrometric	6.7		units	0.1	0.1	4/1/99	cd
Residue, Filterable (TDS) @180C	M160.1 - Gravimetric	220		mg/L	10	20	4/2/99	cc/cd
Residue, Non-Filterable (TSS) @103-5C	M160.2 - Gravimetric		U	mg/L	5	20	4/1/99	cd

Qualifiers (Qual) Explained

U = Analyte was analyzed for but not detected at the indicated MDL
B = Analyte concentration detected at a value between MDL and PQL
PQL = Practical Quantitation Limit

RVPoulsen

Vice President of Operations: Ralph Poulsen

ACZ

Analytical Results

ACZ Laboratories, Inc.
2773 Downhill Drive
Steamboat Springs, CO 80487
(800) 334-5493

Lab Sample ID: L22555-13
Client Sample ID: MW13
Client Project ID:
ACZ Report ID: RG90237

Hecla Mining Co.-Grouse Creek Unit
P.O. Box 647
Challis, ID 83226
Eileen Steilman

Date Sampled: 3/29/99 14:45
Date Received: 4/1/99
Date Reported: 4/16/99

Sample Matrix: Ground Water

Metals Analysis

Parameter	Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Arsenic, dissolved	M206.2 GFAA	0.002	B	mg/L	0.001	0.005	4/3/99	jb
Arsenic, total recoverable	M206.2 GFAA	0.001	B	mg/L	0.001	0.005	4/10/99	jl
Lead, dissolved	M200.7 ICP		U	mg/L	0.04	0.2	4/8/99	gg
Lead, total recoverable	M200.7 ICP		U	mg/L	0.04	0.2	4/10/99	jb
Silver, dissolved	M200.7 ICP		U	mg/L	0.005	0.03	4/13/99	kr
Silver, total recoverable	M200.7 ICP		U	mg/L	0.005	0.03	4/16/99	jb
Zinc, dissolved	M200.7 ICP	0.01	B	mg/L	0.01	0.05	4/8/99	gg
Zinc, total recoverable	M200.7 ICP	0.01	B	mg/L	0.01	0.05	4/10/99	jb

Metals Prep

Parameter	Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Total Recoverable Digestion	M3005 ICP						4/9/99	tdr
Total Recoverable Digestion	M3005 GFAA						4/9/99	tdr

Wet Chemistry

Parameter	Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	M2320B							
Bicarbonate as CaCO3		109		mg/L	2	10	4/1/99	cd
Carbonate as CaCO3			U	mg/L	2	10	4/1/99	cd
Hydroxide as CaCO3			U	mg/L	2	10	4/1/99	cd
Total Alkalinity		109		mg/L	2	10	4/1/99	cd
Cyanide, total	M335.4 - Colorimetric w/ distillation		U	mg/L	0.01	0.05	4/13/99	bg
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation.		U	mg/L	0.01	0.05	4/10/99	tr/bg
Lab Filtration	***						4/2/99	cc
Lab Filtration & Acidification	***						4/5/99	tdr
pH (lab)	M150.1 - Electrometric	7.1		units	0.1	0.1	4/1/99	cd
Residue, Filterable (TDS) @180C	M160.1 - Gravimetric	120		mg/L	10	20	4/2/99	cc/cd
Residue, Non-Filterable (TSS) @103-5C	M160.2 - Gravimetric		U	mg/L	5	20	4/1/99	cd

Qualifiers
U = Analyte was analyzed for but not detected at the indicated MDL
B = Analyte concentration detected at a value between MDL and PQL
PQL = Practical Quantitation Limit

RVPoulsen

Vice President of Operations: Ralph Poulsen

ACZ

Analytical Results

ACZ Laboratories, Inc.
2773 Downhill Drive
Steamboat Springs, CO 80487
(800) 334-5493

Lab Sample ID: L22555-14
Client Sample ID: MW14
Client Project ID:
ACZ Report ID: RG90238

Hecla Mining Co.-Grouse Creek Unit
P.O. Box 647
Challis, ID 83226
Eileen Steilman

Date Sampled: 3/29/99 14:15
Date Received: 4/1/99
Date Reported: 4/16/99

Sample Matrix: Ground Water

Metals Analysis

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Arsenic, dissolved	M206.2 GFAA	0.006		mg/L	0.001	0.005	4/6/99	jl
Arsenic, total recoverable	M206.2 GFAA	0.006		mg/L	0.001	0.005	4/10/99	jl
Lead, dissolved	M200.7 ICP		U	mg/L	0.04	0.2	4/8/99	gg
Lead, total recoverable	M200.7 ICP		U	mg/L	0.08	0.4	4/12/99	kr
Silver, dissolved	M200.7 ICP		U	mg/L	0.005	0.03	4/13/99	kr
Silver, total recoverable	M200.7 ICP		U	mg/L	0.01	0.05	4/16/99	jb
Zinc, dissolved	M200.7 ICP	0.06		mg/L	0.01	0.05	4/8/99	gg
Zinc, total recoverable	M200.7 ICP	0.03	B	mg/L	0.01	0.05	4/10/99	jb

Metals Prep

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Total Recoverable Digestion	M3005 ICP						4/9/99	tdr
Total Recoverable Digestion	M3005 GFAA						4/9/99	tdr

Wet Chemistry

Parameter	EPA Method	Result	Qual	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	M2320B							
Bicarbonate as CaCO3		154		mg/L	2	10	4/1/99	cd
Carbonate as CaCO3			U	mg/L	2	10	4/1/99	cd
Hydroxide as CaCO3			U	mg/L	2	10	4/1/99	cd
Total Alkalinity		154		mg/L	2	10	4/1/99	cd
Cyanide, total	M335.4 - Colorimetric w/ distillation	0.07		mg/L	0.01	0.05	4/13/99	bg
Cyanide, WAD	SM4500-CN I-Colorimetric w/ distillation	0.02	B	mg/L	0.01	0.05	4/10/99	m/bg
Lab Filtration	***						4/2/99	cc
Lab Filtration & Acidification	***						4/3/99	tdr
pH (lab)	M150.1 - Electrometric	7.6		units	0.1	0.1	4/1/99	cd
Residue, Filterable (TDS) @180C	M160.1 - Gravimetric	220		mg/L	10	20	4/2/99	cc/cd
Residue, Non-Filterable (TSS) @103-5C	M160.2 - Gravimetric	14	B	mg/L	5	20	4/1/99	cd

Qualifiers (Modifiers) & Definitions

U = Analyte was analyzed for but not detected at the indicated MDL

B = Analyte concentration detected at a value between MDL and PQL

PQL = Practical Quantitation Limit

Vice President of Operations: Ralph Poulsen

ANALYTICAL LABORATORIES, INC.
1804 N. 33rd Street
Boise, Idaho 83703
Phone # (208) 342-5515

LABORATORY ANALYSIS REPORT
SAMPLE NUMBER - 9905994

Attn. EILEEN STEILMAN

HECLA MINING COMPANY
1 MILE N OF CHALLIS
PO BOX 647
CHALLIS, ID 83226-

Time of Collection: 14:00
Date of Collection: 03/04/99

Date Received: 03/09/99
Date Reported: 03/17/99

Submitted by: BVK/KA

Source of Sample: POND 4

Test Requested	FRDS # MCL	Analysis Result Unit	MDL	Method	Date Completed	Analyst Initials
MERCURY		0.0015 mg/L	0.0002	EPA 245.1	03/16/99	BMM
CYANIDE TOTAL		3.8 mg/L	0.005	EPA 335.2	03/15/99	KDH
CYANIDE WEAK ACID DIS		1.3 mg/L	0.005	SM 4500	03/15/99	KDH

ANALYTICAL LABORATORIES, INC.
1804 N. 33rd Street
Boise, Idaho 83703
Phone # (208) 342-5515

LABORATORY ANALYSIS REPORT
SAMPLE NUMBER - 9904533

Attn. EILEEN STEILMAN

HECLA MINING COMPANY
1 MILE N OF CHALLIS
PO BOX 647
CHALLIS, ID 83226-

Time of Collection: :
Date of Collection: 02/18/99

Date Received: 02/23/99
Date Reported: 03/04/99

Submitted by: WTP

Source of Sample: POND 4

Test Requested	FRDS #	MCL	Analysis Result	Unit	MDL	Method	Date Completed	Analyst Initials
MERCURY			0.0012	mg/L	0.0002	EPA 245.1	03/03/99	BMM
CYANIDE TOTAL			4.0	mg/L	0.005	EPA 335.2	02/26/99	KDH
CYANIDE WEAK ACID DIS			1.11	mg/L	0.005	SM 4500	03/01/99	KDH

ANALYTICAL LABORATORIES, INC.
1804 N. 33rd Street
Boise, Idaho 83703
Phone # (208) 342-5515

LABORATORY ANALYSIS REPORT
SAMPLE NUMBER - 9903435

Attn. EILEEN STEILMAN

HECLA MINING COMPANY
1 MILE N OF CHALLIS
PO BOX 647
CHALLIS, ID 83226-

Time of Collection: 14:00
Date of Collection: 02/04/99

Date Received: 02/09/99
Date Reported: 02/18/99

Submitted by: WTP/TR

Source of Sample: POND 4

Test Requested	FRDS # MCL	Analysis Result Unit	MDL	Method	Date Completed	Analyst Initials
MERCURY		0.0014 mg/L	0.0002	EPA 245.1	02/17/99	BMM
CYANIDE TOTAL		3.2 mg/L	0.005	EPA 335.2	02/16/99	KDH
CYANIDE WEAK ACID DIS		1.0 mg/L	0.005	SM 4500	02/16/99	KDH

ANALYTICAL LABORATORIES, INC.
1804 N. 33rd Street
Boise, Idaho 83703
Phone # (208) 342-5515

LABORATORY ANALYSIS REPORT
SAMPLE NUMBER - 9902143

Attn. EILEEN STEILMAN

HECLA MINING COMPANY
1 MILE N OF CHALLIS
PO BOX 647
CHALLIS, ID 83226-

Time of Collection: :
Date of Collection: 01/21/99

Date Received: 01/26/99
Date Reported: 02/04/99

Submitted by: GC/WN/DL

Source of Sample: POND 4

Test Requested	FRDS #	MCL	Analysis Result	Unit	MDL	Method	Date Completed	Analyst Initials
MERCURY			0.0007	mg/L	0.0002	EPA 245.1	02/03/99	BMN
CYANIDE TOTAL			3.66	mg/L	0.005	EPA 335.2	01/27/99	KDH
CYANIDE WEAK ACID DIS			0.62	mg/L	0.005	SM 4500	01/27/99	KDH

FEB 2 0 '99

ANALYTICAL LABORATORIES, INC.

1804 N. 33rd Street
Boise, Idaho 83703
Phone # (208) 342-5515

LABORATORY ANALYSIS REPORT
SAMPLE NUMBER - 9903436

Attn. EILEEN STEILMAN

HECLA MINING COMPANY
1 MILE N OF CHALLIS
PO BOX 647
CHALLIS, ID 83226

Time of Collection: 15:00
Date of Collection: 02/04/99

Date Received: 02/09/99
Date Reported: 02/18/99

Submitted by: WTP/TR

Source of Sample: M-13

Test Requested	EPDS # MCL	Analysis Result Unit	MDL	Method	Date Completed	Analyst Initials
MERCURY		<0.0002 mg/l	0.0002	EPA 245.1	02/17/99	BMM
CYANIDE TOTAL		<0.005 mg/l	0.005	EPA 335.2	02/10/99	KDH
CYANIDE WEAK ACID DIS		<0.005 mg/L	0.005	SM 4500	02/10/99	KDH

SVL ANALYTICAL, INC.
One Government Gulch ■ P.O. Box 929 ■ Kellogg, Idaho 83837-0929 ■ Phone: (208)784-1258 ■ Fax: (208)783-089

REPORT OF ANALYTICAL RESULTS

CLIENT : Hecla Mining Company

SVL JOB No. : 90309
SVL SAMPLE No.: 196886

CLIENT SAMPLE ID: M-13
Sample Collected: 2/04/99 14:00
Sample Receipt : 2/09/99
Date of Report : 2/17/99

Matrix: WATERG

Determination	Result	Units	Dilution	Method	Test Date	Reference
Cyanide-TOT	<0.01	mg/L	1	335.4	2/09/99	1
Cyanide-WAD	<0.01	mg/L	1	4500I	2/09/99	3
Mercury	<0.0002	mg/L	1	245.1	2/16/99	1

REFERENCES: 1) "Methods for Chemical Analysis of Water and Wastes", EPA-600/4-79-20; 2) "Test Methods for Evaluating Solid Wastes, 3rd Edition", SW 846, 1994; 3) "Standard Methods for the Examination of Water and Wastewater", 18th ED. 1992; 4) ASTM Method; 5) 40 CFR, Part 261

Reviewed By: Blake Johnson Date 2/17/99
2/17/99 8:35

ANALYTICAL LABORATORIES, INC.

1804 N. 33rd Street
Boise, Idaho 83703
Phone # (208) 342-5515

LABORATORY ANALYSIS REPORT
SAMPLE NUMBER - 9902144

Attn. EILEEN STEILMAN

HECLA MINING COMPANY
1 MILE N OF CHALLIS
PO BOX 647
CHALLIS, ID 83226

Time of Collection: :
Date of Collection: 01/21/99

Date Received: 01/26/99
Date Reported: 02/04/99

Submitted by: GC/WN/DL

Source of Sample: M-13

Test Requested	FRDS # MCL	Analysis Result Unit	MDL	Method	Date Completed	Analyst Initials
MERCURY		<0.0002 mg/L	0.0002	EPA 245.1	02/03/99	BMM
CYANIDE TOTAL		<0.005 mg/L	0.005	EPA 335.2	01/27/99	KDH
CYANIDE WEAK ACID DIS		<0.005 mg/L	0.005	SM 4500	01/27/99	KDH

1

STATE OF IDAHO
DIVISION OF
ENVIRONMENTAL QUALITY

900 North Skyline Drive, Suite B • Idaho Falls, Idaho 83402-1718 • (208) 528-2650

Dirk Kempthorne, Governor
C. Stephen Allred, Administrator

May 18, 1999

VIA FACSIMILE

Mr. Douglas Wollant
Hecla Mining Company
P.O. Box 647
Challis, Idaho 83226

RE: Cyanidation Permit No. CN-000022

Dear Mr. Wollant:

This letter is in response to the information Mr. Gary Gamble provided Jim Johnston during a telephone conversation on May 17, 1999. During that phone call the Idaho Division of Environmental Quality (IDEQ) was notified that recent cyanide levels in Jordan Creek are, at least partially, resulting from seeps and springs currently discharging into the creek. Hecla originally submitted a proposed response plan in a May 5, 1999 letter to the U.S. Forest Service (USFS), outlining Hecla's intended actions and a schedule for those actions. During our May 12, 1999 meeting with USFS and U.S. Environmental Protection Agency (EPA) personnel, we discussed your preliminary investigation findings and the proposed plan to address cyanide releases in the vicinity of Grouse Creek Mine. The agencies also requested additional information and monitoring at the site. Hecla agreed to provide the information no later that May 21, 1999.

As a result of the latest notification and new source information on this issue, IDEQ is immediately invoking Section I. of Cyanidation Permit No. CN-000022: "*Provide Information. The permittee shall furnish to the Director within a reasonable time, any information including copies of records required by the this permit or other applicable regulations which the Director may reasonable require to determine whether cause exists for modifying or revoking this permit or to determine compliance with the permit or other applicable regulations.*" In addition to the Hydrogeologic Study Hecla commissioned in the fall of 1998, IDEQ is requiring you to provide all information and documents not previously provided and relevant to any cyanide releases or potential releases to soils, ground, or surface water at the Grouse Creek Unit no later that May 21, 1999.

In accordance with Section N. of Permit No. CN-00022, Hecla shall immediately begin collecting and analyzing daily samples at all surface monitoring locations and weekly samples at all ground water monitoring locations until further notice. Parameters shall include total and WAD cyanide, nitrates, and flow measurements. Similarly, a complete sampling event shall be

conducted no later than May 24, 1999 which will include all parameters currently required under Hecla's monitoring plan and all major ions at all sampling locations in addition to the tailings impoundment supernatant liquid, tailings pore water, and under drain waters. The supernatant sampling should be integrated depth sampling. Hecla shall provide all information from these sampling events to IDEQ immediately upon receipt. This information is required in addition to those items listed above and discussed during our May 12, 1999 meeting.

Please don't hesitate to call me at (208) 528-2650 if you have any questions.

Sincerely,

Catherine Reno

Catherine Reno
Regional Manager

cc: James S. Johnston, IDEQ
Rene' Mabe, USFS
Dave Tomten, EPA

2

Hecla
MINING COMPANY

Ms. Catherine Reno
Regional Manager
Division of Environmental Quality
900 North Skyline Drive, Suite B
Idaho Falls, Idaho 83402

May 21, 1999

RE: **HECLA'S WORK PLAN FOR MITIGATION MEASURES AND RESPONSE TO IDEQ INFORMATION REQUESTED IN LETTER DATED MAY 18, 1999**

Dear Ms. Reno:

This letter and the enclosed information are in response to our May 12, 1999 meeting at which you requested a work plan for short-term mitigation measures and your letter dated May 18, 1999 which requested additional information.

Hecla met with our hydrologic consultant on May 20th, 1999 at the Grouse Creek Unit site. We reviewed the recent information and inspected the Jordan Creek sites. Hecla is in the process of planning these short-term mitigation measures stated below.

Hecla is requesting immediate emergency agency approval to construct an access road to Jordan Creek and to construct the "pump back sumps" adjacent to Jordan Creek as described below. Hecla will be locating the access road and pump back sumps on the ground over the next few days. Hecla will begin implementing the mitigation measures immediately upon approval by the agencies. Hecla has submitted all of the requested information with this letter.

SHORT TERM MITIGATION MEASURES

1. Hecla is requesting immediate emergency approval from IDWR and the USFS to obtain access across Jordan Creek and along the western side of Jordan Creek from the north access road to the vicinity of surface monitoring site S-2. The access will likely involve walking heavy equipment across and down Jordan Creek and some trees may need to be removed. The preliminary location of this access road is shown on the attached map (Jordan Creek Sampling Sites, May 13, 1999).

2. Hecla will be constructing several pump-back sumps between the west side of Jordan Creek and the toe of Pinyon Hill for the purpose of collecting the cyanide source waters that were identified with the Jordan Creek sampling events of May 13th, 18th, 20th, 1999. The pump-back sumps will be approximately 10 feet wide by 10 feet long. A slotted piece of approximately 3 foot diameter culvert / pipe will be set vertically in each sump and then back filled with coarse sand and gravel. A pump will be placed in the slotted culvert and the water will initially be pumped to Pond 1 (tailing impoundment). These preliminary sump locations are shown on the attached drawing (Jordan Creek Sampling Sites, May 13, 1999).

3. Hecla will be conducting geophysical surveys in the North Embankment / North Access Road areas during the week of June 1st, 1999. A Very Low Frequency survey (VLF) and an Electro-Magnetic Frequency survey (EMF) will be conducted in these areas. The purpose of these surveys is to provide further detail on the bedrock / colluvium contact and to delineate future drill / pump back sump sites.

Grouse Creek Unit • P.O. Box 647 • Challis, ID 83226 • (208) 879-2304 • Fax (208) 879-5529

4. Additional wells will be drilled in the North Embankment Area and the South Embankment Area at the locations recommended by our hydrologic consultant. The drilling contractor will be mobilizing to the mine site on May 27th, 1999. The preliminary well locations are contained in the report "Preliminary Collection and Evaluation of Hydrogeologic Data at Tailing Storage Facility; Golder Associates, dated May 21, 1999".

5. The proposed wells for the North Embankment Area will have soil samples collected at 5-foot intervals and analyzed for cyanide.

6. A pump will be installed in well MW-24 which is located in the South Embankment Area. Since the hydraulic conductivity of the screened interval is low, we anticipate a low pumping rate.

7. The static water levels in the monitoring wells located in the North Embankment Area have increased. A slug test will be performed on monitoring well MW-19 during the week of June 1st, 1999 to determine the feasibility of pumping from this well.

8. Monitoring and analysis requested in paragraph 3 of your May 18, 1999 letter will be implemented and the results reported to you as they become available. In addition, static water levels in wells located in the North and South Embankment Areas will be monitored weekly.

IDEQ REQUEST FOR INFORMATION

In the letter dated May 18th, 1999, the IDEQ requested all information and documents not previously provided and relevant to any cyanide releases or potential releases to soils, ground, or surface water at the Grouse Creek Unit no later than May 21, 1999. This information is in the documents listed on pages 3 and 4 that are enclosed.

Hecla believes these actions will assist in short-term mitigation, identifying and locating the problem and will result in helping to define the appropriate corrective action. Hecla takes this situation very seriously and is committed to solving any problems. We believe this letter and the enclosed information fully satisfy the commitments made by Hecla at our meeting of May 12th and the information requested in your letter of May 18th. If you have any questions or need additional information, do not hesitate to contact me at (208) 879-2304, ext. 530.

