Hecla
MINING COMPANY

NOV 05 1993

DIVISION OF
OIL, GAS & MINING

November 1, 1993

D. Wayne Hedberg
Permit Supervisor
Minerals Regulatory Program
Division of Oil, Gas and Mining
Department of Natural Resources
355 West North Temple
3 Triad Center, Suite 350
Salt Lake City, Utah 84180-1203

RE: Escalante Tailings Reclamation

Dear Mr. Hedberg:

Within this letter you will find our comments to your conditions for tentative approval of our capillary barrier proposal for reclamation at the Escalante Unit tailings impoundment. This letter is intended to supplement the October 18, 1993, Hecla responses to the BLM's letter of October 4, 1993.

Tailings Compaction

Hecla will agree to make a compactive effort on the surface of the tailings but we cannot agree to a specific criteria of meeting a compaction specification of 1 E-6 cm/sec. In our letter of May 14, 1993, we did not intend to establish a performance standard that had to be met for compaction of the tails and in fact no such guarantee can be made by Hecla.

Capillary Barrier

We had only intended that the lower few inches of the ten inches of waste rock layer would actually perform as a capillary barrier. The upper few inches of waste rock would form a buffer between the barrier and the plant roots. Ten inches of rock is more material than is required to establish an effective capillary barrier. For the rock to provide an acceptable capillary barrier, it simply has to provide an adequate break between the tailings and the subsoils to prevent the capillary rise of the salts from the tailings. As we are agreeing to provide additional subsoils below the rooting depth, as outlined later in this letter, we believe that six inches of size selected waste rock will provide the necessary barrier to prevent this upward migration of salts. As agreed in our

6500 Mineral Drive • Box C-8000 • Coeur d'Alene, Idaho 83814-1931 • 208/769-4100 • FAX 208/769-4107

letter to BLM, we will visually select the appropriately sized rock to be used to minimize the amount of fines that are placed on the impoundment. However, to minimize the piping ratio we will need to select somewhat smaller rock than was proposed before. To the extent practicable, we will select coarse rock with a diameter of 0.5 inch and larger. It is our understanding that during operations the waste rock from the mine was predominantly larger material, only occasionally encountering finer sized material. Because the larger rock and fines were generally not brought out of the mine and placed on the pile together, we believe we can successfully select rock which will make an appropriate capillary barrier. If we ensure that the rock layer provides sufficient open voids it will prevent upward migration of salts through the layer. Six inches of rock with a good distribution of voids horizontally across the layer will provide an effective capillary barrier.

Subsoil Layer

As the natural rooting depth is 14 inches, we see no advantage to providing 24 inches of rooting medium. As proposed in our October 18, 1993, letter to the BLM, we will agree to increase the subsoil layer to 12 inches, providing 14 inches of rooting medium and an additional 4 inches of soils for moisture retention capacity. Providing additional subsoil will not promote greater rooting depth as there is not any greater rooting depth in the natural soils where the subsoil is thicker. Please note that this is the same amount of topsoil/subsoil depth DOGM and BLM have agreed to with the clay cap design.

Waste Rock Chemistry

Enclosed is a copy of the chemical analyses conducted on the waste pile in 1989.

Please let us know as soon as possible if the reclamation modifications as proposed in this letter are satisfactory. If we are to begin reclamation this Spring, we need to have an approved plan soon so that reclamation preparations can begin.

Very truly yours,

Gary R Gamble

Gary R. Gamble
Environmental Supervisor

cc: Larry Drew - HMC
George Wilhelm - HMC
Arthur Tait - BLM

A&L MID WEST LABORATORIES, INC.

13611 "B" STREET • OMAHA, NE 68144 • (402) 334-7770

REPORT NUMBER: 9- 180-1555

June 29, 1989 (m5)

