MME Form 9
Rev. Nov. 65

UNITED STATES
DEPARTMENT OF THE INTERIOR
Geological Survey

OFFICIAL DOCKET FILE Contract No. _____ Docket No. 6615

Application
- [x] Denied
- [ ] Withdrawn

Contract
- [ ] Terminated - Not Certified
- [ ] Terminated - Certified
- [ ] Cancelled
- [ ] Royalty Agreement

The records contained in this file are marked (x) and arranged in this order:

Folder No. 1:

Left Side

- [ ] Royalty Audits
- [ ] Certification of Discovery
- [ ] Closing Letter
- [ ] Cost Audits
- [ ] Termination Notice or Agreement
- [ ] Recision Notice
- [ ] Assignment of Contract
- [ ] Contract Amendments
- [ ] Contract with all exhibits and annexes
- [ ] Owner's Consent to Lien and Subordination Agreement
- [x] Application and Attachments

Right Side

- [ ] Project Summary (final)
- [ ] Work Completed Analysis (final)

All other material filed in chronological order including the following reports if checked:

- [ ] Field Team Semiannual Report for Certified Project
- [ ] Final Field Team Report (Tab)
- [ ] Operator's Final Report (Tab)
- [ ] Interim Field Team Reports
- [ ] Operator's monthly reports and all attachments
- [x] On-site Exam. Report (Tab) 10/18/67
- [ ] Settlement Sheets
- [ ] Drill Logs

Additional Folders:

Left Side

Folders No. _____: Reports
- [ ] Analysis of Semiannual Inspection Reports
- [ ] Project Summary (Interim) by MME Engineers

Right Side

- [ ] Field Team Semiannual Report for Certified Project
- [ ] Field Team Interim Reports
- [ ] Operator's Monthly Reports with Transmittal, Narrative and Maps

Folders No. _____: Maps (Use pocket folder or envelope)

Folders No. _____: Settlement Sheets

Folders No. _____: Drill Logs

Folders No. _____: Royalty Material

72195-65

Copy to Washington 4-12-68

IN REPLY REFER TO:

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
FEDERAL CENTER, DENVER, COLORADO 80225
Branch of Geochemical Cens

OME Region III
RECEIVED
APR 11 1968
Denver, Colorado

April 10, 1968

Mr. Irvin Nielson
Wolf Ridge Minerals
P. O. Box 1008
Glenwood Springs, Colorado 81601

Dear Mr. Nielson:

Thank you for your invitation to examine and study core material from your sedimentary ore body. I would appreciate the opportunity to bring back to our laboratories in Denver sufficient sample material to have a variety of analytical work done here. In particular, I will want to verify your analyses for copper, silver, and gold and submit samples for spectrographic analyses in which the analyst searches for nearly 60 elements. From this kind of geochemical data it may be possible to suggest element associations that would aid in the interpretation of the origin of the deposits. Some mineralogic work may also be desirable to verify the origin. In return I shall be happy to share with you all the analytical and mineralogical data that is obtained. Furthermore, I shall be happy to discuss with you any ideas or concepts that are developed. All basic chemical data and the description of your property shall be classified "Company confidential" information and withheld from publication or any other manner of public release for at least 1 year from the time the basic data are made available to you. After 1 year, we may request Wolf Ridge Minerals for permission to publish the data as we see fit. In any case we would not release "Company confidential" information without your written consent.

Sincerely yours,

James D. Vine

JDV:btp

Copy to: J. W. Hasler ✓
Dan Shawe

+ Reg. Distribution

Copy to Washington
4-12-68

Bill,

I'm sending you the spectrographic analyses from the Iowa Gulch drilling. The results from the spec. were not high enough to warrant assaying.

The letter to 1st Nat. Bank of Denver gives a brief picture of reserves. The Feb 1 report goes into more detail and shows maps of mineralized areas as well as cross-sections used in calculating Tonnage & Grade.

I hope you can get the information you need from this data. If you need anything further please give Duane or I a ring.

Bill Walker

EARTH SCIENCES, INC.