Sincerely,

Douglas G. Wollant

Douglas G. Wollant
Hecla Mining Company
Unit Manager Grouse Creek Unit

Cc: Rene' Mabe (USFS)
Dave Tomten (USEPA)
Sonny Hornbaker (IDWR, w/o enclosures)

LIST OF INFORMATION ENCLOSED:

1. Preliminary Collection and Evaluation of Hydrogeologic Data at Tailing Storage Facility; Golder Associates, dated May 21, 1999.
2. Jordan Creek Sampling Sites May 13, 1999. Drawing I.D. CN99trav.dwg; dated 4/17/99.
3. Surface and Ground Water Monitoring Stations. Drawing I.D. Jordarea.dwg; dated 4/5/99.
4. HMC-GCU Monitoring Well Location Table; dated May 19, 1999.
5. HMC-GCU Jordan Creek Sampling Table – conducted on 5/13/99; dated 5/21/99.
6. HMC-GCU Jordan Creek Sampling Table – conducted on 5/13/99, 5/18/99, 5/20/99; dated 5/21/99.
7. HMC-GCU Washout Creek Sampling Table; dated 5/21/99.
8. Grouse Creek Project Tailings Impoundment Sampling Analytical Results Summary; SRK, dated June 20, 1997.
9. HMC-GCU Environmental Lab Analysis for Pond 1 Floor Drain Pump, dated 5/6/99 and 5/13/99.
10. HMC-GCU Ground Water Elevations, dated 5/21/99.
11. HMC-GCU Ground Water Monitoring Well Pumping Information MW-26, dated 5/19/99.
12. HMC-GCU Static Water Level (elevation) Graphs for MW-10, MW-23, MW-25, dated 5/19/99.
13. HMC-GCU Tailings Pond 1 Capacity Report, dated 4/7/99.
14. HMC-GCU Surface Water Quality Monitoring Program for S-1, S-2, S-3, S-4, S-5, S-6, S-7, S-8, S-9, S-10, S-11 with most recent outside analytical lab analysis.
15. HMC-GCU Ground Water Quality Monitoring Program for MW-1, MW-3, MW-7, MW-10, MW-11, MW-12, MW-13, MW-14, MW-15, MW-16, MW-17, MW-19, MW-20, MW-23, MW-24, MW-25, MW-26, MW-27, MW-28 with the most recent outside analytical analysis.
16. HMC-GCU Miscellaneous Sampling, dated 5/21/99.
17. HMC-GCU Internal Lab Results for S-2, S-3, S-4, S-5, S-11; dated thru 5/19/99.
18. HMC-GCU Internal Lab Results for MW-3, MW-10, MW-13, MW-14, MW-15, MW-16, MW-17, MW-18, MW-19, MW-23, MW-24, MW-25, MW-26, MW-27, MW-28; dated thru 4/27/99.
19. SVL analytical results for S-2, S-3; S-4, S-5, S-11; dated 4/27/99, 4/30/99, 5/1/99, 5/2/99, 5/3/99, 5/4/99, 5/5/99, 5/6/99, 5/7/99, 5/9/99.
20. HMC-GCU Graphs: Pounds of CN vs Flow for Underdrains and Upper Pinyon and Pond 4; Pond 4; Underdrains and Upper Pinyon; Floor Drain Total and WAD CN; dated April 1999.
21. ACZ Laboratories soil analysis for soil 3, soil 5, soil 8, soil 9, soil 10, soil 11, soil 12, soil 13, soil 14, soil 15; dated 9/2/98.
22. ACZ Laboratories soil analysis for NE-2, NE-4, NE-5, NE-6, NE-11, NE-13, NE-9, NE-14, NE-15, NE-17; dated 9/22/98.

23. HMC-GCU Jordan Creek Staff Gauge Readings; dated 5/21/99.

24. HMC-GCU Surface Water Sampling Log / Worksheet / 1999; dated 3/29/99, 4/27/99, 4/30/99, 5/1/99, 5/2/99, 5/3/99, 5/4/99, 5/7/99, 5/9/99, 5/10/99, 5/11/99, 5/12/99, 5/13/99, 5/17/99, 5/18/99, 5/19/99, 5/20/99.

25. HMC-GCU Ground Water Sampling Log / Worksheet; dated 3/29/99.

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STATE OF IDAHO
DIVISION OF
ENVIRONMENTAL QUALITY

900 North Skyline Drive, Suite B • Idaho Falls, Idaho 83402-1718 • (208) 528-2650

Dirk Kempthorne, Governor
C. Stephen Allred, Administrator

June 15, 1999

Mr. Douglas Wollant
Hecla Mining Company
P.O. Box 647
Challis, Idaho 83226

Via Facsimile

Re: Hecla Grouse Creek Mine

Dear Mr. Wollant:

This letter is written in response to discussions which took place during meetings held on May 12, 1999 and June 2, 1999 regarding the presence of cyanide in ground and surface waters at Hecla's Grouse Creek Mine. DEQ appreciates Hecla's prompt response to this situation so far and looks forward to working with Hecla on this complex problem. The Idaho Department of Health and Welfare, Division of Environmental Quality (DEQ) also reviewed the information that Hecla provided in response to DEQ's May 18, 1999 letter. DEQ has discussed this situation with several federal and state agencies, including but not limited to the United States Department of Agriculture Forest Service (USDA) and the United States Environmental Protection Agency (EPA). Based upon careful review of the submitted information and these discussions, DEQ, USDA and EPA have determined that the following actions are necessary to protect human health and environment at and near the Hecla Grouse Creek Mine.

First, the immediate needs of the Grouse Creek Mine must be addressed. Therefore, pursuant to the requirements of Cyanidation Permit No. CN 000022, DEQ directs Hecla to perform the actions which are set forth in *Attachment A* to this letter. The actions described in *Attachment A* reflect the conclusions reached by representatives of DEQ, USDA and EPA. If Hecla wishes to take any actions in addition to those set forth in *Attachment A*, Hecla must inform the USDA, EPA and DEQ and obtain written approval from these three agencies prior to engaging in any actions. Hecla is also notified that DEQ, USDA and EPA reserve the right to initiate enforcement actions and/or remedial actions for any and all violations of state and federal laws and regulations which may have occurred at the Hecla Grouse Creek Mine.

Second, the long term needs of the Grouse Creek Mine must be addressed. The USDA, EPA and DEQ anticipate that this will be accomplished via a single Consent Order between Hecla and these three entities. Each agency will utilize its own statutory and regulatory authority to enter such a Consent Order. A single unified Consent Order entered between Hecla, DEQ, EPA and USDA should streamline the process and result in a remediation that is cost effective and protective of human health and the environment. We anticipate commencing discussions for

such a Consent Order within the next few weeks.

DEQ is committed to working cooperatively with Hecla and all other state and federal agencies to address the Grouse Creek Mine. DEQ believes that the requirements set forth in this letter will aid all parties in achieving this goal. If you have any questions or wish to discuss these matters in greater detail, please do not hesitate to call me.

Sincerely

for

Catherine Reno
Regional Environmental Manager

cc: James S. Johnston, IFRO Regional Administrator
Timothy Callanan, Deputy Attorney General
Rene Mabe', USDA-USFS, Challis National Forest
Terry Harwood, USDA-USFS, Washington D.C.
Steve Silverman, USFS OGC, Denver
Gary Fremerman, USFS OGC, Washington D.C.
Nick Ceto, EPA Region X, Seattle
Dave Tomten, EPA Idaho Operations, Boise
Ed Kowalski, EPA OGC

Attachment

Requirements for Site Characterization and Technical Information Needs for Hecla Grouse Creek Unit

Hecla shall develop and implement a workplan for characterizing the impoundment area, including the area from the north embankment to the north access bridge and from the south embankment to below Washout Creek. The workplan should describe the rationale and methods for characterizing ground water and surface water hydrology, surface water/ground water/pond water interactions, and the nature and extent of cyanide contamination in the area. The workplan shall include a schedule for various tasks, and include as a deliverable a quality assurance project plan for collection of data. The workplan shall also include as a deliverable a site characterization report that presents and interprets data, and presents a conceptual site model. Findings of the site characterization activities are necessary to design effective mitigation measures.

The agencies recognize the site characterization activities conducted to date by Hecla, and believe they are a good start toward better defining site conditions. At our June 2nd meeting in Boise, the agencies raised a number of questions and identified specific items that were needed to better understand site conditions. The site characterization workplan and resulting report must cover the following items:

1. A full analytical suite (major ions, nitrogen species, dissolved and total metals, field parameters) to determine water chemistry of the tailings impoundment including the supernatant liquid, floor drain and underdrains (as requested in the DEQ letter dated May 18, 1999 and will be conducted on June 7, 1999). Protocols should be included in the QAPP.

2. A map of all underdrains, which includes underdrains 10 through 15.

3. Rationale for proposed ground water monitoring well locations and proposed construction specifications and what data will be gained from this effort. A workplan for these activities must be submitted to, and approved by, the agencies. Several of the well locations should include clustered wells (as was done in the North Embankment area last fall). Measurement of static water levels in all monitoring wells must be conducted weekly. All data gathered from this effort must be submitted to the agencies within 30 days of completion. The agencies support the use of

geophysical methods to understand problem and to help locate future monitoring and pumping wells.

4. Installation of ground water monitoring wells between the south access road and Washout Creek in unconsolidated deposits to assess potential migration of contaminated water to the south. These well(s) should also be clustered.

5. Design and conduct a tracer study to address the possible migration of tailings solution to Jordan Creek at both the North and South Embankments.

6. Design and conduct a discrete gain-loss study on Jordan Creek using tracers to further assess groundwater contributions to Jordan Creek within the influence of Mine, from surface water Stations S-6 to S-5.

7. The site characterization report should provide additional interpretation on the ground water interaction between the landslide deposit and bedrock in the mine area, tailings impoundment, and both embankments.

8. Characterize springs and seeps with the same suite of analytes as listed above, including flow rates (as requested in the DEQ letter dated May 18, 1999 and will be conducted on June 7, 1999).

9. Collect consistent data on S-6; data should be concurrent with other in-stream monitoring.

10. Add surface water station S-12, located on Jordan Creek below S-4 and immediately above the confluence of Gnarly Creek, approximated elevation 6,980 feet.

11. Washout Creek should be included in the Comprehensive Water Quality Monitoring and Quality Assurance Plan and sampled on the quarterly schedule.

12. Jordan Creek and Washout Creek should be visually inspected for seeps monthly and seeps should be inventoried.

13. Implement increased biomonitoring, to include seasonal macroinvertebrate sampling (tied to the hydrograph), algae toxicology and fish toxicology testing.

14. Provide a water quality monitoring plan for the waste rock storage area, including the west ditch, underdrain and surface erosion. Also, provide a water quality monitoring plan for the South Embankment low pH runoff water (Pond 8 water). This type of information is required to develop a more thorough understanding of contaminated wastewaters quantity/quality at the site, and to enable for integrated planning for wastewater management.

15. Conduct an analysis of seasonal water quality variations for the South Embankment underdrains from 1994 to present, using all parameters which have been analyzed. Include in the analysis variations in cyanide concentrations in the tailings impoundment supernatant liquid.

(The report needs to provide an explanation for the seasonal rise in cyanide in the underdrains during 1997 and 1998 considering the decreasing amount of cyanide in the supernatant liquid.)

16. Provide all data and information in a consistent and organized format.

17. Develop a hydrograph for Jordan Creek at each ambient monitoring location, and collect flow measurements each time water quality sampling events occur.

18. The report should provide map(s) of the potentiometric surface of the groundwater system for the north and south embankment areas, and delineate the extent of all occurrences of cyanide in groundwater. Groundwater monitoring wells having non-detects for cyanide are required to delineate the downgradient extent of cyanide plumes. These maps should be prepared for different seasons as it appears that ground water conditions vary seasonally.

19. Any proposed short-term or interim actions for the purpose of containing or mitigating cyanide releases to the environment shall be submitted in writing for agency review and approval determination.

20. The memorandum dated May 28, 1999 was provided to Hecla via facsimile regarding monitoring locations and parameters, as well as the spreadsheet you constructed specifying the requirements for this event are incorporated by reference and will be provided upon request. Monthly reports of the weekly surface water and monthly groundwater sampling events described in the memorandum and associated spreadsheet shall be submitted no later than the 10th day of the following month. These reports must utilize a consistent format which includes trend analyses, raw data sheets, and quality assurance and control documentation.

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STATE OF IDAHO
DIVISION OF
ENVIRONMENTAL QUALITY

900 North Skyline Drive, Suite B • Idaho Falls, Idaho 83402-1718 - (208) 528-2650

Dirk Kempthorne, Governor
C. Stephen Allred, Administrator

July 30, 1999

RECEIVED
CHALLIS
AUG 03 1999
RANGER DISTRICT

Mr. Douglas Wollant
Hecla Mining Company
Grouse Creek Unit
P.O. Box 647
Challis, Idaho 83226

RE: Response to Hecla July 16, 1999 document **Work Plan To Evaluate Sources of Cyanide Entering Jordan Creek From Hecla Mining Company's Grouse Creek Unit**

Dear Mr. Wollant:

The Idaho Division of Environmental Quality (IDEQ) in consultation with the Environmental Protection Agency (EPA) and the U.S. Forest Service (USFS) reviewed the Work Plan submitted by Hecla Mining Company dated July 16, 1999. The Work Plan is approved subject to the following agency comments:

Section 1.1, Page 1. The short-term objective should reference the chronic aquatic life standard for cyanide. See also previous correspondence from DEQ to Hecla, dated July 16, 1999.

Section 2. The section on site background contains some statements that all agencies may not agree with. In addition, a few important points are omitted. Because this isn't an critical part of work planning, the concerns were not enumerated.

Section 3.1 Surface Water Uncertainty/measurement error must be reported for all surfacewater flow measurements made on the project. (A reference for evaluation of streamflow current meter measurements is USGS Open-File Report 92-144, Sauer and Meyer, 1992.) The combination of streamflow measurement error plus laboratory error (especially at or near laboratory reporting limits) may make the cyanide loading and streamflow gain-loss calculations suspect.

Section 3.1.1.2. The data show that there was a marked increase in CN in Jordan Creek in April 1999. Please address this increase.

Section 3.1.2. This section on water quality for the Pinyon Creek outfall 002 should acknowledge that discharges of CN at or below the effluent limit may cause or contribute to violations of water quality standards in the receiving stream during some flow conditions.

Section 3.1.3.2. For samples collected in Washout Creek, how many contained CN and what were the concentrations? Saying that most samples were below the detection limit is not very useful.

Section 3.3.3. The paragraph on WET testing of fish must be expanded to address CN levels in the effluent used and comment on the representativeness of effluent used. This information is needed to assess whether additional WET testing is warranted.

Section 4.2. The list of potential sources for CN that is found in groundwater and surface water must include discharge of effluent at outfall 002.

Section 4.2. The fourth paragraph refers to the lined collection ponds. It would be useful to know more about the types of liners used and how they were constructed in order to evaluate the likelihood of leakage from these features to groundwater. Please provide this information.

Table 4-1 The table indicates that water quality criteria for arsenic are hardness-based. Please correct.

Section 4.4. Suggest consulting with fisheries staff on whether additional toxicity testing is warranted. See also comment above on representativeness of effluent used in previous rounds of WET testing. Under the circumstances, additional WET testing would help to help sort out the question of impacts to fish. Relying on WET testing of algae may be inappropriate considering that algae appears to thrive in Jordan Creek below the outfall.

Section 4.5.1. The list of short-term remedial measures should include reduction of CN loading associated with discharge at outfall 002.

Section 5.4 Monitoring Well Installation Extensive geophysical work carried out at the North and South Embankment areas since May 1999, but it appears that only one proposed monitoring well location (15,980/3,3,210 - South Area) is based on results of geophysical survey investigations. Will geophysical surveys be used in locating additional monitoring wells?

As mentioned in previous comments, tracer dilution methods to measure streamflow coupled with synoptic sampling have been used to pinpoint areas of metal mass loading to streams in other mining situations. When compared to monitoring well installation costs ($5,000-15,000/well) and the associated uncertainty of a proper well location, especially in fracture flow situations, tracer dilution measurements combined with synoptic sampling may provide cost effective information for choosing monitoring well locations. Please evaluate this method.

Identification of potential groundwater flow paths contributing to seeps JC-26 through JC-30 isn't addressed by any of the proposed monitoring well locations (Figure 5-1). Please discuss well(s) locations for the general area of 19,250/4,500. The northeast corner of the North Embankment area is suspect as an area of leaks. Ice and rock damage to the liner occurred in this area during the winter of 94/95, but due to the steep slopes along Pinyon Hill and rapidly rising water levels in the impoundment, repairs were difficult to make.

Section 5.4. From the write-up, it appears that only one pump-back well is planned for the north embankment area. It wasn't clear from the write-up how decisions on additional pump-back wells would be made or when. Considering that a groundwater pathway is evident and that proposed sumps would be expected to capture only 10 -15% of the daily CN load to Jordan Creek, I would suggest that a more aggressive approach using additional pump-back wells is warranted. Please describe where/when additional pumpback wells will be installed.

Section 5.7 Groundwater Sampling Nitrate-N and ammonia must be included in all groundwater sampling analysis.

Section 6.0, Page 37. Reports that are generated should be provided to EPA and the FS as well.

Section 6.1 Monthly Reporting Please specify which data base will be used for submission of monitoring data.

Section 7.0 Schedule The schedule indicates that the Site Characterization Report will be submitted 60 days after receipt of the final laboratory data, for a submittal date of January 23, 2000. It is requested that an interim progress report be submitted to agency contact personnel. A suggested date for this interim report is October 31, 1999. The progress report should show the current monitoring well array, wells have been selected as pumping wells, locations of pump back stations and cyanide recovery information for pumping wells and sumps. Any other information relevant to the site characterization efforts also should be included in the interim report. The purpose of this report is to keep agency personnel abreast of summer field activities at the site. This information may be presented at an Interagency Task Force meeting.

Data Reporting It is requested that a statistical analysis be developed for data gathered at the site. The analysis should address deviations from mean values and trends at the various sample stations.

If you have questions please do not hesitate to call.

Sincerely,

James S. Johnston
Regional Administrator

cc: Catherine Reno, IDEQ
Joe Baldwin, IDEQ
Jerry Yoder, IDEQ
Timothy Callanan, IDAG
Rene' Mabe, USFS
Pete Peters, USFS
Nick Ceto, EPA
Dave Tomten, EPA

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United States Department of Agriculture | Forest Service | Intermountain Region | 324 25th Street Ogden, UT 84401-2310

File Code: 2150/2800 Date: July 26, 1999
Route To:
Subject: Grouse Creek Mine
To: Official File

Enclosed is a copy of the Removal Action Memorandum officially initiating CERCLA response actions at the Grouse Creek Mine on the Yankee Fork RD, Salmon-Challis NF, in Idaho.

/s/ Jack G. Troyer (for)

JACK A. BLACKWELL
Regional Forester

Enclosure

cc:
Brenda Styer/r5,ltbmu
Pete Peters/r4,s-c
Forest Supervisor/r4,s-c
Rene Mabe/r4,s-c
Manderbach

GROUSE CREEK MINE
REMOVAL ACTION MEMORANDUM

I. PURPOSE

A release, or significant threat of a release, of hazardous substances that potentially pose a threat to public health, welfare, or the environment has occurred or may occur at the Grouse Creek Mine site (the Site) on and/or from lands under the jurisdiction, custody, or control of the USDA Forest Service, Salmon-Challis National Forest (National Forest System or NFS lands), Yankee Fork Ranger District.

The purpose of this Action Memorandum is to document, pursuant to the guidelines of the National Oil and Hazardous Substance Contingency Plan (NCP), 40 CFR 300, et seq. (1995), the decision to initiate a CERCLA Removal Action, as authorized by Section 104 (42 USC 9604) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA; 42 USC 9601 et seq.), and Executive Order 12580, 52 Federal Register 2923-26 (January 23, 1987).

II. SITE CONDITIONS AND BACKGROUND

A. Site Description and Background

The Grouse Creek Mine is located in Custer County, Idaho, and is approximately 19 miles northeast of Stanley, Idaho (Figure 1). The project is located within Sections 19, 20, 29, 30, and 32 T13N, R15E of the Boise Meridian. Grouse Creek, Pinyon Creek, and Washout Creek are the primary tributaries flowing out of the project area into Jordan Creek. Jordan Creek is a tributary to the Yankee Fork of the Salmon River. The Site lies in the Yankee Fork Mining District.

Access to the project area is from Challis, south on State Highway 75, to the Yankee Fork Road, then north on Yankee Fork Road for approximately 10 miles to Jordan Creek Road, and continuing north on Jordan Creek Road approximately three and one-half miles to the Site. Facilities on site include one open pit, a waste rock disposal area, crushing and milling facilities, a tailings impoundment, and ancillary support facilities, including numerous capture ponds. Other ancillary facilities include access and haul roads, power supply, water supply, fuel, chemical and reagent storage areas, and a building to include the office, assay laboratory, warehouse, and maintenance shop building. Underground historical mining occurred at this Site from the late 1800's with exploration by numerous companies in the 1900's.

After submittal of a mining Plan of Operation to both the USDA Forest Service (FS) and State of Idaho (Idaho), a Final Environmental Impact Statement/Record of Decision was issued in May of 1992 for Hecla Mining Company to proceed with site development. Construction began in June of 1993. The proposed plan was to develop two open pits: a conventional tailings pond with two embankment and a conventional mill utilizing a cyanidation process. This would have resulted 49 million tons of waste rock and 15 million tons of ore produced, and an estimated total surface disturbance of 515 acres. Actual mine production began at 7,500 tons per day ore rock in October of 1994. At that time, a mine NPDES permit was issued by the Environmental Protection Agency (EPA).

The climate of the area is characterized by long, harsh, snowy winters and short, cool, dry summers. The central Idaho region generally has a westerly air flow, with some extratropical cyclines approaching from the southwest or northwest. A majority of the precipitation is received in the form of snow between the middle of October to the middle of May. These precipitation events generally have a long duration and continue for more than 24 hours. Thunderstorms also occur during the spring and summer months, generally of high intensity, short duration of less than one hour. Summer weather in the study area is usually clear with clouds forming in late afternoon and evening. Most thunderstorm events occur during the latter part of the day. Winter weather is a mix of clear, cold days and nights, and cloudy, stormy periods, which can extend for several days. Temperature extremes range from minus 50 degrees Fahrenheit to 95 degrees Fahrenheit. Freezing temperatures may occur throughout the year with no definite frost-free periods. Wind speeds generally range from 5 to 20 knots. Average annual precipitation for the area is approximately 30 inches, the majority of which occurs as snow. The only long-term evaporation data that has been collected near the study area are from Arrowrock Dam, Idaho, station. The average annual evaporation for this station during the period 1961-1985 is approximately 32.2 inches.