SUBJECT: ENVIRONMENTAL ANALYSIS

Hecla Mining Company #9595
Box 310
Enterprise, UT 84725

PO#: EM44288
Date Received: 6-15-89

Laboratory Number	Sample Identification	Analysis	Level Found	Detection Limit	Method
11349	Waste Pile	Total Cyanide	< 0.2 mg/kg	0.2 mg/kg	EPA 9010
		Total Aluminum	12,970 mg/kg	1.00 mg/kg	EPA 6010
		Total Arsenic	179 mg/kg	5.00 mg/kg	EPA 6010
		Total Barium	1,404 mg/kg	0.5 mg/kg	EPA 6010
		Total Cadmium	20.8 mg/kg	0.5 mg/kg	EPA 6010
		Total Chromium	3.36 mg/kg	1.00 mg/kg	EPA 6010
		Total Copper	233 mg/kg	1.00 mg/kg	EPA 6010
		Total Iron	986 mg/kg	1.00 mg/kg	EPA 6010
		Total Lead	2,754 mg/kg	5.00 mg/kg	EPA 6010
		Total Manganese	1,162 mg/kg	1.00 mg/kg	EPA 6010
		Total Mercury	0.18 mg/kg	0.02 mg/kg	EPA 7471
		Total Molybdenum	< 1.00 mg/kg	1.00 mg/kg	EPA 6010
		Total Nickel	5.16 mg/kg	1.00 mg/kg	EPA 6010
		Total Silver	19.6 mg/kg	1.00 mg/kg	EPA 6010
		Total Titanium	468 mg/kg	100 mg/kg	Flame AA
		Total Zinc	2,905 mg/kg	1.00 mg/kg	EPA 6010
		Total Solids	99.8%	0.01%	SM 209F
		Extractable Selenium by AB-DTPA	0.08 mg/kg	0.05 mg/kg	SM 303E

Note: <= Less than

Respectfully submitted,

John Torpy
Laboratory Supervisor

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A&L MID WEST LABORATORIES, INC.

13611 "B" STREET • OMAHA, NE 68144 • (402) 334-7770

REPORT NUMBER 9-180-1551/1555

June 29, 1989 M5

Hecla Mining Company #9595
P. O. Box 310
Enterprise, UT 84725

Subject: Coal & Overburden Analysis

Number of Samples: 5

Laboratory Number	11345	11346	11347	11348	11349
Sample Identification	**#1**	**#2**	**#3**	**Top Soil**	**Waste Pile**
pH	9.8	9.5	9.7	8.2	8.3
Total Sulfur (S) %	0.29	0.21	0.33	0.04	0.14
Potential Acidity (Maximum) *	9.1	6.6	10.3	1.3	4.4
Pyritic Sulfur (S) %	0.04	0.02	0.01	0.02	< 0.01
Potential Acidity (Actual) *	1.2	< 1.0	< 1.0	< 1.0	< 1.0
Neutralization Potential *	163	151	157	58	116
Acid-Base Potential					
$CaCO_3$ Excess * (+)	162	151	157	88	116
$CaCO_3$ Deficiency *(-)					
Potentially Acid/Toxic**	No	No	No	No	No
Other:					
Water Soluble Calcium (Ca) ppm	9	17	14	64	150
Water Soluble Magnesium (Mg) ppm	1	2	1	10	19
Water Soluble Sodium (Na) ppm	420	1830	1630	51	53
Sodium Absorption Ratio (SAR)	35.4	111.8	113.2	1.6	1.1
Sulfate Sulfur SO_4-S (%)	0.07	0.06	0.10	0.01	0.08

* Tons $CaCO_3$ equivalent per 1,000 tons of material.

** pH less than 4.0 or acid-base potential deficiency greater than 5.0 tons $CaCO_3$ equivalent per 1,000 tons of material. Indicate yes or no

< Less than

John Torpy, Laboratory Supervisor

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REPORT NUMBER
9-174-0116

A & L MID WEST LABORATORIES, INC.

13611 "B" Street ● Omaha, Nebraska 68144-3693 ● Phone: (402) 334-7770

REPORT DATE 06/29/89

ACCOUNT NO. 9595

GROWER HECIA MINING COMPANY

TO: HECIA MINING COMPANY
TANNY HARLIN
BOX 310
ENTERPRISE UT 84725

SUBMITTED BY:

SOIL ANALYSIS REPORT

(SEE EXPLANATION ON BACK)

INFO SHEET # 127797

SAMPLE NUMBER	LAB NUMBER	ORGANIC MATTER			PHOSPHORUS		POTASSIUM	MAGNESIUM	CALCIUM	SODIUM	pH								
#1	34294	0.3V	39	1	2		155	20	1425	316	9.8		0.0	9.1	4.4	1.8	78.6	0.01	5.2
#2	34295	0.3V	39	2	3		238	17	1400	994	9.5		0.0	12.1	5.1	1.2	58.0	0.03	5.8
#3	34296	0.3V	39	1	2		246	20	1412	859	9.7		0.0	11.6	5.4	1.4	60.9	0.03	2.2
TOP	34297	2.1M	71	21H	79VH		481VH	368VH	2801H	36	8.2		0.0	18.5	6.7	16.6	75.9	0.0	0.8