4/5/68

GEOLOGY **GEOCHEMISTRY** **GEOPHYSICS** Golden, Colorado 80401

303-279-7733

SPECTROCHEMICAL ANALYSES

Assay IG-2 1'-5'

TO:

DATE: October 12, 1967

SAMPLE DESCRIPTION: Hilltop

PURCHASE ORDER:

ATTN:

REFER TO FILM: 604

Method 479

Cores 2.8A

IG-2 ~~1'-5'~~

END

HB-A1 +15 2.8A

HB-A1 +15 2.7A

Sample	Lab No.	Color	Ag %	Zn %	Pb %	Elements					
Fe-line	✓1D										
H.T. #2 Std.	✓1U										
—	—2D	—									
1'-5'	✓2U		3.4	0.5							
5'-10'	✓3D		0.5								
10'-15'	✓3U		0.4								
15'-20'	✓4D		0.6								
20'-25'	✓4U		2.0								
25'-30'	✓5D										
30'-35'	✓5U										
35'-40'	✓6D										
—	—6U	—									
40'-45'	✓7D										
45'-50'	✓7U										
50'-55'	✓8D										
55'-60'	✓8U		0.5	0.4							
60'-65'	✓9D		2.5	0.6							
65'-70'	✓9U		1.0	0.4							
70'-75'	✓10D		2.4	0.5							
75'-82'	✓10U		2.7	0.4							
—	—11D	—									
144-148	✓11U	L. Br.	0.5	0.5							
148-152	✓12D	"									
152-156	✓12U	Brown									
156-160	✓13D	"									
160-164	✓13U	"									
164-168	✓14D	"									
168-172	✓14U	"									
172-176	✓15D	"									
—	—15U	—									
176-180	✓16D	"									
180-184	✓16U	"									
184-188	✓17D	L. Br.									
188-192	✓17U	L. Br.									
192-196	✓18D	L. Br.									
196-200	✓18U	L. Br.									
—	—19D	—									
112-116	✓19U	Brown									
116-120	✓20D	"									
120-124	✓20U	"									
124-128	✓21D	"									
128-132	✓21U	"									
132-136	✓22D	"									
136-140	✓22U	"									
140-144	✓23D	"									
—	—23U	—									
H.T. #4 Std.	✓24D										
—	—24U	—									
Fe line	✓25D										
	25U										
Lower Limit Detection											

Iowa Gulch Dia Drill Hole

Remarks: 1. — not detected.
2. LLD = lower limit of detection.
3. All values in parts per million unless otherwise indicated.
4. Reported value within ..... of true value.

EARTH SCIENCES, INC.

GEOLOGY GEOCHEMISTRY GEOPHYSICS Golden, Colorado 80401

303-279-7733

SPECTROCHEMICAL ANALYSES

TO:

DATE: Oct 9, 1967

SAMPLE DESCRIPTION: Hell Hole

PURCHASE ORDER:

ATTN:

REFER TO FILM: 600

Method 479

Elements

Sample	Lab No.		% Ag	% Zn	% Pb						
Fe Line	✓1D						Iowa Gulch				
H.T. #2	✓1U										
	2D						Diamond Drill Hole				
IG-2-5 32-37	✓2U				Low						
37-42	✓3D										
42-47	✓3U										
47-52	✓4D										
52-57	✓4U										
57-62	✓5D										
62-67	✓5U		2.0	0.5			Sludge Samples				
67-72	✓6D		2.0	0.4							
	6U										
72-77	✓7D		2.0	0.5							
77-82	✓7U		2.5	0.4							
	8D										
B Vein IG-2 17-21	✓8U		1.0								
C Vein IG-2 62-73	✓9D		2.0	0.4			Vein Samples				
73-82	✓9U		2.5	0.4							
WET 73-82	✓10D		2.5	0.3							
	10U										
HT #4	✓11D										
Fe Line	✓11U										
	12D										
	12U										
	13D										
	13U										
	14D										
	14U										
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	25D										
	25U										
Lower Limit Detection											

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EARTH SCIENCES INC.

GEOLOGY **GEOCHEMISTRY** **GEOPHYSICS** Golden, Colorado 80401

303-279-7733

SPECTROCHEMICAL ANALYSES

TO:

DATE: October 26, 1967

SAMPLE DESCRIPTION: Sugar Loaf and Iowa Gulch "Jade"

PURCHASE ORDER:

REFER TO FILM: 617

ATTN: Method 560

Sample	Lab No.	Na	Ca	Mg							
Feline	1D										
	1U										
15+00W	2D										
15+50W	2U										
16+00W	3D										
16+50W	3U										
17+00W	4D										
17+50W	4U										
18+16W	5D										
18+50W	5U										
19+00W	6D										
19+50W	6U										
	7D										
20+00W	7U										
20+50W	8D										
21+00W	8U										
21+50W	9D										
22+00W	9U										
22+50W	10D										
23+00W	10U										
23+50W	11D										
	11U										
	12D										
Ken's Jade Sample	12U	2000	≥ 2%	1500							
	13D										
500 ppm Sul Std.	13U	400	500	500							
	14D	7500									
	14U										
	15D										
	15U										
	16D		Ag								
82-90	16U		0.6								
90-100	17D										
100-110	17U										
110-120	18D										
120-130	18U										
130-140	19D										
140-150	19U										
	20D										
H.T. # 2 Std	20U										
H.T. # 4 Std.	21D										
	21U										
Feline	22D										
	22U										
	23D										
	23U										
	24D										
	24U										
	25D										
	25U										
Lower Limit Detection											

2.7A

SL-A

2.7A

IG-2

Box 12

2.7A

Method 479

Iowa Gulch Diamond Drill Hole

Remarks: 1. — not detected.
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EARTH SCIENCES, INC.

GEOLOGY GEOCHEMISTRY GEOPHYSICS Golden, Colorado 80401

303-279-7733

SPECTROCHEMICAL ANALYSES

TO: Bill Walker
Iowa Gulch
HDD1 (Hilda)

ATTN:

DATE: Dec, 18, 1967
SAMPLE DESCRIPTION: Hilltop
PURCHASE ORDER:
REFER TO FILM: #666

Sample	Lab No.		Ag	Zn	Pb	Elements					
Fe-line	✓ 1D										
	— 1U										
HT #2	✓ 2D										
	— 2U										
HILDA HDD1 0-10	✓ 3D										
10-20	✓ 3U										
20-40	✓ 4D										
40-49	✓ 4U										
2.9 A 50-60	✓ 5D										
60-70	✓ 5U										
70-80	✓ 6D										
80-90	✓ 6U										
90-100	✓ 7D										
100-110	✓ 7U										
110-120	✓ 8D										
	— 8U										
IOWA GULCH 2 150-160	✓ 9D										
160-170	— 9U		0.4								
170-180	— 10D										
180-190	✓ 10U										
190-200	✓ 11D										
200-210	✓ 11U		0.4								
210-219	✓ 12D		0.5								
	— 12U										
HT #4	✓ 13D										
	— 13U										
Fe-line	✓ 14D										
	14U										
	15D										
	15U										
	16D										
	16U										
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	25D										
	25U										
Lower Limit Detection											

Iowa Gulch Hole

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4. Reported value within ..... of true value.

EARTH SCIENCES, INC.

GEOLOGY GEOCHEMISTRY GEOPHYSICS Golden, Colorado 80401

303-279-7733

3144

February 26, 1968

Mr. J. William Hasler
Field Officer, Region III
Office of Minerals Exploration
U.S. Geological Survey
Federal Center
Denver, Colorado 80225

Re: Leadville Lead Proposal of 2/67
Docket No. OME 6615

Dear Bill:

Enclosed is an additional core drilling bid from Joy Manufacturing Company. Since none of the companies who have bid can individually furnish the 5 rigs required for the job, we will probably have to use all three. Boyles has indicated that they can supply one or two. Sprague and Henwood indicated it could supply two and Joy has indicated one. Boyles has high footage rates and low mobilization charges relative to the other two. Inserting the Sprague and Henwood Inc. and Joy Manufacturing Co. figures in the estimated cost breakdown shown on pages 2 and 3 of the January 23 addendum gives the following:

	Boyles Brothers	Sprague & Henwood	Joy Manufact.
Total cost of Independent contract items 1 through 12 excluding item 10.	$77,141.75	$73,095.24	$75,217.00
Cost of average hole (figures above divided by five)	$15,428.35	$14,619.05	$15,043.40
Average cost per foot in average hole (first figure divided by total footage)	$13.84/ft	$13.12/ft.	$13.50/ft.

Boyles bid has a disadvantage in that they make the customer liable for lost steel. I took this into account in estimating the program cost with their bid (item 5).

Sprague and Henwood have an advantage in that they submitted a casing cost per foot rather than an hourly rate.

As it stands now, I believe Sprague and Henwood should be put on holes IG-3 and IG-4 (1500 ft. each); Joy on hole IG-1 (1300 ft.) and Boyles on holes IG-5 (1200 ft.) and IG-2 (700 ft.).

Sincerely,

Duane

Duane N. Bloom

EARTH SCIENCES, INC.