This FS management unit encompasses the entire Yankee Fork Watershed and numerous lakes and small streams. The area is a mixture of high, rugged peaks and alpine lakes in cirque basins, steep to moderately steep timbered slopes, narrow to flat canyon bottoms and sagebrush/grass covered slopes and ridges. Vegetation consists of lodgepole pine, Douglas fir, Englemann spruce, sub-alpine fir, sagebrush and grasses. The area is classified as a Grand fir/Douglas fir ecosystem. The unit is also highly mineralized with many present and historic mines and mills present.

The area provides habitat for elk, mule deer, bighorn sheep, mountain goat, black bear, and mountain lion. The West and Yankee forks of the Salmon River are important anadromous spawning and rearing streams. Lakes and smaller streams provide for cold water fisheries.

Current use includes mineral exploration, access to mining, mining, logging, livestock grazing, hunting, fishing, camping, and snowmobiling. Also subsistence hunting and fishing by the Shoshone-Bannock tribe occurs in the area. The FS has prepared a Forest Plan which covers management activities throughout the entire forest. The Site area lands administered by the FS are designated for dispersed recreation opportunities, mineral activities, timber production, and enhancement of anadromous fish habitat. Notable tourist attractions are the old mining towns of Bonanza and Custer, and the Yankee Fork gold dredge. Notable present mining activities in the Yankee Fork drainage area include the Grouse Creek Mine and numerous independent placer and hardrock claimant activities. Recreational mining, involving mostly gold panning, also occurs in the placer deposits of the Yankee Fork and tributaries. Most activities are centered around gold and silver recovery and development.

Except for several scattered homes and seasonal cabins in the area, the closest main population area to the Site is the town of Challis, 26 air miles east of the Site, and the Custer County seat. The 1992 estimated population of Challis was 1,300. The next closest community, Stanley, had a 1992 estimated permanent residency in the Upper and Lower Stanley area of 140. The Stanley area receives a large population influx during the summer months from recreationists.

The economy of Custer County is comprised of four major sectors: mining, agriculture, government, and recreation/tourism. Employment in Custer County has been greatly influenced by the Thompson Creek Molybdenum Project near Challis.

B. Site Characteristics

As described earlier, the Site consists of an open pit, a tailings pond with two embankments, a mill, and numerous other ancillary features. A FS technical team was established on June 1, 1999, to review all existing data on the Site. The following is a synopsis of some of the Site characteristics supporting a release:

1) Tailings Impoundment (450,000,000 gallons of estimated standing water/4, 300,000 estimated tons of tailings rock).

a. According to a 1997 report by SRK, Inc.:

- 7 constituents exceed acute and chronic criteria in tailings pore water: Al, Cu, As, Se, Ag, Zn, & CN.

- EPA Method 1312 leachability tests of the tailings were consistent exceedances of arsenic.

- Acid-Base Accounting tests of the tailings material reveal a potential for becoming acidic over time, with little neutralizing minerals present.

b. In a 1999 Golder & Associates, Inc., report and other water quality monitoring data, the following information on tailings water quality was compiled:

Date	Total CN	WAD CN
1/97	--	38
4/97	430	--
11/97	180	6.2
5/98	170	12.8
8/98	--	1.4
10/98	76	--
5/7/99	77	0.98
5/15/99	85	1.4

c. Elevated total CN was first detected in MW-11 (monitoring well) in August of 1994; and in the NPDES outfall in June of 1995.

d. The discharge of the underdrain system (into pond #6) , a series of capture pipes below the tailings pond liner, shows an increase in WAD CN. The following is a review:

	Year 1995*	Year 1996	Year 1997	Year 1998
Total CN	1.94	5.4	4.33	8.74
WAD CN	0.66	0.33	0.65	1.89

e. The technical team concluded that the cyanide detected in both surface and ground water monitoring stations is coming from the tailings pond.

2) Ground Water

a. The detection of cyanide in all the wells below the south embankment indicates that contaminated water is moving through the landslide deposit.

b. Cyanide is found in seeps and springs along and entering Jordan Creek.

3) Surface Water

a. Water quality monitoring has shown cyanide periodically detected at the farthest surface water quality monitoring station, located in wetlands, before entering the Yankee Fork of the Salmon River since March of 1999.

b. Most of the additional monitoring stations nearer the Site, except background, have shown stable to rising levels of cyanide.

4) Additional Releases:

a. Acidic leachate is releasing, or has the potential to release, from the tailings embankments, the waste rock dump, and pit walls.

C. Release or Threatened Release into the Environment of a Hazardous Substance, Pollutant, or Contaminant

As of the date of this Action Memorandum, an CERCLA Time Critical Removal Action have been initiated. A removal Preliminary Assessment will be developed by the Forest Service in order to gather information about the Site and those parties that may have had involvement at, or a connection with, the Site. The removal Preliminary Assessment, and, if necessary, a Site Inspection, will also determine if an on-the-ground time critical removal action is necessary. If it is determined that such action is necessary, then those parties deemed to be potentially responsible will be requested to perform further studies and site removal actions.

This Action Memorandum also authorizes an Early Action at the Site, in accordance with an approved work plan, to capture cyanide bearing seeps and springs along Jordan Creek and pump the water back into the tailings/process pond circuit for treatment. This Action is contingent upon receipt and approval of a work plan.

If the current Site conditions persist, there is the potential for adverse chronic health effects on aquatic organisms, including listed endangered species, other wildlife, and humans entering the area.

D. Actions Taken on the Site

Recent actions and occurrences at the Site include:

- In May 1992, the FEIS/ROD was issued.

- In June 1993, mine construction began at the Site.

- October 1994, mine production began.

- August 1995, a tailings line failure occurred. Cyanide-bearing tailings released into Jordan Creek for approximately 40 minutes. The release was reported to the appropriate agencies. Tailings pond underdrains have carried traces of cyanide since this failure. Cyanide-bearing waters have been contained in ponds or intercepted by groundwaer wells and treated prior to release via an EPA permitted NPDES outfall.

- 1995, fines paid to EPA for NPDES outfall violations.

- January 1996, a 5,000 gallon reclaim water (cyanide-bearing) was spilled in the mill yard area. The spill was reported to the appropriate agencies. Frozen solution was placed back in the tailings pond.

- April 1997, Hecla Mining Company suspended operations due to unfavorable economic conditions. The water treatment plant has operated continuously since suspension.

- May - December 1997, WAD cyanide was detected off-site, instream, and down stream from the mine.

- 1998, fines paid to Idaho for surface water violations.

- April 1999, FS, Idaho, and EPA receive the consolidated water quality monitoring report for the mine from Hecla Mining Company. The FS notified Hecla by letter of concerns related to pervasive levels of WAD cyanide in Jordan Creek, with copies to Idaho, EPA, National Marine Fisheries Service, and U.S. Fish and Wildlife Service.

- April 1999, first quarter monitoring report submitted to agencies by Hecla show all surface water monitoring sites on Jordan Creek, downstream from the mine, that exceed cold-water biota standards.
-

- May 1999, Hecla reported that springs and seeps that feed Jordan Creek are contaminated with cyanide via telephone.

- May 1999, as directed by EPA/FS/DEQ, Hecla begins daily sampling and submits response/mitigation plan to agencies.

- June 1999, FS technical team developed to review response/mitigation plan and general site characteristics.

- June 1999, multi-agency and Hecla meeting to discuss options. Agencies included Corp of Engineers, U.S. Fish and Wildlife Service, National Marine Fisheries Service, EPA, Idaho, and FS

- June 1999, FS/Idaho/EPA met to develop strategy for Site. Technical and Legal Teams were developed.

- July 1999, FS/Idaho/EPA met at the Site to discuss the urgent need for implementing an action to capture cyanide bearing springs and seeps that enter Jordan Creek.

E. Federal, State, and Local Authorities Role

Consistent with Title 40 CFR, Section 300.415(i) (the NCP), non-Superfund financed removal actions conducted under CERCLA should attain ARARs to the extent practicable, although actual Federal or state permits are not required for any portion of CERCLA response actions (42 USC 9621(e)(1)) conducted on-site. Federal environmental laws will be reviewed and subsequent Federal ARARs will be identified for the Site. Those ARARs considered to be applicable, relevant, and appropriate will be considered in the response action determination. A substantive review of ARARs will be included in the Engineering Evaluation/Cost Analysis (EE/CA) (40 CFR, Section 300.415).

III. STATUTORY AND REGULATORY AUTHORITIES AND THREATS TO PUBLIC HEALTH OR WELFARE OR THE ENVIRONMENT

Conditions presently exist at the site which, if not addressed, may present an imminent and substantial endangerment to the public welfare and/or the environment. Conditions at the Site meet the criteria for a time critical removal action as stated in the NCP, 40 CFR Section 300.415(b)(2) as follows:

(i). Actual or potential exposure to nearby human populations, animals, or the food chain from hazardous substances or pollutants or contaminants.

Aquatic food chain organisms, terrestrial organisms, and human health are threatened by release of cyanide, via the receiving stream and eventual migration to the Salmon River.

(iv). High levels or hazardous sybstances or pollutants or contaminants in soils largely at or near the surface, that may migrate.

As cyanide attenuates to soils, it may still become available to the surface waters through storm water runoff events which, in turn, could elevate cyanide levels in Jordan Creek. Also, cyanide complexes with soils can create availability of heavy metals to the aquatic system.

(v). Seasonal weather conditions that may cause hazardous substances or pollutants or contaminants to migrate or be released.

Low seasonal flows in Jordan Creek in the late summer and fall may, and lose of dilution factor, most likely will result in higher concentrations of cyanide and a higher potential for chronic and acute effects, especially on aquatic organisms.

(vii). The availability of other appropriate federal or state response mechanisms to respond to the release.

The State of Idaho has a mechanism for responding to mine related releases on private land through the Cyanidation Permit program; however, in that most of Jordan Creek lies on public lands administered by the U.S.D.A. Forest Service, CERCLA is the most appropriate instrument for response on National Forest System lands. A Memorandum of Understanding between the U.S.D.A. Forest Service and Environmental Protection Agency will provide the lead agency On-Scene Coordinator and responsibilities for the Site.

Consistent with both the Clean Water Act and CERCLA provisions for Natural Resource Damage Assessments, appropriate private land owners and agencies will be notified of our intent to initiate CERCLA response actions.

The 1997 SRK report states that cyanide, arsenic, sulfate, and copper are the four major contaminants of concern at the Site with potential to affect environmental organisms, specifically aquatic life in Jordan Creek, as well as human health. Also, acidic leachate can be identified as detrimental to the environment, and is either releasing or has the potential to release from the Site. The following describes the potential sources of these constituents:. 1) the tailings pond supernatant liquid and pore water and 2) runoff from storm events, snow melt, and ground water (including seeps, and springs) in contact with acidic waste rock material.

The environmental pathways by which contaminants enter the environment, and their potential receptors, are:

Pathways: Potential contaminant release mechanisms or transport pathways include: 1) direct contact with contaminated soils or water; 2) fugitive dust generation and deposition from blowing dust originating from contaminated soils; 4) site runoff and resultant erosion of contaminants into Jordan Creek; and 5) infiltration or percolation to ground water.

The presence of sulfide minerals (especially pyrite and chalcopyrite) increase the potential for migration of metals. Oxidation of the sulfides results in the formation of sulfuric acid, which increases the solubility of many metals. The acidic drainage from an historic adit, shows that this process is already active at the Site. The area's waste rock piles (including exposed tailings material, the waste rock dump, and embankments) contain sulfide-bearing rock and already show evidence of leaching and precipitation.

Receptors: For cyanide, the potential receptors can be affected by direct contact with contaminated soils or water by site workers or visitors which may allow dermal contact or inadvertent ingestion of contaminants. Toxic levels of cyanide, if ingested, can cause death to

species in aquatic habitats. Humans could be a secondary receptor from consumption of contaminated game or livestock. Fugitive dust generation from the Site may pose inhalation exposure to site workers and visitors. Toxicity of cyanide to plant life is not known.

Adverse environmental impacts that may be occurring at the Site include:

1. Degradation of surface water quality in Jordan Creek due to elevated cyanide levels, and potentially low pH and associated metals. Direct ingestion of these contaminants can occur by humans, wildlife, aquatic, and riparian flora and fauna.

2. Sorption and accumulation of metals in stream bed and bank sediments, of which metals can be directly taken into riparian and aquatic flora.

3. Endangerment of wildlife and human visitors at the Site due to inhalation or absorption of dusts from waste rock piles.

IV. ENDANGERMENT DETERMINATION

Actual or threatened releases of hazardous substances from the Site, if not addressed by implementing the response action selected in this Action Memorandum, may present an imminent and substantial endangerment to public health, welfare, or the environment.

V. PROPOSED ACTIONS AND ESTIMATED ACTIONS

The proposed action for the Site is to initiate a Time Critical Removal Action. In compliance with the NCP, a Preliminary Assessment (PA) will be developed by the agencies to review all pertinent information on the Site and recommend further actions. If deemed necessary, a Site Inspection (SI) will also be prepared.

An action to capture the cyanide bearing springs and seeps along Jordan Creek should be implemented immediately, and especially in lieu of the decreasing volume of water in the creek and concern for increasing concentrations of cyanide. This action will be in coordination with the Environmental Protection Agency, State of Idaho, U.S. Fish and Wildlife Service, National Marine Fisheries Service, Shoshone-Bannock Tribe, and Hecla Mining Company (the owners/operators at the Site). A work plan will be submitted to the agencies for review before the action is initiated.

Any or all of the following alternatives may be necessary to capture contaminated ground water impacting Jordan Creek. Proposed actions that may be taken at the Site include:

- Sumps will be constructed at seeps/springs to capture cyanide bearing groundwater and pumps will transport the water back to the tailings or process ponds for treatment.
- Interception trenches and/or recovery wells may be installed, again, for capture of ground water for treatment.
- Treatment of water from tailings pond underdrains.

Other actions may be proposed.

The actions taken at the Site are considered Time Critical in nature, due to the urgency of preventing cyanide concentrations from increasing in Jordan Creek as creek levels decrease through the year, and subsequential eminant threats to aquatic and terrestrial biota.

VI. EXPECTED CHANGE IN THE SITUATION SHOULD ACTION BE DELAYED OR NOT TAKEN

Should the removal action be delayed or not taken, ongoing or potential injury to natural resources will continue.

VII. OUTSTANDING POLICY ISSUES

The proposed actions at the Grouse Creek Mine will be under Forest Service oversight under the NCP guidance, and under the authority of 42 USC 9601 et seq. and 7 CFR. 2.60(a). It is believed that implementation of this process will result in an improvement in ecosystem health in an efficient and cost-effective manner, and in a relatively rapid time frame.

It is the full intention of the Forest Service to seek cost recovery to reimburse the citizens of the United States for all expenses incurred in the planning and cleanup of the Site. All selected, viable Potentially Responsible Parties that participated as owners and/or operators of the Site will be approached for completing all necessary documents consistent with the NCP, except for the PA, or if necessary, full payment upon completion of the removal measures on the Site.

VIII. ADMINISTRATIVE RECORD AND COMMUNITY RELATIONS

Pursuant to 40 CFR 300.415(m), I have designated Donald (Pete) Peters as the On-Scene Coordinator and Rene Mabe, District Ranger, Yankee Fork Ranger District, as Spokesperson for the project.

A Community Relations Plan for the removal action will be developed for this project. The Administrative Record for this Removal Action will be compiled and made available during regular business hours at the office of the Yankee Fork Ranger District of the Salmon-Challis National Forest, HC 67 Box 650, Clayton, Idaho, 83227. A Notice of Availability of the Administrative Record will be published in local newspapers.

VIII. DECISION

By this Action Memorandum, I find that a CERCLA time critical removal of the action at the Grouse Creek Mine is appropriate.

I also recommend that in accordance with an approved work plan, actions be taken for capture of the springs and seeps along Jordan Creek through the installation of sump pumps, in order to pump the cyanide bearing ground water back to the tailings pond for eventual treatment before release. This Action Memorandum serves as a Decision Document in approving this action at the Site.

By copy of this Action Memorandum, we are formally notifying the State of Idaho and EPA Region X of our finding of the appropriateness of a CERCLA removal action at the Grouse Creek Mine.

JACK A. BLACKWELL
Regional Forester

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NOTICE OF VIOLATION

Issued to: **Hecla Mining Company**
Gary Gamble, Environmental Director
6500 Mineral Drive
Coeur d'Alene, Idaho 83814-8788

Hecla Mining Company (Hecla) operated a facility for ore processing by cyanidation at its Grouse Creek mine located in Custer County, Idaho. On June 18, 1992 Hecla was issued Ore Processing by Cyanidation Permit No. CN-000022 (Permit) by the Department of Health and Welfare, Idaho Division of Environmental Quality (Department) authorizing the construction and operation of an ore cyanidation facility at the Grouse Creek mine.

On March 31, 1999, Hecla provided the Department with a copy of Hecla's *1998 Summary of Water Quality Report* (1998 Report) in accordance with the Permit and the Grouse Creek Unit Plan of Operations. In addition to the 1998 Report, the Department requested and received analytical information relevant to cyanide releases at the facility. Based on the Department's review of all available analytical data, the Department alleges the following violations of the Permit, the Idaho Water Quality Standards and Wastewater Treatment Requirements and the Idaho Ground Water Rule have occurred at the Grouse Creek mine, pursuant to Idaho Code Sections 39-105 and 39-108 (Idaho Environmental Health and Protection Act):

VIOLATIONS

Violation No. 1

Legal Provisions Violated: IDAPA 16.01.02.080.01.a. and 16.01.02.250.02.a.iv.; Idaho Water Quality Standards and Wastewater Treatment Requirements; IDAPA 16.01.11.200.01.a. and 16.01.11.400.01.a. ; Idaho Ground Water Quality Rule and Condition C.1. of the Permit

IDAPA 16.01.02.080.01.a. states:

"Discharges Which Result in Water Quality Standards Violation. No pollutant shall be discharged from a single source or in combination with pollutants discharged from other sources in concentrations or in a manner that:

a. Will or can be expected to result in violation of the water quality standards applicable to the receiving water body or downstream waters."

The following water quality criteria apply to surface waters of the state according to the designated beneficial uses on a water body.

Aquatic Life

IDAPA 16.01.02.250.02.a.iv. states:

"All toxic substance criteria set forth in 40 CFR 131.36(b)(1), Columns B1, B2 and D2, revised as of December 22, 1992, effective February 5, 1993 (57 FR 60848, December 22, 1992) provided, however, the standard for arsenic shall be fifty (50) ug/L for Column D2. 40 CFR 131.36(b)(1) is hereby incorporated by reference in the manner provided in subsection 250.07."

The acute standard for cyanide in Column B1 is 22 ug/L [the highest concentration of a pollutant to which aquatic life can be exposed for a short period of time (1 hour average) without deleterious effects]. The chronic standard for cyanide in Column B2 is 5.2 ug/L [the highest concentration of a pollutant to which aquatic life can be exposed for an extended period of time (4 days) without deleterious effects].

IDAPA 16.01.11.200.01.a. states:

"GROUND WATER QUALITY STANDARDS. The following numerical and narrative standards apply to all ground water of the state and shall not be exceeded unless otherwise allowed in this rule.

01. Numerical Ground Water Quality Standards.

a. The Primary Constituent Standards are based on protection of human health and are identified in Table II."

IDAPA 16.01.11.400.01.a. states:

"Releases Degrading Ground Water Quality. No person shall cause or allow the release, spilling, leaking, emission, discharge, escape, leaching, or disposal of a contaminant into the environment in a manner that:

a. Causes a ground water quality standard to be exceeded."

Condition C.1. of the Permit states in relevant part:

"Limitations and Monitoring Requirements. There shall be no unauthorized discharge of any deleterious material, hazardous material or pollutant to the surface or ground waters of the State of Idaho...."

Hecla discharged a hazardous material, pollutant and contaminant, namely cyanide, without authorization, from its tailings impoundment to the surface and ground waters of the State of Idaho (Jordan Creek).

The unauthorized cyanide discharge resulted in a violation of water quality standards applicable to the receiving body of water. Sample results provided by Hecla indicate cyanide concentrations in Jordan Creek exceeded the acute standard of 22 ug/L periodically since March 29, 1999 and exceeded the chronic standard of 5.2 ug/L periodically since October 21, 1998.

The unauthorized cyanide discharge to the ground water resulted in an exceedance of the ground water quality standard for cyanide. Per Table II in IDAPA 16.01.11.200.01.a., the primary constituent ground water standard for cyanide is 0.2 mg/L. Hecla provided analytical data in its *Preliminary Hydrogeologic Data Report on the Tailing's Facility*, Golder Associates, May 21, 1999, indicating concentrations of cyanide in Grouse Creek Unit monitoring wells MW-17, MW-19, MW-23, MW-24, MW-25 and MW-26 in excess of 0.2 mg/L beginning October 24, 1998.

The exclusive known source of cyanide in the Jordan Creek drainage is that imported by Hecla for use in ore processing.

Penalty: **$10,000.00**

Violation No. 2

Legal Provision Violated: IDAPA 16.01.02.800.; Idaho Water Quality Standards and Wastewater Treatment Requirements

IDAPA 16.01.02.800 states:

"HAZARDOUS AND DELETERIOUS MATERIAL STORAGE. Hazardous and deleterious materials must not be stored, disposed of, or accumulated adjacent to or in the immediate vicinity of state waters unless adequate measures and controls are provided to insure that those materials will not enter state waters as a result of high water, precipitation runoff, wind, storage facility failure, accidents in operation, or unauthorized third party activities."