DTPA EXTRACTION

SAMPLE NUMBER	NITRATE NO. N	SULFUR	ZINC	MANGANESE	IRON	COPPER	BORON	EXCESS LIME	SOLUBLE SALTS	% SAND	% SILT	% CLAY	
#1	2						8.1	H	1.6	14	78	8	SILT LOAM
#2	2						8.0	H	3.7	10	84	6	SILT
#3	2						9	H	3.7	10	82	8	SILT
TOP	2						1.8	H	1.2	38	46	16	LOAM

COMMENTS:
The sample identified as waste pile consisted entirely of particle sizes of cobbles and course gravel. This material was pulvarized and analyzed for the parameters requiring total element content. It was not analyzed for extractable or exchangeable nutrients.

This report applies only to the sample(s) tested. Samples are retained a maximum of thirty days after testing.

A & L MID WEST LABORATORIES, INC.

Ken Pohlman/John Menghini
AL Rev 6.1 MG

* CODE TO RATING: VERY LOW (VL), LOW (L), MEDIUM (M), HIGH (H), VERY HIGH (VH), AND NONE (N)
** ENR - ESTIMATED NITROGEN RELEASE
*** MULTIPLY THE RESULTS IN ppm BY 2 TO CONVERT TO LBS. PER ACRE OF THE ELEMENTAL FORM
**** MULTIPLY THE RESULTS IN ppm BY 4.6 TO CONVERT TO LBS. PER ACRE P_2O_5
***** MULTIPLY THE RESULTS IN ppm BY 2.4 TO CONVERT TO LBS. PER ACRE K_2O
MOST SOILS WEIGH TWO (2) MILLION POUNDS (DRY WEIGHT) FOR AN ACRE OF SOIL 6-2/3 INCHES DEEP.

(801)439-5355 Zone 5

SOIL ANALYSIS METHODS

used by

A & L MID WEST AGRICULTURAL LABORATORIES, INC.
13611 B Street
Omaha, Nebraska 68144

	Analysis	Method	Reference
1.	Organic Matter	Chromic acid oxidation/ colorimetric	NCR, p. 30
2.	Phosphorous		
	a. P_1	Extraction w/dilute acid and ammonium fluoride (weak Bray)/ colorimetric	NCR, p. 14-15
	b. P_2	Extraction with strong Bray solution (4 times the acid concentration of weak Bray)/colorimetric	
	c. Bicarbonate P	Extraction with sodium bicarbonate/ colorimetric	ASA, p. 421-22
3.	Potassium, Magnesium, Calcium, Sodium,Sulfur	Neutral ammonium acetate (1 N) extraction/Inductively Coupled Argon Plasma (ICAP) detection	RMST, p. 60-65 NCR, p.17-18
4.	pH Soil pH, Buffer index	1:1 Soil:Water mixture/combination electrode. Shoemaker, Melcan and Pratt (SMP) buffer/combination electrode	NCR, p. 5-8
5.	Cation Exchange Capacity (CEC)	a. Summation of cations, Ca++, Mg++, K+, Na+, and H+(see 3 & 4)	
		b.Ammonium acetate saturation/ displacement with NaCl/distillation and titration	ASA, p.149-151
6.	Nitrate-N	Saturated $CaSO_4$ extraction/specific ion electrode	ASA, p. 671
7.	Ammonia-N, Exchange-able	Neutral salt KCl extraction/specific ion electrode	ASA, p. 648
8.	Zinc, Manganese, Iron, Copper	a. DPTA extraction/ICAP detection	NCR, p. 18-19
		b. 0.1 N HCl extraction ICAP det. (over)	NCR, p. 19-20

9.	Boron	Hot water extraction/curcumin-colorimetric	NCR, p. 22-23
10.	Excess lime	1 N HCl spot test	
11.	Soluble Salts	Conductivity meter	USDA, p. 89-90
12.	Soil Texture	Hydrometer method	ASA, p. 549-566
13.	Chloride	KNO_3 - HNO_3 extraction/specific ion electrode	ASA, p. 459-460
14.	Molybdenum, extractable	Acid ammonium oxalate extraction/ ICAP or AA detection	ASA

References

NCR - Recommended Chemical Soil Test Procedures for the North Central Region. No. 499 (revised). North Dakota State University.

ASA - Methods of Soil Analysis - Part 2: Chemical and Microbiological Properties, Second Edition, 1982. American Society of Agronomy.

RMST - Handbook on Reference Methods for Soil Testing, 1974., Council on Soil Testing and Plant Analysis.

USDA - USDA Agriculture Handbook 60.