Hecla utilized the tailings impoundment for storage of a hazardous material; specifically, ore process water contaminated with cyanide. The tailings impoundment is located adjacent to and in the immediate vicinity of state waters (Jordan Creek). Hecla's failure to insure the tailings impoundment liner was of sound integrity resulted in a cyanide release to Jordan Creek. Sample results provided by Hecla indicate cyanide concentrations in Jordan Creek exceeded the acute standard of 22 ug/L periodically since March 29, 1999 and exceeded the chronic standard of 5.2 ug/L periodically since October 21, 1998. The exclusive known source of cyanide in the Jordan Creek drainage is that imported by Hecla for use in ore processing.

Penalty: **$10,000.00**

Violation No. 3

Legal Provision Violated: Condition L.1. and L.2. of the Permit.

Condition L.1. and L.2. of the Permit state in relevant part:

"Reporting. It shall be the permittee's responsibility to report to the Director:

1. Orally, as soon as possible, but no later than twenty-four (24) hours from the time the permittee knows or should reasonably know of any noncompliance which may endanger the public health or the environment.

2. In writing, within five (5) working days from the time a permittee knows or should reasonably know of any event which may be or which may result in a violation of the regulations..."

Hecla failed to provide oral notification to the Director within twenty-four (24) hours and failed to provide written notification to the Director within five (5) working days of the time Hecla knew or should have reasonably known of noncompliance at the facility. The Department requested outstanding information relevant to cyanide releases at the Grouse Creek Unit via letter to Hecla dated May 18, 1999. On May 21, 1999, Hecla provided analytical data in its *Preliminary Hydrogeologic Data Report on the Tailing Facility* (Report), Golder Associates, May 21, 1999. The report showed that ten monitoring wells were installed at the North and South embankments of the tailings impoundment. Per review of Report *Table 3: Groundwater Cyanide Concentration*, the Department determined Hecla should have reasonably known of the presence of cyanide in the ground water as the monitoring well sampling results were in excess of the 0.2 mg/L standard beginning October 24, 1998. Sampling results continued to show cyanide in monitoring wells above ground water standards through at least March 11, 1999.

Penalty Assessed: **$1,000/day from October 24, 1998 to May 21, 1999**
210 days @ $1,000/day = $210,000

Total Penalty Assessed: **$230,000**

TIMETABLE

Hecla Mining Company may request a compliance conference with the Department to explain the violation and discuss entering into a Consent Order. A Consent Order is an agreement that includes a plan to remedy damage caused by any violation, pay a penalty and assure future compliance.

To arrange a compliance conference, Hecla Mining Company must contact the Department within fifteen (15) days of receipt of this Notice of Violation. Failure to arrange and attend a compliance conference or reach agreement on a Consent Order within sixty (60) days after receipt of this Notice of Violation, may result in a civil enforcement action in district court for injunctive relief, penalties, expenses, attorney fees and other relief or remedy available under Idaho law.

The compliance conference will be held at the Idaho Falls Regional Office located at 900 N. Skyline, Suite B, Idaho Falls, Idaho

Inquiries or correspondence concerning this Notice of Violation or for scheduling a compliance conference should be directed to:

James S. Johnston
Regional Administrator
Idaho Division of Environmental Quality
900 N. Skyline, Suite B
Idaho Falls, Idaho 83402
(208) 528-2650

DATED this 15th day of September, 1999.

C. Stephen Allred, Administrator
Idaho Department of Health and Welfare
Division of Environmental Quality

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United States Department of Agriculture | Forest Service | Intermountain Region | 324 25th Street Ogden, UT 84401-2310

File Code: 2160/6740/7470 Date: October 22, 1999
Route To:

Subject: Time Critical Action at Grouse Creek Mine, Yankee Fork RD

To: Forest Supervisor, Salmon-Challis NF

Enclosed is the approved action memorandum for the CERCLA action at the Grouse Creek

Mine. Please contact Suzanne Buntrock at (801) 625-5454 or Maggie Manderbach at

(801) 625-5271 if you have questions.

/s/ Tamara L. Hanan (for)

JACK A. BLACKWELL
Regional Forester

Cc:
OGC (Tom Fox)
Payette NF (P.Trainor)
E (S.Buntrock)
BPR (M.Manderback)

BPR:BBURKHARDT:cbh:10/26/99

Reviewed by C.Hampton 10/25/99
I concur Ken Page 10/26/99
I concur Max Ewing 10/26/99

United States Department of Agriculture | Forest Service | Intermountain Region | 324 25th Street Ogden, UT 84401-2310

File Code: 2160/6740/7470

Date: October 14, 1999

TIME CRITICAL ACTION MEMORANDUM

I. PURPOSE

Time Critical Action Memorandum
A release, or significant threat of a release, of hazardous substances that potentially pose a threat to public health, welfare, or the environment has occurred or may occur at the Grouse Creek Mine site (the Site) on and/or from lands under the jurisdiction, custody, or control of the USDA Forest Service, Salmon-Challis National Forest (National Forest System or NFS lands), Yankee Fork Ranger District.

The purpose of this Action Memorandum is to document, pursuant to the guidelines of the National Oil and Hazardous Substance Contingency Plan (NCP), 40 CFR 300, et seq. (1995), the decision to initiate a CERCLA Removal Action, as authorized by Section 104 (42 USC 9604) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA; 42 USC 9601 et seq.), and Executive Order 12580, 52 Federal Register 2923-26 (January 23, 1987).

For the reasons described herein, I hereby authorize the below-described actions to occur on National Forest System lands.

II. SITE CONDITION AND BACKGROUND

A. Site description and background.

The Grouse Creek Mine is located in Custer County, Idaho, and is approximately 19 miles northeast of Stanley, Idaho (Figure 1). The project is located within Sections 19, 20, 29, 30, and 32 T13N, R15E of the Boise Meridian. Grouse Creek, Pinyon Creek, and Washout Creek are the primary tributaries flowing out of the project area into Jordan Creek. Jordan Creek is a tributary to the Yankee Fork of the Salmon River. The Site lies in the Yankee Fork Mining District.

Facilities on site include one open pit, a waste rock disposal area, crushing and milling facilities, a tailings impoundment, and ancillary support facilities, including numerous capture ponds. Other ancillary facilities include access and haul roads, power supply, water supply, fuel, chemical and reagent storage areas, and a building to include the office, assay laboratory, warehouse, and maintenance shop building. Underground

historical mining occurred at this Site from the late 1800's with exploration by numerous companies in the 1900's.

After submittal of a mining Plan of Operation to both the USDA Forest Service (FS) and State of Idaho (Idaho), a Final Environmental Impact Statement/Record of Decision was issued in May of 1992 for Hecla Mining Company to proceed with site development. Construction began in June of 1993. The proposed plan was to develop two open pits: a conventional tailings pond with two embankments and a conventional mill utilizing a cyanidation process. This would have resulted in the production of 49 million tons of waste rock and 15 million tons of ore, and an estimated total surface disturbance of 515 acres. Actual mine production began at 7,500 tons per day ore rock in October of 1994. At that time, the Environmental Protection Agency (EPA) issued a mine NPDES permit.

The climate of the area is characterized by long, harsh, snowy winters and short, cool, dry summers. The central Idaho region generally has a westerly airflow, with some extra tropical cyclines approaching from the southwest or northwest. A majority of the precipitation is received in the form of snow between the middle of October to the middle of May. These precipitation events generally have a long duration and continue for more than 24 hours. Thunderstorms also occur during the spring and summer months, generally of high intensity, short duration of less than one hour. Summer weather in the study area is usually clear with clouds forming in late afternoon and evening. Most thunderstorm events occur during the latter part of the day. Winter weather is a mix of clear, cold days and nights, and cloudy, stormy periods, which can extend for several days. Temperature extremes range from minus 50 degrees Fahrenheit to 95 degrees Fahrenheit. Freezing temperatures may occur throughout the year with no definite frost-free periods. Wind speeds generally range from 5 to 20 knots. Average annual precipitation for the area is approximately 30 inches, the majority of which occurs as snow. The only long-term evaporation data that has been collected near the study area are from Arrowrock Dam, Idaho, station. The average annual evaporation for this station during the period 1961-1985 is approximately 32.2 inches.

This FS management unit encompasses the entire Yankee Fork Watershed and numerous lakes and small streams. The area is a mixture of high, rugged peaks and alpine lakes in cirque basins, steep to moderately steep timbered slopes, narrow to flat canyon bottoms and sagebrush/grass covered slopes and ridges. Vegetation consists of lodge pole pine, Douglas fir, Englemann spruce, sub-alpine fir, sagebrush and grasses. The area is classified as a Grand fir/Douglas fir ecosystem. The unit is also highly mineralized with many present and historic mines and mills present.

The area provides habitat for elk, mule deer, bighorn sheep, mountain goat, black bear, and mountain lion. The West and Yankee forks of the Salmon River are important anadromous spawning and rearing streams. Lakes and smaller streams provide for cold-water fisheries.

Current use includes mineral exploration, access to mining, mining, logging, livestock grazing, hunting, fishing, camping, and snowmobiling. Also subsistence hunting and fishing by the Shoshone-Bannock tribe occurs in the area. The FS has prepared a Forest Plan, which covers management activities throughout the entire forest. The Site area lands administered by the FS are designated for dispersed recreation opportunities, mineral activities, timber production, and enhancement of anadromous fish habitat. Notable tourist attractions are the old mining towns of Bonanza and Custer, and the Yankee Fork gold dredge. Notable present mining activities in the Yankee Fork drainage area include the Grouse Creek Mine and numerous independent placer and hard rock claimant activities. Recreational mining, involving mostly gold panning, also occurs in the placer deposits of the Yankee Fork and tributaries. Most activities are centered around gold and silver recovery and development.

Except for several scattered homes and seasonal cabins in the area, the closest main population area to the Site is the town of Challis, 26 air miles east of the Site, and the Custer County seat. The 1992 estimated population of Challis was 1,300. The next closest community, Stanley, had a 1992-estimated permanent residency in the Upper and Lower Stanley area of 140. The Stanley area receives a large population influx during the summer months from recreationists.

The economy of Custer County is comprised of four major sectors: mining, agriculture, government, and recreation/tourism. Employment in Custer County has been greatly influenced by the Thompson Creek Molybdenum Project near Challis.

1. Removal Site Evaluation

As described earlier, the Site consists of an open pit, a tailings pond with two embankments, a mill, and numerous other ancillary features. A FS technical team was established on June 1, 1999, to review all existing data on the Site. The following is a synopsis of some of the Site characteristics supporting a release:

1) Tailings Impoundment (450,000,000 gallons of estimated standing water/4, 300,000 estimated tons of tailings rock).

a. According to a 1997 report by SRK, Inc.:

Seven constituents exceed acute and chronic criteria in tailings pore water: aluminum, copper, arsenic, selenium sliver, zinc, and cyanide.

EPA Method 1312 leachability tests of the tailings were consistent exceedances of arsenic.

Acid-Base Accounting tests of the tailings material reveal a potential for becoming acidic over time, with little neutralizing minerals present.

b. In a 1999 Golder & Associates, Inc., report and other water quality monitoring data, the following information on tailings water quality was compiled:

Date	Total Cyanide	Weak Acid Dissolved Cyanide
1/97	--	38
4/97	430	--
11/97	180	6.2
5/98	170	12.8
8/98	--	1.4
10/98	76	--
5/7/99	77	0.98
5/15/99	85	1.4

c. Elevated total cyanide was first detected in MW-11 (monitoring well) in August of 1994; and in the NPDES outfall in June of 1995.

d. The discharge of the under drain system (into pond #6), a series of capture pipes below the tailings pond liner, shows an increase in Weak Acid Dissolved (WAD) cyanide. The following is a review:

CYANIDE	Year 1995*	Year 1996	Year 1997	Year 1998
Total	1.94	5.4	4.33	8.74
WAD	0.66	0.33	0.65	1.89

e. The technical team concluded that the cyanide detected in both surface and ground water monitoring stations is coming from the tailings pond. The following pathways showed releases:

1) Ground Water

a. The detection of cyanide in all the wells below the south embankment indicates that contaminated water is moving through the landslide deposit.

b. Cyanide is found in seeps and springs along and entering Jordan Creek.

2) Surface Water

a. Water quality monitoring has shown cyanide periodically detected at the farthest surface water quality monitoring station, located in wetlands, before entering the Yankee Fork of the Salmon River since March of 1999.

b. Most of the additional monitoring stations nearer the Site, except

background, have shown stable to rising levels of cyanide.

3) Additional Releases:

a. Acidic leachate is releasing, or has the potential to release, from the tailings embankments, the waste rock dump, and pit walls.

2. Physical Location

Access to the project area is from Challis, south on State Highway 75, to the Yankee Fork Road, then north on Yankee Fork Road for approximately 10 miles to Jordan Creek Road, and continuing north on Jordan Creek Road approximately three and one-half miles to the Site. The Site includes both National Forest Systems Lands subject to private property interests through the 1872 Mining Law, and private lands.

The Grouse Creek Mine is located in Custer County, Idaho, and is approximately 19 miles northeast of Stanley, Idaho (Figure 1). The project is located within Sections 19, 20, 29, 30, and 32 T13N, R15E of the Boise Meridian.

3. Site Characteristics

Jordan Creek flows through the joins the Yankee Fork of the Salmon River. All drainages within and downstream of the Site are listed as critical habitat for the spring/summer Chinook salmon, Steelhead, and Bull trout

4. Release, or threatened release, into the environment of a hazardous substance, or pollutant, or contaminant

A CERCLA removal action is necessary to eliminate the release of cyanide into Jordan Creek. The levels of cyanide have been measured at three-times background continuously since May 1999 as reported earlier in this memo. Investigations have revealed that the source of the cyanide is from the tailings pond. Furthermore the 1997 SRK Inc. report show that there is also a threat of a release from Aluminum, Copper, Arsenic, Selenium, Sliver, and Zinc. at levels above background.

5. NPL Status

The Site is being evaluated for inclusion on the NPL. The Forest Service will complete a Preliminary Assessment at a later date.

B. Other Actions To Date

Recent actions and occurrences at the Site include:

- In May 1992, the FEIS/ROD was issued.

- In June 1993, mine construction began at the Site.
- October 1994, mine production began.
- August 1995, a tailings line failure occurred. Cyanide-bearing tailings released into Jordan Creek for approximately 40 minutes. The release was reported to the appropriate agencies. Tailings pond underdrains have carried traces of cyanide since this failure. Cyanide-bearing waters have been contained in ponds or intercepted by groundwater wells and treated prior to release via an EPA permitted NPDES outfall.
- 1995, fines were paid to EPA by Hecla Mining Company for NPDES discharge violations.
- January 1996, a 5,000-gallon reclaim water (cyanide-bearing) was spilled in the mill yard area. The spill was reported to the appropriate agencies. Frozen solution was placed back in the tailings pond.
- April 1997, Hecla Mining Company suspended operations due to unfavorable economic conditions. The water treatment plant has operated continuously since suspension.
- May - December 1997, WAD cyanide was detected off-site, in stream, and down stream from the mine.
- 1998 fines paid to Idaho by Hecla Mining Company for surface water violations.
- April 1999, FS, Idaho, and EPA received a consolidated water quality monitoring report for the mine from Hecla Mining Company. The FS notified Hecla by letter of concerns related to pervasive levels of WAD cyanide in Jordan Creek, with copies to Idaho, EPA, National Marine Fisheries Service, and U.S. Fish and Wildlife Service.
- April 1999, a first quarter monitoring report was submitted to the agencies by Hecla showing all surface water monitoring sites on Jordan Creek, downstream from the mine, that exceed cold-water biota standards.
- May 1999, Hecla reported that springs and seeps that feed Jordan Creek are contaminated with cyanide.
- May 1999, as directed by EPA/FS/DEQ, Hecla began daily sampling and submitted response/mitigation plan to agencies.
- June 1999, a FS technical team was created to review response/mitigation plans and general site characteristics.

- June 1999, a multi-agency meeting was convened with Hecla to discuss response actions options. Agencies included U.S. Army Corp of Engineers, The U.S. Fish and Wildlife Service, The National Marine Fisheries Service, EPA, The State of Idaho Division of Environmental Quality, and the FS

- June 1999, FS/Idaho/EPA met to develop strategy for the Site. Technical and Legal Teams were developed.

- July 1999, FS/Idaho/EPA met at the Site to discuss the urgent need for implementing an action to capture cyanide bearing springs and seeps that enter Jordan Creek.

- July 26, 1999, An Action Memo was signed by Regional Forester authorizing HELCA construction of sumps to capture cyanide-bearing springs. The project was started by HECLA on September 13, 1999.

- August 20, 1999, A Letter was sent to HECLA by directing the company to start the sump removal action.

- August 20, 1999, An addendum Action Memo was issue by the FS changing OSCs from Pete Peters to Pat Trainor.

- September 15, 1999, IDEQ sent a Notice of Violation to Hecla for violations to a cyanidation permit previously issued by IDEQ

C. State and Local Action Roles

1. State and Local Action to Date

The State of Idaho Department of Health and Welfare Division of Environmental Quality, has been monitoring the Site. IDEQ has made numerous visits to the Site including water quality evaluations. In 1992 IDEQ issued a cyanidation permit to Hecla Mining company.

The Idaho Department of Lands administers mining operations on adjacent private lands, and on state school trusts lands.

DEQ has taken no cleanup actions on the Site. DEQ, EPA and the FS plan to address and clean up the Site through their delegated CERCLA authorities and collateral state authorities.

2. Potential for Continued State and Local Response

The potential remains for valuable partnerships between all groups to provide some help in the clean up of this Site.

III. THREATS TO PUBLIC HEALTH OR WELFARE OR THE ENVIRONMENT, AND STATUTORY AND REGULATORY AUTHORITIES

A. Threats to Public Health or Welfare and the Environment

Conditions presently exist at the site, which, if not addressed, may present an imminent and substantial endangerment to the public welfare and/or the environment. Conditions at the Site meet the criteria for a time critical removal action as stated in the NCP, 40 CFR Section 300.415(b)(2) as follows:

Aquatic food chain organisms, terrestrial organisms, and human health are threatened by release of cyanide, via the receiving stream and eventual migration to the Salmon River.

High levels or hazardous substances or pollutants or contaminants in soils largely at or near the surface, that may migrate.

As cyanide attenuates to soils, it may still become available to the surface waters through storm water runoff events, which, in turn, could elevate cyanide levels in Jordan Creek. Also, cyanide complexes with soils can create availability of heavy metals to the aquatic system.

1. Seasonal weather conditions that may cause hazardous substances or pollutants or contaminants to migrate or be released.

Low seasonal flows in Jordan Creek in the late summer and fall may, and loss of dilution factor, most likely will result in higher concentrations of cyanide and a higher potential for chronic and acute effects, especially on aquatic organisms.

2. The availability of other appropriate federal or state response mechanisms to respond to the release.

The State of Idaho has a mechanism for responding to mine related releases on private land through the Cyanidation Permit program; however, Since most of Jordan Creek lies on public lands administered by the U.S.D.A. Forest Service, CERCLA is the most appropriate instrument for response on National Forest System lands.

Consistent with both the Clean Water Act and CERCLA provisions for Natural Resource Damage Assessments, appropriate private land owners and agencies will be notified of the FS intent to initiate CERCLA response actions.

3. Adverse environmental impacts that may be occurring at the Site include:

- The 1997 SRK report states that cyanide, arsenic, sulfate, and copper are the

four major contaminants of concern at the Site with potential to affect environmental organisms, specifically aquatic life in Jordan Creek, as well as human health. Also, acidic leachate can be identified as detrimental to the environment, and is either releasing or has the potential to release from the Site. The following describes the potential sources of these constituents: 1) the tailings pond supernatant liquid and pore water and 2) runoff from storm events, snow melt, and ground water (including seeps, and springs) in contact with acidic waste rock material.

- Degradation of surface water quality in Jordan Creek due to elevated cyanide levels, and potentially low pH and associated metals. Direct ingestion of these contaminants can occur by humans, wildlife, aquatic, and riparian flora and fauna.

- Sorption and accumulation of metals in streambed and bank sediments, of which metals can be directly taken into riparian and aquatic flora.

- Endangerment of wildlife and human visitors at the Site due to inhalation or absorption of dusts from waste rock piles.

IV. ENDANGERMENT DETERMINATION

Actual or threatened releases of hazardous substances from the Site, if not addressed by implementing the response action selected in this Action Memorandum, may present an imminent and substantial endangerment to public health, welfare, or the environment.

V. PROPOSED ACTIONS AND ESTIMATED ACTIONS

Attached are the actions evaluated by the EPA and FS.

1. Proposed Action Description:

De-water Tailings Impoundment: A statement of work (SOW) for this response action was jointly developed by the FS, EPA and IDEQ. The SOW provides for de-watering of the tailings impoundment with in one year, and prevents formation and release of acid drainage from the reactive tailings & impoundment. It shall include a schedule for necessary treatability studies and design and construction of additional treatment facility. A Project Work Plan shall provide a detailed description and flow diagram of the proposed method by which the tailings impoundment will be de-watered, and shall provide a table that shows estimated water balance on a monthly basis. The project work plan shall include the predicted effluent quantity and quality for any proposed discharge, and shall include a monitoring plan for the effluent and receiving water.

The U.S. Environmental Protection Agency (EPA), USDA Forest Service (FS) and Idaho Department of Environmental Quality (DEQ) shall approve effluent limitations for any proposed discharge of wastewater from the tailings impoundment prior to such

discharge. Any effluent discharge shall be managed to meet applicable water quality criteria, as determined by EPA, FS, and DEQ, in Jordan Creek and the Yankee Fork during all stream flow conditions.

Collect and Pump Back Contaminated Groundwater: The SOW provides for a collection and pumping back to the tailings pond of the contaminated groundwater at the site in accordance with the July 26, 1999 proposal for Jordan Creek Seeps and Pools Pump Back Project, as approved in the U.S. Forest Service letter of August 20, 1999. Additional groundwater collection measures, such as the installation of groundwater recovery wells or an interceptor trench,

2. Contribution to Remedial Performance

All removal actions are consistent with future remedial activities to the extent practicable considering that no remedial actions have been determined.

3. Engineering Evaluation/Cost Analysis (EE/CA)

Performance of an EE/CA is required to only non-time critical responses. Conditions at this Site require that time-critical removal action be taken;. Hence, no EE/CA has been proposed.

4. Applicable or Relevant and Appropriate Requirements (ARAR's)

Due to the exigent nature of the CERCLA time critical removal process, no federal or State of Idaho ARARs have formally been identified at this time. However, in compliance with 42 U.S.C. 9621, identification of federal and state ARARs will be addressed if and when there is at the Remedial Investigation/Feasibility Study stage: Federal and Idaho ARAR's, and/or other requirements, determined to be practicable for this Site are the various requirements authorized by the Forest Service's Organic Act and other authorizing statutes, the Clean Water Act, the Resource Conservation and Recovery Act, the Endangered Species Act (ESA), and the National Historic Preservation Act.

The Forest Service has taken the lead in entering into emergency consultation regarding this action with the National Marine Fisheries Service (NMFS) and US Fish and Wildlife Service (USFWS) under section 7 of the Endangered Species Act.

5. Project Schedule

The action is scheduled for November 1, 1999. This project should be completed by one year after signing of the order. Hecla, operator of the site, will design and implement this removal under FS and EPA oversight.

6. Estimated Costs

The removal is to be completed by Hecla on NFS lands of the Site. Costs shown are for estimated FS oversite. Actual oversight costs may be higher then currently projected.

Extramural Costs (as shown on Action Memorandum):

FS Costs (oversite, including USDA-OGC)) SUB-Total	$ 150,000
Additional 10% Contingency Allowance	$ 15,000
TOTAL	$ 165,000
Intramural costs:	
Direct costs	
FS costs	$ 15,000
Indirect costs:	
FS costs	$ 10,000
Subtotal costs	$ 25,000
Total Removal Project Oversight Ceiling Estimate:	$ 190,000

VI. EXPECTED CHANGE IN SITUATION SHOULD ACTION BE DELAYED OR NOT TAKEN

Delayed action could result in a continued release of cyanide into Jordan Creek and on to the Yankee Fork of the Salmon River system. Hazardous substances would enter the food chain and possibly effect humans, Chinook salmon, and Steelhead, a threatened species. Because of the threats, the FS has determined that a Time Critical Removal should be authorized.

VII. OUTSTANDING POLICY ISSUES

Because of the mixed jurisdictional issues at this Site, EPA, FS and IDEQ will attempt to coordinate the use of their authorities.

The proposed actions at the Grouse Creek Mine will be under Forest Service oversight under the NCP guidance, and under the authority of 42 USC 9601 et seq. and 7 CFR.

2.60(a). It is believed that implementation of this process will result in an improvement in ecosystem health in an efficient and cost-effective manner, and in a relatively rapid time frame.

It is the full intention of the Forest Service to seek cost recovery to reimburse the citizens of the United States for all expenses incurred in the planning and cleanup of the Site. All selected, viable Potentially Responsible Parties that participated as owners and/or operators of the Site will be approached for completing all necessary documents consistent with the NCP, except for the PA, or if necessary, full payment upon completion of the removal measures on the Site.

VIII. ENFORCEMENT

The Forest Service is exercising its authority as a "lead agency" as defined by 40 CFR 300.5, and pursuant to said role is undertaking this action, in conjunction with EPA.

The Forest Service does not, by executing this Action Memorandum, by acknowledging its role as "lead agency," or by taking, or planning to take any enforcement or other activity at this Site, represent nor acknowledge, expressly or by implication, any duty, liability, or responsibility under any federal or state law.

IX. DECISION

I hereby find that a release, or a significant threat of a release, has or is occurring that poses a threat to public health or welfare or the environment, and hereby authorize the described action to occur on National Forest System lands. A true and accurate copy of this Action Memorandum, and its attachments, will be placed in the Administrative Record, as set forth by the NCP. It may be viewed during regular business hours at the Yankee Fork Ranger District of the Salmon-Challis National Forest, HC 67 Box 650, Clayton, Idaho, 83227. A formal notice of the availability this Action Memorandum and the Administrative Record's will be published in a local newspaper of general circulation within 60 days of initiation of on-Site removal actions. Copies of this Action Memorandum will also be sent directly to EPA project wide OSC, and to the State of Idaho. I also reaffirm by designation of Pat Trainor as OSC and public spokesperson for the Site.

RECOMMENDED: _____ DATE:
PAT TRAINOR
Grouse Creek Project Manager/On-Scene Coordinator

RECOMMENDED: /s/ Rene M. Mabe DATE: 10/14/99
Rene M. Mabe
Yankee Fork Ranger District Ranger

APPROVED: /s/ Jack G. Troyer (f DATE: 10/22/99
JACK. A. BLACKWELL
Regional Forester

8

Implementation of UAO Reform Questionnaire

(form revised 3/2/99)

- This form should be filled out for each UAO issued pursuant to CERCLA 106 (except those issued for site access only).
- Please fill out this form **no later than two weeks** after issuance.
- **Once completed, the form should be returned to Mike Northridge or Yolaanda Walker, USEPA, mail code 2272A, 401 M Street, S.W., Washington, D.C. 20460,** or through LAN mail.
- If you have any questions regarding the questionnaire, please call Mike at (202)564-4263 or Yolaanda at (202)564-4281.

Site Name: Grouse Creek Mine	**Region:** Forest Service 4	**Date Prepared:** 6/13/00
Preparer Name: Steve Silverman	**Position:** Attorney	**Phone Number:** (303)275-5591

1) a) Date UAO issued: projected -- 7/00 b) UAO Number: _____ *(if available)* *(e.g., UA002)*

2) Purpose of UAO (please ✔ appropriate box):
(Note: Do not include UAOs that are for access only)

Removal	RI/FS	RD/RA
X		

3) Number of parties receiving the UAO: 1

4) Number of parties receiving the UAO that were governmental (local, state or federal) entities:
(Note: Please provide names of any governmental parties that received the UAO)

0

5) Number of parties that did **NOT** receive the UAO: 0
Note: Parties are considered excluded when:
- *There is sufficient evidence to make a preliminary determination of potential liability under §107 of CERCLA; and*
- *They have not previously reached full settlement with the government; and*
- *They were not issued the UAO.*

STOP here if the answer to question 5 is zero.

6) If parties were excluded from the UAO, please provide the reason(s) for excluding them in the chart on the next page:

Note: *Agency policy provides for only several acceptable reasons for excluding PRPs from a UAO. These include:*
1) *lack of evidence of the party's liability;*
2) *the party is financially non-viable;*
3) *the party made only a relatively minor contribution towards the site conditions (e.g., sent only a de minimis amount of waste to the site);*
4) *consideration of work that a PRP has already conducted at the site (or has agreed*

Memorandum

To: Grouse Creek Administrative Record

From: Pat Trainor, On-Scene Coordinator

Date: 09/30/1999

Re: Past and Present Owners/Operators at Grouse Creek Mine

This memorandum is for the Administrative Record files on the Grouse Creek Mine (the Site) Time Critical Removal Action (TCRA) on owners and operators at the Site.

The Grouse Creek Mine is located in Custer County, Idaho and is approximately 19 miles northeast of Stanley, Idaho. The project is located within Sections 19, 29, 30, and 32 T13N, R15E of the Boise Meridian. Grouse Creek, Pinyon Creek, and Washout Creek are the primary tributaries flowing out of the project area into Jordan Creek. Jordan Creek is a tributary to the Yankee Fork of the Salmon River. The Site lies in the Yankee Fork Mining District.

A release of cyanide in both surface and ground water is occurring at the Site. Cyanide is also found in seeps and springs above and entering Jordan Creek, and is detected at the farthest surface water quality monitoring station, located in wetlands, before entering the Salmon River, since March of 1999. Most of the additional monitoring stations nearer the Site, except background, have shown stable to rising levels of cyanide. This release was discovered through a series of reports on water quality monitoring data. The detection of cyanide in all the wells below the south embankment of the Site's tailings impoundment suggests that contaminated water is likely moving through an ancient landslide deposit and has migrated into shallow bedrock.

After submittal of a mining Plan of Operation to both the USDA Forest Service (FS) and State of Idaho, a Final Environmental Impact Statement/Record of Decision was issued in May of 1992 for Hecla Mining Company to proceed with Site development. The proposed plan was to develop two open pits, a conventional tailings pond with two embankments, conventional mill utilizing a cyanidation process; with resultant 49 million tons of waste rock and 15 million tons of ore produced, and an estimated total surface disturbance of 515 acres. Actual mine production began at 7,500 tons per day ore rock in October of 1994. At that time, a mine NPDES permit was issued by the Environmental Protection Agency (EPA). Also, the State of Idaho issued a state Cyanidization Permit. A final Plan of Operation was also approved by the FS.

Facilities on Site include one open pit, a waste rock disposal area, crushing and milling facilities, a tailings impoundment with two embankments, and ancillary support facilities, including numerous capture ponds. Other ancillary facilities include access and haul roads, power supply, water supply, fuel, chemical and reagent storage areas, and a building to include the office, assay laboratory, warehouse, and maintenance shop building. Underground historical mining occurred at this Site from the late-1800's with exploration by numerous companies in the 1900's.

An overview of actions and construction at the Site include the following:

- In May 1992, the Final Environmental Impact State and Record of Decision was issued.

- In June 1993, mine construction began at the Site by Hecla Mining Company, including construction of the tailings facility.

- In October 1994, mine production began.

- In August 1995, a tailings line failure occurred. Cyanide-bearing tailings released into Jordan Creek for approximately 40 minutes. The release was reported to the appropriate agencies. Tailings pond underdrains have carried traces of cyanide since this failure. Cyanide-bearing waters have been contained in ponds or intercepted by ground water wells and treated prior to release via an EPA permitted NPDES outfall.

- In 1995, fines were paid to EPA by Hecla Mining Company for NPDES outfall violations.

- In 1998, fines were paid to Idaho Department of Environmental Quality for surface water quality violations under a state Cyanidization Permit.

- In January 1996, A 5,000 gallon reclaim water (cyanide-bearing) was spilled in the mill yard area. The spill was reported to the appropriate agencies. Frozen solution was placed back in the tailings pond.

- April 1997, Hecla Mining Company suspended operations due to unfavorable economic conditions. The water treatment plant has operated continuously since suspension.

- In May through December of 1997, Weak Acid Dissociable (WAD) cyanide was detected in Jordan Creek below the EPA permitted NPDES outfall.

- In April 1999, FS, Idaho, and EPA receive a consolidated water quality monitoring report for the mine from Hecla Mining Company. The Forest Service notified Hecla Mining Company by letter of concern related to pervasive levels of WAD cyanide in Jordan Creek, with copies to Idaho, EPA, National Marine Fisheries Service, and U.S. Fish & Wildlife Service.

- In April of 1999, first quarter monitoring report submitted to agencies by Hecla Mining Company show all surface water site results exceed cold-water biota standards.

According to the above historical overview of the Site including permitting, construction, and operation, Hecla Mining Company is the sole owner and operator at the Grouse Creek Mine, including the constructed tailings facility, believed to be the source of the cyanide release.

This history does not include other subsidiaries or ownerships of the company itself. It is the full intention of the Forest Service to seek cost recovery to reimburse the citizens of the United States for all expenses incurred in the planning and cleanup of the Site.

United States Department of Agriculture | Forest Service | Intermountain Region | 324 25th Street Ogden, UT 84401-2310

File Code: 2800/2160

Date: October 18, 1999

Ms. Helen E. Hillman
Coastal Resource Coordinator
National Oceanic and Atmospheric Administration
1200 Sixth Avenue (ECL-117)
Seattle, WA 98101

Dear Ms. Hillman:

This letter is to inform you, as a Federal or State agency, or as a Tribal sovereign, with Natural Resource Trustee Authority under Section 107 (f) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) 442 U.S.C. 9607 (f), and Section 311 (e) (5) of the Clean Water Act (33 U.S.C. 1321 (e) (5), of probable natural resource injuries, destruction or losses associated with the below described events. This notice is provided pursuant to Section 104 (b) of CERCLA, 42 U.S.C. 9604 (b), and also is provided as a matter of comity to any Tribal sovereign.

The Secretary of the United States Department of Agriculture was authorized to act as the trustee for natural resources under its jurisdiction through Executive Order 12580. The Secretary's authority was further delegated to the Chief of the Forest Service by 7 CFR 2.60 (a)(43) and then re-delegated to the Forests pursuant to the Forest Service Manual 1260, effective November 10, 1994.

The Grouse Creek Mine (the Site) is located in Custer County, Idaho, and is approximately 19 miles northeast of Stanley, Idaho (Figure 1). The project is located within Sections 19, 29, 30, and 32 T13N, R15E of the Boise Meridian. Grouse Creek, Pinyon Creek, and Washout Creek are the primary tributaries flowing out of the project area into Jordan Creek. Jordan Creek is a tributary to the Yankee Fork of the Salmon River. The Site lies in the Yankee Fork Mining District. In April 1997, Hecla Mining Company (the owner/operator of the Site) suspended operations due to unfavorable economic conditions. The water treatment plant has operated continuously since suspension.

A release of cyanide in both surface and ground water is occurring at the Site. Cyanide is also found in seeps and springs above and entering Jordan Creek, and is detected at the farthest surface water quality monitoring station located in wetlands, before entering the Salmon River, since March 1999. Most of the additional monitoring stations nearer the Site, except background, have shown stable to rising levels of cyanide. This release was discovered through a series of reports on water quality monitoring data. The detection of cyanide in all the wells below the south embankment of the Site's tailings impoundment suggests that contaminated water is likely moving through an ancient landslide deposit and has migrated into shallow bedrock.

If the current Site conditions persist, there is the potential for adverse chronic health effects on aquatic organisms, livestock, other wildlife, and humans entering the area.

On July 26, 1999, the Forest Service, under its delegated CERCLA response authorities, commenced a Time Critical Removal Action by issuing a Time Critical Removal Action Memorandum (TCRAM). This TCRAM authorized Hecla Mining Company to perform immediate and necessary actions for the affected National Forest System lands. These actions were designed to capture cyanide bearing waters emanating from seeps and springs above Jordan Creek and pump the waters back onto the Site for treatment.

Planning and negotiations have also begun for long-term removal actions to be conducted under the auspices of an Administrative Order on Consent or Unilateral Administrative Order. Due to the exigent circumstances presented by the releases at the Site, the Forest Service may not be able to afford a full 30 days to review this notice and provide comments. However, should you wish to provide comments, we recommend that you contact either Pat Trainor or Maggie Manderbach at the numbers below.

As the next step in the Natural Resource Damage process, we would like your agency to identify the key contact person(s) so that we can communicate and coordinate with them. Please respond to Pat Trainor, On-Site Coordinator, at (208) 634-0820 or Maggie Manderbach, Regional Office Program Coordinator, at (801) 625-5271, with your agency contact(s).

Sincerely,

/s/ Jack G. Troyer (for)

JACK A. BLACKWELL
Regional Forester

Enclosure

cc:
S.Silverman
G.Fremerman
S.Penney, Nez Perce Tribal Excecutive Committee
M.Cota, Shoshone-Paiute Tribes
D.Thompson, Shoshone-Bannock Tribes
H.Hillman, NOAA
S.Allred, State of Idaho

BPR:MMANDERBACH:cbh:10/13/99

Reviewed by C.Hampton 10/13/99
Reviewed by Judy Barker 10/15/99

United States Department of Agriculture | Forest Service | Intermountain Region | 324 25th Street Ogden, UT 84401-2310

File Code:

Date: October 18, 1999

Mr. Preston Slegar
Regional Environmental Officer
United States Department of the Interior
500 NE Multnomah Street, Suite 356
Portland, OR 97232

Dear Mr. Slegar:

The purpose of this letter is to inform you, as a Federal or State agency, or as a Tribal sovereign, with Natural Resource Trustee Authority under Section 107 (f) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) 442 USC 9607 (f), and Section 311 (e) (5) of the Clean Water Act (33 USC 1321 (e) (5), of probable natural resource injuries, destruction or losses associated with the below described events. This notice is provided pursuant to Section 104 (b) of CERCLA, 42 USC 9604 (b), and also is provided as a matter of comity to any Tribal sovereign.

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The Grouse Creek Mine (the Site) is located in Custer County, Idaho, and is approximately 19 miles northeast of Stanley, Idaho (Figure 1). The project is located within Sections 19, 29, 30, and 32 T13N, R15E of the Boise Meridian. Grouse Creek, Pinyon Creek, and Washout Creek are the primary tributaries flowing out of the project area into Jordan Creek. Jordan Creek is a tributary to the Yankee Fork of the Salmon River. The Site lies in the Yankee Fork Mining District. In April 1997, Hecla Mining Company (the owner/operator of the Site) suspended operations due to unfavorable economic conditions. The water treatment plant has operated continuously since suspension.

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As the next step in the Natural Resource Damage process, we would like your agency to identify the key contact person/persons so that we can communicate and coordinate with your agency. Please contact Pat Trainor, On-Site Coordinator, at (208) 634-0820 or Maggie Manderbach, Regional Office Program Coordinator, at (801) 625-5271, with your agency contact(s).

Sincerely,

/s/ Jack G. Troyer (for)

JACK A. BLACKWELL
Regional Forester

Enclosure

cc:
S.Silverman
G.Fremerman
S.Penney, Nez Perce Tribal Excecutive Committee
M.Cota, Shoshone-Paiute Tribes
D.Thompson, Shoshone-Bannock Tribes
H.Hillman, NOAA
S.Allred, State of Idaho

BPR:MMANDERBACH:cbh:10/13/99

Reviewed by C.Hampton 10/13/99

United States Department of Agriculture | Forest Service | Intermountain Region | 324 25th Street Ogden, UT 84401-2310

File Code: 2800/2160

Date: October 18, 1999

Mr. C. Stephen Allred
Administrator
Idaho Division of Environmental Quality
1410 North Hilton
Boise, ID 83706-1255

Dear Mr. Allred:

This letter is to inform you, as a Federal or State agency, or as a Tribal sovereign, with Natural Resource Trustee Authority under Section 107 (f) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) 442 U.S.C. 9607 (f), and Section 311 (e) (5) of the Clean Water Act (33 U.S.C. 1321 (e) (5), of probable natural resource injuries, destruction or losses associated with the below described events. This notice is provided pursuant to Section 104 (b) of CERCLA, 42 U.S.C. 9604 (b), and also is provided as a matter of comity to any Tribal sovereign.

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As the next step in the Natural Resource Damage process, we would like your agency to identify the key contact person(s) so that we can communicate and coordinate with them. Please respond to Pat Trainor, On-Site Coordinator, at (208) 634-0820 or Maggie Manderbach, Regional Office Program Coordinator, at (801) 625-5271, with your agency contact(s).

Sincerely,

/s/ Jack G. Troyer (for)

JACK A. BLACKWELL
Regional Forester

Enclosure

cc:
S.Silverman
G.Fremerman
S.Penney, Nez Perce Tribal Excecutive Commi
M.Cota, Shoshone-Paiute Tribes
D.Thompson, Shoshone-Bannock Tribes
H.Hillman, NOAA
S.Allred, State of Idaho

BPR:MMANDERBACH:cbh:10/13/99

Reviewed by C.Hampton 10/13/99
Reviewed by Judy Barker 10/15/99

United States Department of Agriculture | Forest Service | Intermountain Region | 324 25th Street Ogden, UT 84401-2310

File Code: 2800/2160

Date: October 18, 1999

Mr. Samuel Penney
Tribal Chairman
Nez Perce Tribal Executive Committee
P.O. Box 365
Lapwai, ID 83540

Dear Mr. Penney:

This letter is to inform you, as a Federal or State agency, or as a Tribal sovereign, with Natural Resource Trustee Authority under Section 107 (f) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) 442 U.S.C. 9607 (f), and Section 311 (e) (5) of the Clean Water Act (33 U.S.C. 1321 (e) (5), of probable natural resource injuries, destruction or losses associated with the below described events. This notice is provided pursuant to Section 104 (b) of CERCLA, 42 U.S.C. 9604 (b), and also is provided as a matter of comity to any Tribal sovereign.

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The Grouse Creek Mine (the Site) is located in Custer County, Idaho, and is approximately 19 miles northeast of Stanley, Idaho (Figure 1). The project is located within Sections 19, 29, 30, and 32 T13N, R15E of the Boise Meridian. Grouse Creek, Pinyon Creek, and Washout Creek are the primary tributaries flowing out of the project area into Jordan Creek. Jordan Creek is a tributary to the Yankee Fork of the Salmon River. The Site lies in the Yankee Fork Mining District. In April 1997, Hecla Mining Company (the owner/operator of the Site) suspended operations due to unfavorable economic conditions. The water treatment plant has operated continuously since suspension.

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If the current Site conditions persist, there is the potential for adverse chronic health effects on aquatic organisms, livestock, other wildlife, and humans entering the area.

On July 26, 1999, the Forest Service, under its delegated CERCLA response authorities, commenced a Time Critical Removal Action by issuing a Time Critical Removal Action Memorandum (TCRAM). This TCRAM authorized Hecla Mining Company to perform immediate and necessary actions for the affected National Forest System lands. These actions were designed to capture cyanide bearing waters emanating from seeps and springs above Jordan Creek and pump the waters back onto the Site for treatment.

Planning and negotiations have also begun for long-term removal actions to be conducted under the auspices of an Administrative Order on Consent or Unilateral Administrative Order. Due to the exigent circumstances presented by the releases at the Site, the Forest Service may not be able to afford a full 30 days to review this notice and provide comments. However, should you wish to provide comments, we recommend that you contact either Pat Trainor or Maggie Manderbach at the numbers below.

As the next step in the Natural Resource Damage process, we would like your agency to identify the key contact person(s) so that we can communicate and coordinate with them. Please respond to Pat Trainor, On-Site Coordinator, at (208) 634-0820 or Maggie Manderbach, Regional Office Program Coordinator, at (801) 625-5271, with your agency contact(s).

Sincerely,

/s/ Jack G. Troyer (for)

JACK A. BLACKWELL
Regional Forester

Enclosure

cc:
S.Silverman
G.Fremerman
S.Penney, Nez Perce Tribal Excecutive Committee
M.Cota, Shoshone-Paiute Tribes
D.Thompson, Shoshone-Bannock Tribes
H.Hillman, NOAA
S.Allred, State of Idaho

BPR:MMANDERBACH:cbh:10/13/99

Reviewed by C.Hampton 10/13/99
Reviewed by Judy Barker 10/15/99

United States Department of Agriculture | Forest Service | Intermountain Region | 324 25th Street Ogden, UT 84401-2310

File Code: 2800/2160

Date: October 18, 1999

Mr. Marvin Cota
Tribal Chairman
Shoshone-Paiute Tribes
P.O. Box 219
Owyhee, NV 89832

Dear Mr. Cota:

This letter is to inform you, as a Federal or State agency, or as a Tribal sovereign, with Natural Resource Trustee Authority under Section 107 (f) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) 442 U.S.C. 9607 (f), and Section 311 (e) (5) of the Clean Water Act (33 U.S.C. 1321 (e) (5), of probable natural resource injuries, destruction or losses associated with the below described events. This notice is provided pursuant to Section 104 (b) of CERCLA, 42 U.S.C. 9604 (b), and also is provided as a matter of comity to any Tribal sovereign.

The Secretary of the United States Department of Agriculture was authorized to act as the trustee for natural resources under its jurisdiction through Executive Order 12580. The Secretary's authority was further delegated to the Chief of the Forest Service by 7 CFR 2.60 (a)(43) and then re-delegated to the Forests pursuant to the Forest Service Manual 1260, effective November 10, 1994.

The Grouse Creek Mine (the Site) is located in Custer County, Idaho, and is approximately 19 miles northeast of Stanley, Idaho (Figure 1). The project is located within Sections 19, 29, 30, and 32 T13N, R15E of the Boise Meridian. Grouse Creek, Pinyon Creek, and Washout Creek are the primary tributaries flowing out of the project area into Jordan Creek. Jordan Creek is a tributary to the Yankee Fork of the Salmon River. The Site lies in the Yankee Fork Mining District. In April 1997, Hecla Mining Company (the owner/operator of the Site) suspended operations due to unfavorable economic conditions. The water treatment plant has operated continuously since suspension.

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Sincerely,

/s/ Jack G. Troyer (for)

JACK A. BLACKWELL
Regional Forester

Enclosure

cc:
S.Silverman
G.Fremerman
S.Penney, Nez Perce Tribal Excecutive Committee
M.Cota, Shoshone-Paiute Tribes
D.Thompson, Shoshone-Bannock Tribes
H.Hillman, NOAA
S.Allred, State of Idaho

BPR:MMANDERBACH:cbh:10/13/99

Reviewed by C.Hampton 10/13/99
Reviewed by Judy Barker 10/15/99

United States Department of Agriculture | Forest Service | Intermountain Region | 324 25th Street Ogden, UT 84401-2310

File Code: 2800/2160

Date: October 18, 1999

Mr. Duane Thompson
Tribal Chairman
Shoshone-Bannock Tribes
P.O. Box 306
Fort Hall, ID 83203

Dear Mr. Thompson:

This letter is to inform you, as a Federal or State agency, or as a Tribal sovereign, with Natural Resource Trustee Authority under Section 107 (f) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) 442 U.S.C. 9607 (f), and Section 311 (e) (5) of the Clean Water Act (33 U.S.C. 1321 (e) (5), of probable natural resource injuries, destruction or losses associated with the below described events. This notice is provided pursuant to Section 104 (b) of CERCLA, 42 U.S.C. 9604 (b), and also is provided as a matter of comity to any Tribal sovereign.

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Sincerely,

/s/ Jack G. Troyer (for)

JACK A. BLACKWELL
Regional Forester

Enclosure

cc:
S.Silverman
G.Fremerman
S.Penney, Nez Perce Tribal Excecutive Committee
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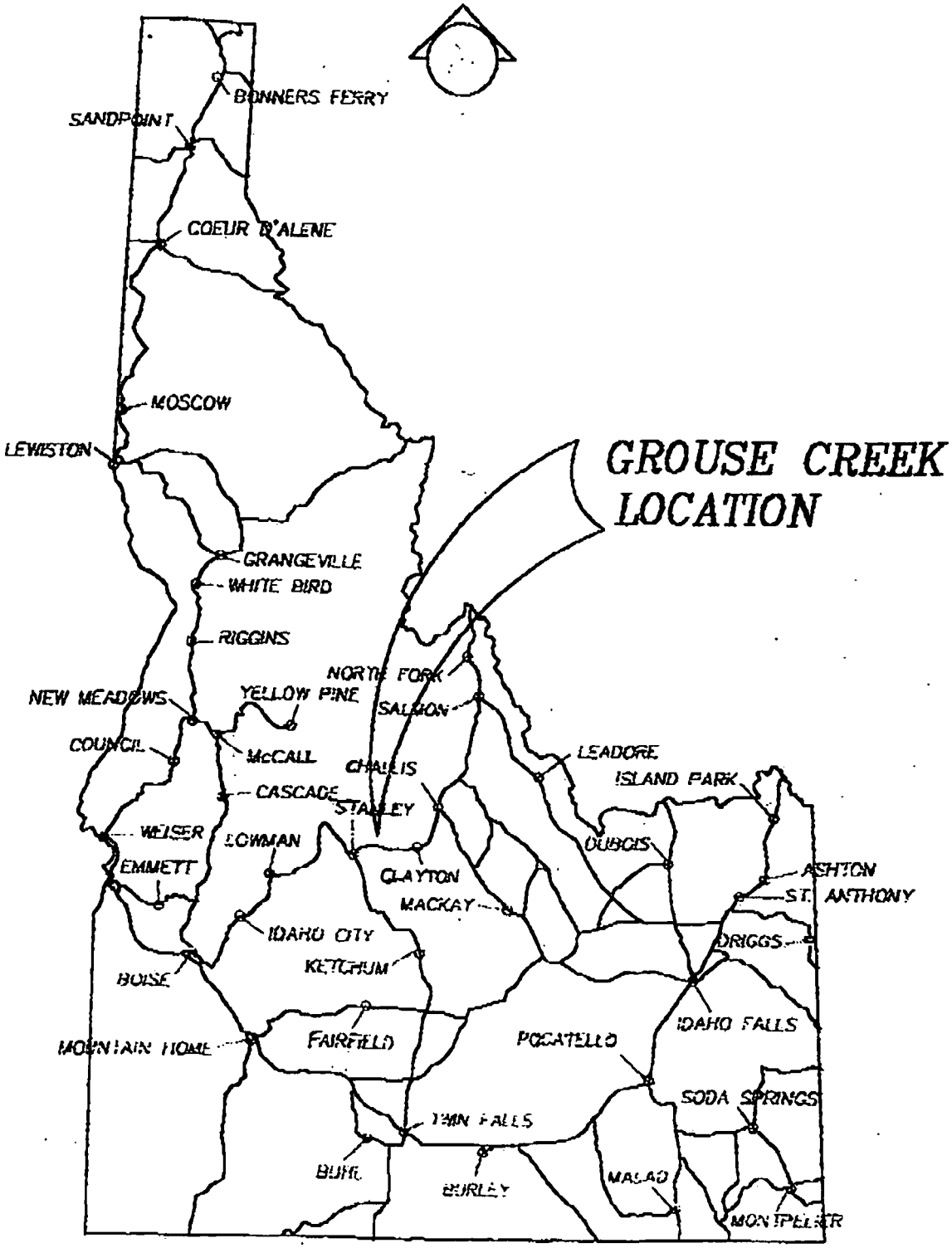
H.Hillman, NOAA
S.Allred, State of Idaho

BPR:MMANDERBACH:cbh:10/13/99

Reviewed by C.Hampton 10/13/99
Reviewed by Judy Barker 10/15/99



VICINITY MAP – IDAHO

FIGURE 1

1

STATE OF IDAHO
DIVISION OF
ENVIRONMENTAL QUALITY

900 North Skyline Drive, Suite B • Idaho Falls, Idaho 83402-1718 • (208) 528-2650

Dirk Kempthorne, Governor
C. Stephen Allred, Administrator

RECEIVED
YANKEE FORK R.D.
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FAX			

CERTIFIED MAIL: RETURN RECEIPT REQUESTED

October 6, 1999

Mr. Nick Ceto
U.S. Environmental Protection Agency
1200 Sixth Avenue
Seattle, Washington 98101

Mr. Pat Trainor
Salmon-Challis National Forest
HC67 Box 650
Clayton, Idaho 83226

RE: October 4, 1999 Meeting with Hecla Mining Company

Dear Nick and Pat:

This letter is to inform you of the Idaho Division of Environmental Quality's concerns regarding the meeting between EPA, the USFS, and Hecla which occurred in Seattle on October 4, 1999. It is our understanding that the purpose of the meeting was to negotiate both the terms of an AOC, and the terms and conditions of the Scope of Work. The discussions were primarily based upon a draft SOW which was jointly agreed upon between the three agencies.

Late on Friday, October 1, 1999, Idaho Deputy Attorney General Tim Callanan learned from Hecla's legal counsel that this meeting was scheduled and contacted attorneys for EPA and the USFS in an attempt to include IDEQ personnel in the discussions. Due to the short notice, lack of agenda and absence of schedule coordination, IDEQ personnel were unable to attend the meeting, and in fact we were only included by phone in the last three hours of discussion during which time it was difficult to hear and participate in most of the discussion.

A similar situation occurred in July. In response, IDEQ sent a letter to your respective agencies to resolve any misunderstandings and prevent future communication problems. We have yet to receive a response to our suggestions ~~are~~ have you provided us with a definitive point of contact for communication with your agencies. To further resolve these issues and begin discussions regarding how the agencies will interact during the course of the Grouse Creek cyanide clean-up project, Mr. Callanan provided your legal counsel with a draft Memorandum of Understanding. The letter, dated September 28, 1999 attached to this document states "...we will keep you

appraised of all meetings and transmittals we have with Hecla. We request that the federal agencies follow the same protocol...". As yet, we have not received a response to the suggested MOU.

IDEQ has, in good faith, attempted to provide EPA and the USFS with all available information. All work, correspondence, and negotiation IDEQ has conducted with Hecla on this project (with the exception of the State's Notice of Violation) has been completed in conjunction and coordination with EPA and the USFS. We remain concerned at the lack of response to our proposals for current and future interaction between the agencies. IDEQ was particularly concerned that the October 4th discussions were scheduled without our knowledge, nor any apparent attempt to accommodate our participation until discussions were well under way.

As you know, it is our intent to work on a parallel track with the federal agencies to ensure a work plan that accommodates the needs and jurisdictional concerns of both the state and federal agencies. It is our goal to provide Hecla with a unified regulatory presence and prevent duplicative or conflicting efforts between the agencies. Therefore, IDEQ is requesting a meeting at your earliest convenience to discuss EPA, USPS, and IDEQ interactions and formalize those discussion through a MOU. Further, we request that agency representatives with the authority to negotiate such an agreement attend this meeting. IDEQ proposes that this meeting occur in IDEQ's state office building at 9:00 a.m. on October 22, 1999. Please call me at your earliest convenience to confirm the meeting date.

Sincerely,

Catherine Reno

Catherine Reno
Regional Manager

cc: C. Steven Allred, Administrator
Katherine Kelly, Waste Program Manager
Dave Mabe, Water Program Manger
Timothy Callanan, Idaho Deputy Attorney General
James S. Johnston, Regional Administrator

2

ADMINISTRATIVE RECORD FILE
Hecla - Grouse Creek Project
Yankee Fork Ranger District - Salmon-Challis National Forest
CERCLA 1999 - 2000

Document Number	Title	Author	Recipient	Date	Type	Number of Pages
1.	Pervasive exceedances of chronic levels of WAD cyanide in Jordan Creek	Rene' M. Mabe, USFS	Doug Wollant, Hecla	4-22-99	Letter	1
2.	Telephone call from Eric Lancaster re: first quarter surface water monitoring results exceedance.	Pete Peters, USFS	Rene' M. Mabe, USFS	4-27-99	Interoffice Memo	1
3.	Written Notification of Jordan Creek Sample Results	Doug Wollant	Ms. Catherine Reno, DEQ	4-30-99	Certified Letter	2
4.	Biological Assessment on Proposed Effluent Discharge to Yankee Fork	Chadwick Ecological Consultants, Inc.	Hecla	5-99	Report	22
5.	Hecla Mining Co's Preliminary plan to address USFS concerns with Jordan Creek water quality	Doug Wollant	Rene' M. Mabe, USFS	5-5-99	Letter	3
6.	Lab sheets from samples collected on 4-27,4-30,5-1, and 5-2, 1999	Eric Lancaster, Hecla	Catherine Reno, DEQ	5-6-99	FAX copy analytical tests	18
7.	Hecla Grouse Creek Unit 1998 Summary of Water Quality	Barbara Machado, USFS	Rene' Mabe, USFS	5-7-99	Interoffice Memo	4
8.	Invoking Section 1 of Cyandiation Permit for Hecla	Catherine Reno, DEQ	Doug Wollant	5-18-99	Letter	2
9.	Initiating informal consultation due to recent reported levels of WAD cyanide	Rene' M. Mabe, USFS	Ted Meyers, NMFS	5-21-99	Letter	2
10.	Hecla's Work Plan for Mitigation Measures and Response to IDEQ Information Requested in Letter dated May 18, 1999	Doug Wollant - Hecla	Catherine Reno, DEQ	5-21-99	Letter	4
11.	Initiating informal consultation due to recent reported levels of WAD cyanide. Correcting emergency consultation to "informal consultation"	Rene' M. Mabe, USFS	Mike Donahoo – USF&W	5-25-99	Letter	4
12.	Mixing Zone Study for Proposed Yankee Fork Discharge Point	Eric Lancaster, Hecla	Catherine Reno, DEQ	5-25-99	Transmittal Letter and report (in File)	125
13.	Hecla Cyanidation Permit Monthly Water Balance and Underdrain Data	Eileen Steilman, Hecla	Catherine Reno, DEQ	5-28-99	Letter and Report	3
14.	Termination of Consent Order	David E. Mabe	George R. Johnson	6-2-99	Letter	1

ADMINISTRATIVE RECORD FILE
Hecla - Grouse Creek Project
Yankee Fork Ranger District - Salmon-Challis National Forest
CERCLA 1999 - 2000

15.	Minutes for the Grouse Creek Meeting in Boise, Idaho June 2, 1999	???	?	6-2-99	Minutes	6
16.	Discussion of meetings held May 12, 1999 and June 2, 1999 regarding the presence of cyanide	Catherine Reno, DEQ	Doug Wollant, Hecla	6-15-99	Letter and Attachment	5
17.	Human Health Risk for Cyanide	Barb Machado, USFS	Rene' M. Mabe, USFS	6-15-99	Interoffice Memo	2
18.	Jordan Creek Data from the standpoint of risk associated with fishing/drinking from stream.	Jeffrey Fromm	Catherine Reno, DEQ	6-17-99	Interoffice Memo	1
19.	Stipulating a schedule for various actions instructed in letter of June 15, 1999	Catherine Reno, DEQ	Doug Wollant, Hecla	6-18-99	Letter	1
20.	Access for Pumping Project	David Berberick, Hecla	Tom Montoya, USFS	6-29-99	Letter	1
21.	IDEQ Request for a Workplan and a Characterization Report in Letters	Hecla Grouse Creek	Catherine Reno, DEQ	7-2-99	Letter and Report	583
22.	Determination of Effects Worksheet for electrical cable and water tank installation.	Tom Montoya, USFS	Files	7-7-99	Worksheet	4
23.	Appendix B Quality Assurance Project Plan in Support of the Work Plan to evaluate sources of Cyanide	Golder Assoc.	USFS	7-15-99	Document	423
24.	Work Plan to Evaluate Sources of Cyanide Entering Jordan Creek from Hecla Mining Co. Grouse Creek	Golder Assoc.	USFS	7-16-99	Document	79
25.	Response to Hecla's July 2, 1999 Letter and Technical Document package	Catherine Reno, DEQ	Doug Wollant, Hecla	7-16-99	Letter	4
26.	Live standing timber cut on site	Rene' M. Mabe	Doug Wollant, Hecla	7-21-99	Letter	2
27.	Transmittal Letter for Summary of Water Quality Jan-Jun 1999	Golder Assoc.	Rene' Mabe, USFS	7-21-99	Letter and document	64
28.	NPDES Mixing Zone Determination for Proposed Yankee Fork Discharge Point	Catherine Reno, DEQ	Eric Lancaster, Hecla	7-21-99	Letter	2
29.	Transmittal for data to Technical Team	Rene' M. Mabe, USFS	Tom Jeffers	7-22-99	Letter	1
30.	Removal Action Memorandum officially initiating CERCLA response actions.	Jack A. Blackwell, USFS	Official File	7-26-99	Letter and Removal Action Memo	10
31.	Stream Alteration for Construction of Jordan Creek Sumps Grouse Creek Unit	Douglas Wollant, Hecla	Terry Blau, IDWR	7-26-99	Letter	2

ADMINISTRATIVE RECORD FILE
Hecla - Grouse Creek Project
Yankee Fork Ranger District - Salmon-Challis National Forest
CERCLA 1999 - 2000

32.	Construction of Jordan Creek Sumps	Douglas Wollant, Hecla	Rene' Mabe, USFS	7-26-99	Letter	1
33.	Proposed Groundwater Wells Along Jordan Cr. Road	Doug Wollant, Hecla	Rene' Mabe, USFS	7-26-99	Letter and Map	3
34.	Stream Alteration for Construction of Jordan Creek Sumps	Eric Lancaster, Hecla	Robert Flowers	7-28-99	Letter	
35.	Requesting recommendations for the application for stream crossings and pump back sumps	Terry Blau,	Yankee Fork Ranger District - USDA Forest Service	7-30-99	Letter and Application	12
36.	Grouse Creek Unit Monthly Water Quality Report	Catherine Reno, DEQ	Doug Wollant, Hecla	7-30-99	Letter and support document	499
37.	Transmittal Letter for Work Plan to Evaluate Sources of cyanide entering Jordan Cr.	Rene' M. Mabe, USFS	Jerry Zimfer	7-30-99	Letter	1
38.	Contractor cutting green trees	Douglas G. Wollant, Hecl	Rene' M. Mabe, USFS	8-2-99	Letter	1
39.	Acceptance of proposal to provide technical assistance for Grouse Cr. Mine	Suzanne Buntrock, Contr Officers Rep.	Mr. H. Reb Conn, Science Applications International Corp.	8-4-99	Letter	1
40.	Biological Assessment for Construction of Jordan Creek Sumps and Monitoring Wells at Hecla Grouse Creek Unit	Thomas A. Montoya, USI		8-10-99	Document	60
41.	Summary of Water Quality July 1999	Golder Assoc.	USFS	8-10-99	Document	41
42.	Initiating informal consultation with BA for construction of Jordan Creek Sumps.	Rene' M. Mabe, USFS	Ted Meyers NMFS	8-11-99	Letter transmitting BA	2
43.	Initiating informal consultation with BA for construction of Jordan Creek Sumps.	Rene' M. Mabe, USFS	Mike Donahoo USF&W	8-11-99	Letter transmitting BA	2
44.	Request for Sump Installation Approval	Catherine Reno, DEQ	Douglas Wollant	8-17-99	Letter	

ADMINISTRATIVE RECORD FILE
Hecla - Grouse Creek Project
Yankee Fork Ranger District - Salmon-Challis National Forest
CERCLA 1999 - 2000

45.	Requesting review and comments on Monthly Water Quality and Summary of Water Quality	Rene' M. Mabe, USFS	Tom Jeffers and cc's	8-19-99	Letter transmitting reports	1
46.	Jordan Creek Sumps and Monitoring Wells (two actions)	William Stelle, Jr., NMFS	Rene' Mabe, USFS	8-19-99	Letter	2
47.	Designation of Pat Trainor as On-Scene Coordinator for the Time Critical Removal Action at the Grouse Creek Mine Site	Mabe – Matejko and Stolesen	Pat Trainor, USFS	8-20-99	Letter and enclosure	4
48.	Requirements before start of sump construction activity	Rene' Mabe, USFS	Doug Wollant, Hecla	8-20-99	Letter and enclosure	5
49.	Grouse Creek Mine Action Memorandum Addendum to change on-scene coordinator to Pat Trainor	George Matejko, Forest Supervisor	Official File	8-20-99	Memo and enclosure	12
50.	Jordan Creek Sumps and Monitoring Wells	Michael J. Donahoo, USF&W	Rene' M. Mabe, USFS	8-24-99	Letter	2
51.	**Memo – Determination of Limits for Tailings Impoundment Discharge – REVISED**	**Patty McGrath, EPA**	**Nick Ceto**	**8-26-99**	**Memo**	**20**
52.	Sump pre-work meeting	Doug Wollant, Hecla	Pat Trainor	8-30-99	FAX cc's to Tom Montoya and Rene' Mabe	2
53.	Initiating emergency consultation due to levels of WAD cyanide and follow-up to August 11, 1999 letter concerning request for informal consultation on Jordan Creek Sumps	Rene' Mabe, USFS	Mike Donahoo	9-2-99	Letter	1
54.	Initiating emergency consultation due to levels of WAD cyanide and follow-up to August 11, 1999 letter concerning request for informal consultation on Jordan Creek Sumps	Rene' Mabe, USFS	Ted Meyers	9-2-99	Letter	1
55.	Health and Safety Plan for Jordan Creek Pump Back Sump Construction	Golder Associates, Inc.	Rene' M. Mabe, Doug Wollant, Nicholas Ceto, Greg Weigel, and Pat Trainor	9-8-99	Letter and Safety Plan	67
56.	Grouse Creek Unit Monthly Water Quality Report	Doug Wollant, Hecla	Catherine Reno, DEQ	9-9-99	Letter and Report	410

57.	Golder Associates Summary of Water Quality August 1999	Golder Assoc.	USFS and EPA	9-10-99	Transmittal Letter and Report	32
58.	Health and Safety Plan Job Safety Briefing, and Personnel signatures and pictures	Dean Lee, Hecla	Yankee Fork District	9-10-99	FAXED letter	2
59.	Health and Safety Plan for Jordan Creek Pump Back Sump Construction	Eric Lancaster, Hecla	Rene' Mabe USFS	9-14-99	Letter and Report (in library)	56
60.	Hecla's Safety Meeting notes	David Lee – Hecla		9-16-99	Notes	1
61.	Results of the chronic Selenastrum capricornutum toxicity test	Steven P. Canton – Chadv and Associates, Inc.	Eileen Steilman	9-17-99	Letter and enclosures	15
62.	Revegetation Plan for the Jordan Creek Seeps and Pools Pump Back Project	Eric Lancaster – Hecla	Pat Trainor, USFS	9-23-99	Letter and enclosures	2
63.	Statement of Work for an Administrative Order on Consent	Pat Trainor – USFS	Gary Gamble CIH – Hecla	9-24-99	Letter and enclosure	6
64.	Proposed effluent limits applicable to discharge	Greg Weigel – USEPA	Gary Gamble CIH – Hecla	9-24-99	Letter and enclosure	3
65.	Corrections to Golder Assoc Report Dated May 21, 1999	David Banton, Golder Ass	Doug Wollant, Hecla Mining Co.	9-27-99	Letter and correction	3
66.	Corrections to Golder Assoc Report, Dated May 21, 1999 for Grouse Creek Mine	David Banton – Golder A	Doug Wollant, Hecla Mining Co.	9-29-99	Letter and addendum	3
67.	October 4th, 1999 meeting with Hecla	Catherine Reno – DEQ	Nick Ceto - EPA and Pat Trainor - USFS	10-6-99	Letter	2
68.	Hecla's Third Quarter 1999 Toxicity Test Results	Eileen Steilman – Hecla	Jim Corpuz	10-8-99	Letter and document	
69.	Grouse Creek Unit Monthly Water Quality Report	Doug Wollant – Hecla	Catherine Reno – DEQ	10-8-99	Letter and document (in library)	375
70.	Grouse Creek Unit Supporting Documentation for Monthly Water Quality Report	Doug Wollant – Hecla	Catherine Reno – DEQ	10-8-99	Letter and document (in library)	489
71.	Review of Tailings Impoundment Treatability Study for Grouse Creek Mine	Jerry Zimpfer and Tim Re (SAIC)	Pat Trainor – USFS	10-12-99	Letter	7

72.	Communications regarding Grouse Creek Mine	Nick Ceto	Catherine Reno, DEQ	10-13-99	Letter	1
73.	Proposed test work for land application at Bonanza Flats	Alan Wilson – Hecla	Tom Montoya - USFS	10-14-99	Letter	3
74.	Determination of Effects Worksheet – Proposed test work for land application of tailings pond water at Bonanza Flats.	Tom Montoya, USFS	Files	10-14-99	Worksheet	8
75.	Grouse Creek Mine Action Memorandum – Addendum	Pat Trainor – Rene' Mabe USFS	Official File	10-14-99	Letter and map	2
76.	Biological Assessment and Evaluation for Threatened, Endangered and Sensitive Wildlife Species – for Hecla Test Work for Land Application.	Dave Reeder, USFS	District Ranger, Yankee Fork R.D.	10-19-99	Letter and BA	27
77.	Authorize the construction of test pits to determine the viability of land-applying contaminated waters.	Pat Trainor – USFS	Alan Wilson – Hecla	10-21-99	Letter and enclosure	4
78.	Response to Idaho DEQ's correspondence of October 6th.	Pat Trainor, USFS	Catherine Reno, DEQ	10-21-99	Letter	1
79.	Time Critical Action at Grouse Creek Mine, Yankee Fork RD	Jack Blackwell, USFS	Forest Supervisor, Salmon-Challis NF	10-22-99	Letter and enclosure	12
80.	**CONFIDENTIAL SETTLEMENT COMMUNICATION – Hecla Proposed Conceptual Scope of Work**	?	?	10-22-99		6
81.	Interim Characterization Report on Data Collection at Hecla Grouse Creek Unit Phase 2 Hydrogeologic Investigations Volume 1 of 2	Golder Associates, Inc.	Hecla	10-29-99	Report	80
82.	Interim Characterization Report on Data Collection at Hecla Grouse Creek Unit Phase 2 Hydrogeologic Investigations Volume 2 of 2	Golder Associates, Inc.	Hecla	10-29-99	Report	369
83.	Hecla Grouse Creek October 1999 Monthly Water Quality Report	Douglas Wollant – Hecla	Catherine Reno, DEQ	11-8-99	Letter and report (in library)	453
84.	Hecla Grouse Creek Supporting Documentation for October 1999 Monthly Water Quality Report	Hecla Mining Co.	Catherine Reno, DEQ	11-8-99	Report (in library)	260

ADMINISTRATIVE RECORD FILE
Hecla - Grouse Creek Project
Yankee Fork Ranger District - Salmon-Challis National Forest
CERCLA 1999 - 2000

85.	Summary of Water Quality October 1999 Hecla	Golder Assoc	Hecla	11-10-99	Report	51
86.	WAD CN Trends	Hecla	Task Force	11-17-99	Tables	8
87.	**CONFIDENTIAL – DO NOT RELEASE ATTORNEY CLIENT PRIVILEGE Table 1-5 Effluent Limitations for Tailings Impoundment Discharge to Yankee Fork.**	**Patty McGrath, EPA**	**Greg Weigel**	**No date**	**Report**	**5**
88.	Bonanza Flats Land Application test work	Pat Trainor, USFS	Alan Wilson, Hecla	11-22-99	Letter	1
89.	Results of the chronic Selenastrum capricornutum toxicity test	Steven P. Canton, Chadw and Assoc.	Eileen Steilman, Hecla	12-6-99	Letter and Enclosures	14
90.	Grouse Creek Unit Monthly Water Quality Report	Hecla Mining Co.	Catherine Reno, DEQ	12-9-99	Letter and Document	
91.	Supporting Documentation for November 1999 Summary of Water Quality II	Hecla Mining Co.	Catherine Reno, DEQ	12-9-99	Document	
92.	Jordan Creek Sump Project Construction Report	David R. Berberick	Pat Trainor	12-10-99	Letter and Report	
93.	Grouse Creek AOC – Request for authorization to install Outfall 003 diffuser assembly and feed piping in Yankee Fork	Chris Gypton, Hecla	Pat Trainor, USFS	12-13-99	Letter and enclosure (Joint Application for Permit	8
94.	Concerns about the design of the diffuser and effluent requirements. Hold off on diffuser work.	Pat Trainor, USFS	Chris Cypton, Hecla	12-15-99	Letter	1
95.	Revised Statement of Work for and AOC	Pat Trainor, USFS	Gary R. Gamble, CIH, Hecla	12-21-99	Letter and enclosure	38
96.	Grouse Creek Mine, Draft Final Mixing Zone Analysis for Discharge	Tim Reeves, Rob Naeser, SAIC	Pat Trainor, USFS	12-30-99	Letter and enclosure	12
97.	Summary of Water Quality, December 1999	Golder Assoc.	Rene' M. Mabe, USFS	1-10-00	Letter and Report	
98.	Monthly Water Quality Report	Eric Lancaster, Hecla	Catherine Reno, DEQ	1-10-00	Letter and Report	
99.	Supporting Documentation for the Monthly Water Quality Report	Eric Lancaster, Hecla	Catherine Reno, DEQ	1-10-00	Report	
100.	Response to request for information about contaminant	Helen Hillman, Coastal	Dale Brege, Greg	1-12-00	Letter and	9

ADMINISTRATIVE RECORD FILE
Hecla - Grouse Creek Project
Yankee Fork Ranger District - Salmon-Challis National Forest
CERCLA 1999 - 2000

	concentrations protective of NOAA trust resources in the Yankee Fork	Resource Coordinator NOAA/NOS	Wiegel, Patty McGrath		Report	
101.	Hecla Scope of Work, Assumptions to Support May 2002 Pond Decant Schedule	J.H. Templeton PE SAIC	Pat Trainor, USFS	1-13-00	Memo	2
102.	Request denied to start up pilot test program and discharge treated water into Jordan Creek	Pat Trainor, USFS	David Berberick, Hecla	1-28-00	Letter	1
103.	Pollution Report for Time Critical Removal at Grouse Creek Mine	Pat Trainor, USFS	File	1-30-00	Letter and enclosure	10
104.	Grouse Creek Unit Site Characterization Report	Golder Associates	Rene' M. Mabe, USFS	1-31-00	Letter and Report	
105.	Monthly Water Quality Report	Eric Lancaster, Hecla	Cahterine Reno, DEQ	2-9-00	Letter and Report	
106.	Supporting Documentation for Monthly Water Quality Report	Eric Lancaster, Hecla	Cahterine Reno, DEQ	2-9-00	Report	
107.	Stream Alteration for construction of Yankee Fork Diffuser	Eric Lancaster, Hecla	Mr. Terry Blau	2-9-00	Letter and enclosures	11
108.	Summary of Water Quality	Golder Assoc.	Rene' M. Mabe, USFS	2-10-00	Letter and Report	
109.	Application for Hecla Co-Install diffuser line in stream bed	Terry Blau, Dept of Wate Resources	Yankee Fork Ranger District	2-22-00	Letter and Application	10
110.	Hecla can not sign on to the current SOW pursuant to an Administrative Order on Consent.	William Booth, Vice Pres Hecla	Micheal Gearheard, USPA and Pat Trainor, USDA`	2-28-00	Letter	2
111.	Proposed installation of effluent diffuser in the Yankee Fork	Bradley Daly, Dept of the Army	Eric Lancaster, Hecla	2-28-00	Letter	2
112.						

MLH 040700

TOTAL P.09

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IDAHO DEPARTMENT OF HEALTH AND WELFARE

In the matter of:	)	
	)	
	)	CONSENT ORDER
Hecla Mining Company	)	Idaho Code Section 39-108
	)	
	)	

I.
PARTIES AND AUTHORITIES

The Idaho Department of Health and Welfare, Division of Environmental Quality (Department), pursuant to the Idaho Environmental Protection and Health Act ("EPHA"), Idaho Code § 39-101 et seq. enters into this Consent Order with Hecla Mining Company ("Hecla").

II.
FACTUAL BACKGROUND

By Notice of Violation (NOV) dated September 15, 1999 the Department notified Hecla of certain violations of the Idaho Water Quality Standards and Wastewater Treatment Requirement, IDAPA 16.01.02., the Idaho Ground Water Rule, IDAPA 16.01.11. and its Ore Processing by Cyanidation Permit No. CN-000022. The NOV is incorporated by reference into this Consent Order. The NOV provided Hecla Mining Company an opportunity for a compliance conference to discuss the violations and enter into a consent order. A compliance conference was held on November 19, 1999.

III.
PURPOSE

This Consent Order determines the rights, obligations, and responsibilities of the Parties with respect to the Notice of Violation dated September 15, 1999 and any and all remedial action which may be taken at the Site. The Parties intend that all actions taken pursuant to this Consent Order shall be consistent with applicable portions of the National Contingency Plan (NCP) as the NCP is set forth in 40 CFR Part 300.

IV.
AGREEMENT TO CONDUCT REMEDIATION AND CLEAN UP

Hecla hereby agrees to perform the items set forth and described in the agreed upon "Scope of Work, Grouse Creek Mine," (SOW) a true and correct copy of which is attached hereto as Exhibit A and which is hereby incorporated by reference and made an integral part hereof.

V.
AGREEMENT TO PAY PENALTY

In addition to performance of the SOW, Hecla hereby stipulates that the following penalties shall be paid by Hecla to the Department within fifteen (15) days of receipt of the fully executed Consent Order in reference to the allegations of the NOV dated September 15, 1999.

NOV #1 –	$10,000.00	
NOV #2 –	$10,000.00	
NOV #3 –	$31,500.00	($150.00 per day for a period of 210 days)
Total	$51,500.00	

Payment shall be made to the Idaho Department of Health and Welfare and shall be sent to:

Fiscal Office•Accounts Receivable
Division of Environmental Quality
1410 N. Hilton
Boise, ID 83706

VI.
AGREEMENT TO SUSPEND REMAINING PENALTY

The Parties hereby further stipulate that the remaining penalties assessed by the Department in the September 15, 1999 NOV totaling $178,500 shall be and are hereby suspended pending termination of this Consent Order.

VII.
FORFEITURE OF SUSPENDED PENALTY

The Parties hereby stipulate and agree that if at any time during the duration of this Consent Order Hecla should fail to complete on time any activity required by this Consent Order and the attached Scope of Work (Exhibit A), or conduct any such activity in a manner that does not substantially comply with the terms of this Consent Order and the attached Scope of Work (Exhibit A), and Hecla's failure to complete such activity as required continues for a period of not less than fifteen (15) days, the Suspended Penalty or any portion thereof may become immediately due and payable; provided however that Hecla may proceed with Dispute Resolution, set forth in Section XIII, paragraph 16 herein, of any Department determination on the penalty forfeiture or work required in Exhibit A.

VIII.
AGREEMENT TO REIMBURSE COSTS

Hecla agrees to reimburse the Department for the Department's costs related to implementation of this Consent Order.

The Department shall, within thirty (30) days after the end of each fiscal quarter, provide Hecla with a detailed statement of expenditures, by category. Such expenditures shall be in accordance with I.C. § 39-108(6). Hecla shall remit payment for these expenditures to the Department within thirty (30) days of receipt of the statement of expenditures. If Hecla disputes any amounts set forth in the statement of expenditures, Hecla shall remit payment for all sums not in dispute. Thereafter, any disputes concerning the amount owed by Hecla shall be resolved through the dispute resolution process set forth in Section XIII, paragraph 16. If resolution of said dispute results in any portion of the disputed sum being awarded to the Department, Hecla shall within 15 days after receipt of the Department's final decision: (i) remit the amount awarded plus interest accruing at the statutory rate for interest on judgments provided in Idaho Code, Title 28, Article 22, Section 104 (I.C. § 28-22-104) from the date originally due, to the Department; or (ii) proceed with other legal remedies in accordance with Section XIII, paragraph 16.

IX.
COMPLIANCE WITH NATIONAL CONTINGENCY PLAN

If implemented as required, this Consent Order and the SOW will be in substantial compliance with the National Contingency Plan, 40 C.F.R. Part 300, including without limitation 40 C.F.R. Subpart H. (40 C.F.R. § 300.415, and § 300.700), and will result in a CERCLA-quality evaluation and analyses.

X.
COMPLIANCE WITH OTHER LAW

Except as set forth herein, this Consent Order shall not relieve Hecla from its obligation to have its current activities, including activities conducted under this Consent Order, comply with any of the applicable provisions of and the Department specifically reserves all other rights under the EPHA; the HWMA; the Idaho Water Quality Standards and Wastewater Treatment Requirements, IDAPA 16.01.02.001 to16.01.02.999; the Rules and Standards for Hazardous Waste, IDAPA 16.01.05.001 to 16.01.05.999; the Ground Water Quality Rule, IDAPA 16.01.11.001-16.01.11.999 and other applicable local, state or federal law.

XI.
REQUIREMENT TO OBTAIN PERMITS

Except and unless otherwise authorized pursuant to CERCLA § 121(e) (42 U.S.C. § 9621(e)) Hecla shall obtain all agency permits, licenses, and approvals, and shall use reasonable efforts to obtain acceptable agreement with private persons necessary to implement this Consent Order. The Department shall cooperate with Hecla and help Hecla and its contractors and its subcontractors to secure the necessary agency authorization, access and third person agreements required to implement the Consent Order. The Department, may, within its discretion, use applicable authorities to help secure access to property.

XII

REQUIREMENT TO DISCHARGE EFFLUENT

It is understood and agreed that successful completion of this Consent Order and the attached SOW is dependant upon HMC's ability to obtain authorization to discharge treated effluent into the Yankee Fork of the Salmon River. Authorization to discharge into this navigable water is a matter which is outside the jurisdiction of the Idaho DEQ and rests with federal agencies who are not parties to this Consent Order. HMC agrees to make timely and appropriate application to the appropriate Federal agencies in order to obtain either an NPDES permit pursuant to section 402 of the Federal Water Pollution Control Act (FWPCA) or other form of agency authorization to discharge pursuant to the attached scope of work. HMC shall not be deemed to be in violation of this Consent Order if, following appropriate and timely application pursuant to the attached SOW, HMC is unable to obtain an NPDES permit or other authorization to discharge which is based upon considerations of practicability, the results of the Treatability and Pilot Plant studies and the Water Balance Management Plan so as to allow discharge of treated effluent into the Yankee Fork of the Salmon River in a manner consistent with the approved work plan, and Treatment Plant design

XIII.
GENERAL PROVISIONS

1. Conflict Between Consent Order and Exhibits. To the extent of any conflict between the meaning of the terms and provisions in this Consent Order and the Exhibits, the meaning in this Consent Order shall control.

2. Modification. The material terms set forth in the approved reports and submittals may be modified by the Parties' mutual agreement. Agreed modifications must be in writing signed by an authorized representative, identified in Paragraph 15 below, of each Party but may be

made without an amendment of this Consent Order signed by the Director of the Department and Hecla. In requesting a modification of the material terms of the approved reports or other submittals, the requesting Party shall include (a) a justification for the Party's request; and (b) a schedule for implementation of any activities affected by the proposed modification. Without limitation, the deadlines stated in the Scope of Work, and subsequent submittals are material terms. Non-material terms of the SOW or other submittals, such as procedural terms, and terms which do not substantively alter the document, may be modified by the Parties by oral agreement. The Parties recognize that such a level of cooperation is necessary to carry out the SOW. Any other terms of this Consent Order and SOW may be modified only by an amendment of the Consent Order signed by the Administrator of the Department, and Hecla.

3. Notice. All communications required by this Consent Order shall be addressed to:

Department	Hecla Mining Company
Mr. James Johnston	William B. Booth
Regional Administrator	Vice President
Division of Environmental Quality	Hecla Mining Company
900 N. Skyline, Suite B	6500 Mineral Drive
Idaho Falls, ID 83402	Coeur d'Alene, Idaho 83815-8788
Telephone: (208)528-2650	Telephone: (208)769-4111
Fax: (208)528-2695	Fax: (208)769-4122

4. Effect on Successors and Assigns. This Consent Order shall bind the parties and their respective successors, agents, and assigns until such time as the terms of this Consent Order are fully met.

5. Reservation of Natural Resource Damage Claims. Nothing herein shall be deemed to waive or compromise any claims, known or unknown, existing or potential for damages to natural resources whether in existence at the time of this agreement or arising in the future.

6. Tolling Agreement. The parties hereto hereby expressly stipulate and agree that any statute of limitations applicable to any claims under CERCLA, EPHA, HWMA or any other applicable law, for natural resource damages or other damages to the environment, is hereby tolled as of the effective date hereof, until such time as this Consent Order is terminated. The parties further stipulate and agree that the provision set forth herein regarding tolling the statute of limitations is not intended to restrict the Parties from enforcing their rights under this Consent Order, or to limit the time within which the parties may enforce such rights as provided in Idaho Code § 29-110; and the Parties further stipulate and agree that the Department's right to pursue a claim for natural resource damages and Hecla's

right to raise any defense to a natural resource damage claim asserted by the Department are not rights created by or enforceable under this Consent Order and therefore, the tolling provision set forth herein is not prohibited by Idaho Code § 29-110..

7. Events Beyond Hecla's Control. Hecla shall not be deemed in violation of this Consent Order during any period in which its performance is prevented or delayed by any cause or events reasonably beyond its control. Examples of causes reasonably beyond Hecla's control include inclement weather, Hecla's inability to obtain a permit required by law despite timely and proper application for the same, Hecla's inability to obtain timely approval from regulatory agencies to conduct activities required in the attached SOW or to resolve conflicting requirements of regulatory agencies despite making all reasonable attempts to do so, and Hecla's inability to obtain access to private property upon reasonable terms. Hecla shall promptly notify the Department of any event or cause which Hecla believes prevents or delays Hecla's performance of this Consent Order.

8. Third Person's Rights Unaffected. Except as expressly provided herein, nothing in this Consent Order shall be construed to create any rights in, or grant any cause of Action to, the Parties or any person not a party to this Consent Order.

9. Effective Date. The effective date ("Effective Date") of this Consent Order shall be the date of signature by the Administrator of the Department's Division of Environmental Quality.

10. Captions. The paragraph and sub-paragraph captions used herein are for reference only, and shall not in any way affect the meaning or interpretation of this Consent Order.

11. Parties' Relationship. The Department, including its agents, employees and representatives, shall not be liable for any injuries or damages to persons or property resulting from the acts or omissions of Hecla and its contractors or subcontractors in carrying out activities pursuant to this Consent Order, nor shall the Department be deemed a party to any contract made by Hecla or Hecla's agents pursuant to this Consent Order. Hecla shall not be deemed to be a party to any contract made by the Department or its agents pursuant to this Consent Order.

12. Final Completion. Upon final completion of Hecla's obligations under this Consent Order, the Department shall acknowledge in writing that Hecla has fulfilled all requirements of this Consent Order. Any penalties allowed hereunder, whether Stipulated or Statutory, which the Department has not assessed as of the date of the issuance of the letter in the preceding sentence, are hereby deemed waived by the Department.

13. Gender and Number. In this Consent Order, the singular includes the plural, the plural includes the singular, and the use of any gender includes all genders.

14. Severability. In case any provision or authority of this Consent Order or the application of this Consent Order to any Party or circumstance is held by any judicial or administrative authority to be invalid, the application of such provisions to other Parties or circumstances and the remainder of the Consent Order shall remain in force and shall not be affected thereby.

15. Authority. Each undersigned representative to this Consent Order certifies that he or she is fully authorized to enter into the terms and conditions of this Consent Order, and to execute and legally bind such party to this document.

16. Dispute Resolution. Hecla and the Department shall attempt to resolve expeditiously and informally disputes between them that arise under this Consent Order. If after consultation Hecla and the Department cannot agree on disputed matters, Hecla and the Department may further attempt to resolve their differences by initiating a Dispute Resolution Process as provided herein. This process is initiated by a written request by either Hecla or the Department for dispute resolution. The request shall be directed to each Party's representative identified in Section XIII, paragraph 3 and submitted to the Program Administrator of the Department, and shall set forth the position of the requesting party regarding the disputed matter, and include supporting data. The Department, through the Program Administrator and Hecla shall agree to the designation of a person within the Department who has not been previously directly involved in the disputed matter (Dispute Reviewer) to review the dispute. The parties shall use their best efforts to reach agreement on a designated Dispute Reviewer in a timely manner, and in no event more than seven (7) days after the submittal of the request for dispute review. The Department, through the Dispute Reviewer and Hecla shall have thirty (30) days from receipt of the request for dispute review to resolve the disputed matter. The designated Dispute Reviewer shall submit a decision regarding the disputed matter. Either Party may seek review of the dispute Reviewer's decision in accordance with applicable law. If the Dispute Resolution Process is invoked with respect to a particular matter, all other work not directly affected thereby shall proceed according to the requirements of this Consent Order. Excluding interest as provided in paragraph VIII, no payments, statutory, or other penalty shall accrue during any period during which the Dispute Resolution Process is ongoing, until fifteen (15) days following the later of: (i) the Department providing Hecla with its final written decision regarding the disputed matter; or, (ii) the matter is resolved by Court Order.

Signed this _____ day of March, 2000.

IDAHO DEPARTMENT OF HEALTH & WELFARE-Division of Environmental Quality
(Department)

By: _____
C. Stephen Allred, Administrator
Idaho Department of Health & Welfare
Division of Environmental Quality

Signed this 30 day of ~~March,~~ APRIL 2000. WBB

Hecla Mining Company (Hecla)

By: _____

Name: William B. Booth

Its: Vice President

IDAHO DEQ
SCOPE OF WORK
GROUSE CREEK MINE

PURPOSE

The purpose of this Scope of Work (SOW) is to address the on-going release of contaminants from the Hecla Mining Company (HMC) Grouse Creek facility, to Jordan Creek and the Yankee Fork associated surface and regional ground waters as alleged in the September 15, 1999, Notice of Violation. The objective is to reduce concentrations of contaminants to levels that do not exceed applicable water quality criteria for surface water or ground water. In order to achieve this objective, the main work elements will include de-watering of the tailings impoundment, recovery of contaminated ground water and closure of the tailings impoundment.

WORK ELEMENTS

The following work elements are the keys to meeting the objectives of this SOW:

X Maintain surface water quality to meet water quality criteria,
X Monitoring and Analysis Plan,
X Development of interim measures for Outfall 002,
X Address interim/additional measures to reduce tailings pond volume,
X Supernatant treatability analysis,
X Pilot plant study,
X Development of a detailed water management plan,
X Acquisition of an NPDES permit for Outfall 003,
X Water treatment plant design,
X Construction of the water treatment plant, and
X Tailings Impoundment closure plan.

DETAILED WORK PLAN

HMC shall submit a work plan with sufficient detail to describe how and when the work described below will be completed, including start dates, milestones, and finish dates. The detailed work plan will be submitted to the Division of Environmental Quality (DEQ) for approval within forty-five (45) days of the effective date of the Consent Order. The submitted work plan schedule shall achieve the completion dates established in this scope of work.

MAINTAIN SURFACE WATER QUALITY IN JORDAN CREEK: The work plan will detail methods to be used to meet water quality criteria during implementation of the SOW. At a

minimum HMC will continue to collect and pump back to the tailings impoundment contaminated groundwater at the site in accordance with the July 26, 1999 proposal for Jordan Creek Seeps and Pools Pump Back Project, as approved in the US Forest Service letter of August 20, 1999. Additional groundwater collection measures, such as the installation of groundwater recovery wells or an interceptor trench, may be required under this SOW if determined necessary by DEQ, in order to meet the objectives of the SOW.

MONITORING AND ANALYSIS PLAN: HMC will continue current monitoring in accordance with DEQ letters dated June 15, 1999 and July 30, 1999. In addition, HMC will prepare a monitoring plan for the effluent and receiving waters that will commence with the issuance of the Consent Order. The monitoring plan shall include at a minimum the following items:

1. Monitoring plan sufficient to determine compliance with applicable water quality criteria for Jordan Creek and the Yankee Fork associated surface and regional ground waters;

2. Evaluation of monitoring data on a regular basis to characterize changing conditions as the plan is implemented;

3. Adequate post-clean-up monitoring to ensure remediation was successful.

The additional monitoring plan will be submitted to DEQ (with the work plan) for approval within 45 days of signing the CO. A Quality Assurance/Quality Control plan will be developed prior to the sampling events.

INTERIM MEASURES - OUTFALL 002: The work plan shall provide an evaluation of alternatives and identify a preferred alternative for modifying the existing wastewater management and treatment system for NPDES Outfall 002 or adding additional treatment to ensure that State of Idaho water quality criteria (IDAPA 16.01.02200 and IDAPA 16.01.02250) in the receiving water are met during all stream flow conditions, until the NPDES permit for outfall 002 is reissued.

INTERIM/ADDITIONAL MEASURES TO REDUCE TAILING POND VOLUMES: As part of the work plan, HMC will submit for DEQ approval a plan for implementation of interim/additional measures to reduce the volume of water in the tailings impoundment. The work plan will include a schedule for the continued operation of the forced evaporation system. The efficiency of the evaporation system may be evaluated at the first quarterly review of the water balance data or any time thereafter.

TREATABILITY STUDIES: The Treatability Study Report will utilize Best Available Demonstrated Technologies (BADT) for determining treatment of contaminants of concern. The report shall include the predicted effluent quantity and quality for any proposed discharge and an evaluation of the treatment options that are available. The work plan shall provide detailed

information about the treatability studies conducted.

PILOT PLANT STUDY: HMC will provide a plan for the water treatment pilot plant study. The pilot plant study must confirm the proposed discharge quantity and quality developed in the treatability study. At the completion of the pilot plant study, a report with the results of the treatability and pilot plant studies will be prepared for approval by DEQ. The report shall be submitted to the DEQ no later than May 15, 2000.

WATER MANAGEMENT PLAN: By June 1, 2000, HMC shall submit a Water Management Plan which will provide a set of aggressive but achievable deadlines, based on various effluent discharge rates, for de-watering the tailings impoundment. The Water Management Plan will contain a detailed description and flow diagram of the proposed method by which the tailings impoundment will be de-watered. The plan will provide a table that shows the estimated water balance on a monthly basis to de-water the pond. This plan will be updated monthly and reviewed with DEQ on a quarterly basis to insure the schedule is being maintained and to make any necessary adjustments. The format and contents of the plan will be approved by DEQ.

NPDES PERMIT - OUTFALL 003: On May 2, 1997, HMC submitted to EPA an application for the NPDES permit for the Yankee Fork Outfall, 003. As additional information becomes available from continuing studies, HMC will share data with DEQ and EPA so that they may take into consideration the application of BDAT, the results of treatability studies and other practical considerations given the exigencies of the situation, and to facilitate the development of an appropriate and timely discharge permit or other authorization to discharge. HMC shall submit to DEQ supporting documentation for the mixing zone determination and water quality certification. It is understood that agency authorization to discharge is required by June 15, 2000, in order to maintain the schedule for commencing de-watering of tailings impoundment.

TREATMENT PLANT DESIGN: HMC shall commence design of a water treatment plant by May 1, 2000. The final water treatment plant design will be based on results of the treatability, pilot plant studies as well as the practicability of implementation of the results of those studies. a The water treatment plant shall be designed to successfully treat the supernatant in the tailings impoundment to the predicted discharge quality effluent developed utilizing BADT. HMC and DEQ shall establish milestone dates to review design progress and deadlines. HMC shall meet the date for de-watering the pond that is developed in the water management plan. The treatment system must also be designed or readily modified to treat tailings pore water as necessary to support closure of the tailings impoundment. As part of the design phase, HMC shall develop a contingency plan for upset conditions or failures in the water treatment plant and detail measures that will be taken concurrently and subsequent to de-watering to control oxidation of tailings and formation of acid drainage. If at any time during the design phase state or federal agency authorization procedures delay or deny approval of the final plant design, HMC shall provide

documentation of the delay or denial and request that final design cease until authorization from all involved agencies is secured. HMC shall include in the documentation an integrated water balance that incorporates potential delays in discharges from the facility. The final design of the water treatment plant shall be submitted to DEQ for approval in time to facilitate an August 1, 2000 commencement of construction.

TREATMENT PLANT CONSTRUCTION: HMC shall commence construction of the water treatment plant by August 1, 2000, and complete construction of the treatment plant in accordance with the approved design and schedule. The treatment plant shall be constructed, tested, and capable of discharging solution consistent with the designed effluent limits no later than May 1, 2001. HMC shall establish and DEQ shall approve milestone dates to review construction progress and deadlines prior to August 1, 2000. Changes in design during construction that significantly affect the treatment process shall be subject to approval by the DEQ. The work plan shall contain a detailed schedule for the construction of the plant. After the initial three months of operation, DEQ and HMC shall finalize the water management plan and finalize the date for removal of the supernatant from the tailings impoundment.

TAILINGS IMPOUNDMENT CLOSURE PLAN: A work plan and schedule for final reclamation and closure of the tailings impoundment shall be submitted no later than one year prior to the scheduled completion of tailings impoundment de-watering. The closure plan shall specify removal and treatment of tailings pore water and measures to be taken to monitor and maintain the tailings in a de-watered condition and control formation of acid drainage over both the short and long-term. These measures shall be designed to minimize long-term operation and maintenance responsibilities and the plan shall specifically describe such responsibilities. HMC shall implement the tailings impoundment closure plan as approved.

REPORTING

In addition to the monthly monitoring report, HMC shall submit monthly reports to DEQ outlining the accomplishments of that month. The report will be submitted by the 10th of the following month.

Within ninety (90) days after completion of all activities required under this SOW, HMC shall submit a final report summarizing all actions taken to comply with this SOW.

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STATE OF IDAHO
DIVISION OF
ENVIRONMENTAL QUALITY

1410 North Hilton • Boise, Idaho 83706-1255 • (208) 373-0502

Dirk Kempthorne, Governor
C. Stephen Allred, Administrator

May 1, 2000

Mike Dombeck, Chief
Forest Service
United States Department of Agriculture
Sidney R. Yates Federal Building
201 14th Street SW at Independence Ave. Sw.
Washington, D.C. 20250

RE: Grouse Creek Mine Site

Dear Mr. Dombeck:

It has come to my attention that the Forest Service is considering the issuance of a CERCLA § 106 Order to Hecla Mining Company to address problems at the Grouse Creek Mine. The State of Idaho is disappointed and surprised that the federal government is contemplating this approach at this time. We strongly urge you to reconsider.

The Grouse Creek Mine site consists mostly of lands owned by the Forest Service within the Salmon-Challis National Forest. The mine was developed under an Environmental Impact Statement Record of Decision and a Plan of Operations approved by the Forest Service. The site has had a series of environmental compliance problems since production began in October 1994. Regulatory oversight of these problems was handled by EPA or DEQ depending upon which agency had authority. Operation of the mine was suspended in April 1997. Water treatment has continued since then.

In the Spring of 1999 it became apparent that there is a pervasive problem with cyanide and other metals leaking from the tailings impoundment into the ground water which then feeds into Jordan Creek via springs and seeps. Jordan Creek is a tributary to the Yankee Fork of the Salmon River, a river system very important to the people of this State. The State of Idaho is justifiably concerned about this threat to the public health and environment. During the last year, DEQ has directed considerable effort and resources toward this problem. It has been a priority for us to try to coordinate our activities with the Forest Service, as well as other interested agencies. Throughout the year there have been multiple interagency meetings and conference calls, both with and without the mining company. Meanwhile, short-term mitigation efforts have continued on the ground.

On September 15, 1999, DEQ issued a Notice of Violation against Hecla for violations of the Idaho water quality standards, groundwater rules and Hecla's cyanide permit resulting from the releases from the tailings impoundment. The NOV assessed a $230,000 penalty and was resolved through a Consent Order signed by Hecla and DEQ on April 4, 2000. The Consent Order requires Hecla to implement a Scope of Work to address the release, or potential release of contaminants from the site. Hecla's failure to comply with the conditions of the agreement will result in additional violations and payment of a suspended portion of the assessed penalty.

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In the Scope of Work, Hecla has committed to an aggressive schedule to implement a water treatment pilot plant study, develop a management plan to de-water the impoundment, design and construct a water treatment plant, and develop a plan for closure of the impoundment. The next few months are critical to the successful and timely implementation of these projects. The State of Idaho is committed to making the process work and ensuring the implementation of a long-term remedial effort at this site. Hecla appears to be similarly committed. We are, in good faith, attempting to include the Forest Service in this effort and need your cooperation to make it succeed. The treatability and pilot plant studies will be complete on May 15. After that, the State and federal agencies and mining company need to agree on discharge limits by June 15 in order to 1) insure design and construction of a treatment plant before winter to allow discharge to the Yankee Fork during Spring runoff in 2001; and 2) reach agreement on a deadline for de-watering the impoundment. Once we agree on discharge limits it will be appropriate to consider the use of CERCLA authorities in the form of an Administrative Order on Consent.

If your objective at this site is truly environmental, rather than - jurisdictional, financial or procedural - you will devote staff time and your leadership to the ongoing technical effort. The issuance a Unilateral Order at this time will distract mining company and agency resources and will do nothing but delay work to address this problem.

We are reasonably comfortable that Hecla has the will and sufficient resources to comply with the Scope of Work attached to the Consent Order with DEQ in the time frames specified. However, should you take a federal agency action which may delay this project and deflect the limited resources available to Hecla, the State of Idaho is prepared to use state authorities to ensure other responsible parties - including the US Forest Service - will commit their efforts and resources to remediating the Grouse Creek Mine site. We could not responsibly do otherwise.

In summary, the State of Idaho respectfully, but strongly, urges you to refrain from any unilateral federal CERCLA action at the Grouse Creek Mine Site at this time. We also ask you to ensure that your regional staff is committed to working with the State and Hecla in the next few months to initiate a long-term remedial program at the site. I would like to meet with you at your earliest convenience to discuss the cooperation and coordination of our respective agencies in addressing environmental problems on lands within the National Forest System in Idaho. I am specifically asking for such a meeting before the Forest Service takes any unilateral action at the Grouse Creek Mine site.

Sincerely,

C. Stephen Allred
Administrator

cc: Jack Blackwell, Regional Forester, Region 4
Senator Craig
Senator Crapo
Representative Chenoweth-Hage
Representative Simpson

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USDA

United States
Department of
Agriculture

Hazardous Materials
Management Group

1400 Independence
Avenue SW
MS-9100

Washington, DC
20250-9100

June 9, 2000

Mr. C. Stephen Allred
Administrator
Division of Environmental Quality
Idaho Department of Health and Welfare
1410 N. Hilton
Boise, Idaho 83706-1255

Dear Mr. Allred:

This is in response to your letter dated May 1, 2000 to Mike Dombeck, Chief, Forest Service, United States Department of Agriculture (USDA), concerning the Grouse Creek Mine, near Sunbeam, Idaho. In that letter, you requested that USDA reconsider issuance of a CERCLA Section 106 Unilateral Administrative Order (UAO) to Hecla Mining Company (Hecla) requiring implementation of a removal action at the Grouse Creek Mine (the "Site"). The UAO would require Hecla to dewater a large tailings pond and abate the release of cyanide and other hazardous substances from the Site into the environment. Because the Secretary of Agriculture has not delegated this authority to the Chief of the Forest Service, I am responding to your letter for USDA.

You also sent a similar letter to Mr. Steven A. Herman, Assistant Administrator for Enforcement and Compliance Assurance, United States Environmental Protection Agency (EPA). It appears that the original of your letter to Mr. Herman was lost in the mail. Later, EPA Headquarters obtained your letter from EPA Region 10 to whom you had sent a copy. If there were attachments or other information included with the original, but not the copy, EPA has not received them. Because the majority of the Site is located on National Forest System (NFS) land, and because the releases from the Site directly affect NFS land and resources under the jurisdiction of USDA, the USDA is the lead Federal agency for overseeing the CERCLA response at the Site. We have consulted with EPA concerning the issues you raised in your May 1 letter and EPA has concurred in this response to your letters to both Mr. Dombeck and Mr. Herman.

As you are aware, USDA and EPA have been working closely with Hecla and the State of Idaho, Division of Environmental Quality (IDEQ) to develop a Scope of Work (SOW) to address the releases of cyanide and other hazardous substances from the Site. USDA and EPA have made every effort to negotiate an Administrative Order on Consent (AOC) with Hecla for the necessary work at the Site beginning in mid-1999. The Federal agencies also invited IDEQ to become a party to the proposed AOC. USDA notified IDEQ of its intent to issue a UAO at this Site in the Fall of 1999, but refrained from issuing the UAO at that time because Hecla indicated its willingness to negotiate a consensual agreement to conduct the work. Those negotiations ended in February of 2000 when Hecla wrote to

the Federal agencies and indicated that it would not agree to conduct the work under an AOC.

On April 4, 2000, IDEQ entered into a Consent Order with Hecla requiring the company to implement a Scope of Work (SOW) at the Site. Although the State SOW will require Hecla to conduct many of the elements that will be required in the Federal SOW, we believe that Hecla must conduct all of the elements in the Federal SOW to protect the environment from the releases of cyanide and other hazardous substances from this Site. The most significant difference between the State and Federal SOWs is that the Federal SOW establishes effluent limits that are necessary for the protection of the environment and specifically, the endangered and threatened species that are adversely affected by the continuing release of hazardous substances from the Site, and a schedule for dewatering the tailings impoundment at the Site. The Federal SOW allows for modification of the effluent limits and compliance schedule upon a showing of technically impracticability. In contrast, the State SOW does not require Hecla to meet specific effluent limits and instead requires that treatability and pilot plant studies of water treatment technologies be conducted before the establishment of effluent limits and a schedule.

You have previously discussed your concerns with Chuck Clarke, Regional Administrator, EPA Region 10, regarding USDA's intent to issue the proposed UAO at the Grouse Creek Mine Site. Members of your staff have also discussed these issues with USDA and the Forest Service. USDA and EPA explained why the Federal SOW must be implemented at the Site to expeditiously abate releases of cyanide and other hazardous substances from the tailings pond to Jordan Creek, a tributary of the Yankee Fork of the Salmon River. These releases have the potential to affect downstream habitat of several sensitive and/or endangered species, including chinook salmon, steelhead, and bull trout. We believe that these releases constitute exigent circumstances requiring implementation of the Federal SOW elements.

However, because Hecla has recently completed its treatability studies and pilot plant testing under the terms of the State Consent Order, USDA and EPA are willing to meet immediately with Hecla to explore again the possibility of entering into an AOC in lieu of USDA issuing a UAO. We will be contacting Hecla this week to invite the company to renew negotiations on an AOC. If Hecla accepts our invitation and we are able to make immediate progress on finalizing an AOC, we may be able to avoid having to issue the UAO. On the other hand, if we are not able to reach an agreement in principle with Hecla on the final terms for an AOC by
June 30, 2000, USDA intends to issue the UAO as soon as possible after that date.

USDA believes that the proposed Federal SOW, whether implemented through an AOC or a UAO, is necessary to protect the interests of the United States, and National Forest resources in particular, from releases of hazardous substances at and from the Site. We will continue to work with your agency to ensure that our agencies provide a coordinated

response to the environmental conditions at this Site.

We believe that our additional efforts to negotiate a consensual agreement with Hecla addresses your concerns to the extent we are able to do so consistent with the need to respond to the significant environmental threat posed by this Site. If the additional opportunity for negotiations with Hecla has failed to satisfy your concerns and you would like to speak with USDA and EPA officials in Washington, DC about the proposed Federal action at the Grouse Creek Mine Site, we will arrange an opportunity for you to do so. I may be reached at 202-401-4747.

Sincerely,

Terry A. Harwood
Director
USDA Hazardous Materials Management Group

cc: Jack Blackwell, Regional Forester, Region 4
Senator Larry E. Craig
Senator Michael Crapo
Representative Helen Chenoweth-Hage
Representative Michael Simpson
James Leatherwood, F.S.