GEOLOGY GEOCHEMISTRY GEOPHYSICS Golden, Colorado 80401

303-279-7733

February 2, 1968

Mr. Albert Latham
Vice President
First National Bank of Denver
Denver, Colorado

Dear Mr. Latham:

Work on the Leadville Lead Corporation tonnage and grade calculations is nearing completion. This letter will give you a brief description of the Hilltop reserves to date. A more detailed and complete report, including maps and grade calculation data sheets, is being prepared for Leadville Lead and should be completed by February 10. Please contact me if you will want a copy.

The Hilltop reserves have been broken into three categories; reserves drilled to development stage, indicated reserves and inferred reserves. Reserves drilled to development stage consist of ore which has been drilled enough to prepare to mine it. Indicated reserves consist of ore which needs further drilling prior to/or during development to aid in extraction or grade control. Inferred reserves are bodies with only one or two holes penetrating them and for which only rough estimates can be made as to size and shape. Inferred reserves must be considered still in the exploration stage.

Reserves drilled to development stage:

1. New Hilltop body. The Hilltop ore body contains 154,381 tons of ore with a grade of 0.034 oz/T. gold, 3.68 oz/T. silver, 0.144% Copper, 4.04% lead and 5.53%/zinc.

2. Last Hope vein (1038 extension) Grade calculations are not complete as 120' of drilling is left on this vein and several holes are awaiting assay results. Tonnage calculations suggest there is 21,307 tons of ore on the northern extension of the 1038 area.

Indicated Reserves:

1. McGillis vein. Only the south end has been drilled extensively indicating a reserve of 6,138 tons with a grade of 0.05 oz/T gold, 9.95 oz/T. silver, 0.13% copper, 1.01% lead, and 0.18% zinc.

2. Stewart-Fulton vein system. This old stope shows several areas with ore grade material but it is not continuous as was the Hilltop vein. There is a total of 7,914 tons of ore on this vein with the grade varying through each section.

3. Last Hope Vein (between McGillis & 1038). This segment of the Last Hope lacks 1 drill hole of being complete. For the part which is complete we have 6,938 tons of ore with a grade of 0.044 oz/T. gold, 7.01 oz/T. silver, 0.15% copper, 1.74% lead, and 0.14% zinc. If the vein continues as expected, there will be another 4000 tons of similar grade ore to be added to this vein.

4. Dump Material. Several studies of the dumps in the Hilltop area indicate a tonnage of 40,000 tons of vein material of better than $20 gross metal value.

Inferred Reserves:

1. West Hilltop vein. Located 30-70' west of the Hilltop vein, this vein has 2 intersections 600 ft. apart. The inferred tonnage is 50,400 tons with a grade of 0.018 oz/T. gold, 2.76 oz/T. silver, 0.133% copper, 2.92% lead & 0.71% zinc.

2. South extension of the 1038B. One intercept 450 ft. south of the present workings indicate that this vein carries through. The estimated tonnage is 8,280 tons with a grade of 0.03 oz/T. gold, 4.77 oz/T. silver, 0.104% copper, 2.90% lead, & 1.40% zinc.

3. Hilltop Shaft vein. A small vein but easily accessible, it has 200 tons of 0.08 oz/T. gold, 16.12 oz/T. silver, 0.228% copper, 1.62% lead, & 1.50% zinc.

4. Vein between McGillis & Last Hope. One intercept which gives 3000 tons of 0.034 oz/T. gold, 5.09 oz/T. silver, 0.19% copper, 1.06% lead & 0.11% zinc.

5. 115 Level veins. Two veins have been found above the 4 Mile Fault. One shows 4200 tons with 1.59 oz/T. silver, 7.40% lead, & 0.14% zinc. No gold or copper assays were run. The second vein has 1200 tons of ore with 7.64 oz/T. silver and only a trace of lead. No other assays were run.

To date the exploration program at Hilltop has located 175,688 tons of ore which has been drilled to development stage. Drilling resulted in 20,990 tons of indicated reserves. Dump Material provides another 40,000 tons of indicated reserves. Exploration drilling of new structure gives us another 67,280 tons of inferred reserves. The total tonnage of all categories of ore reserves is 303,958 tons.

I trust that this breakdown of Leadville Lead's ore reserve picture is what you require. If there are any questions, please feel free to call.

Sincerely,

EARTH SCIENCES, INC.

W. W. Walker

W. W. Walker
Project Manager

Copy to Washington 4-12-68

EARTH SCIENCES, INC.

GEOLOGY GEOCHEMISTRY GEOPHYSICS Golden, Colorado 80401

303-279-7733

February 16, 1968

OME Region III
RECEIVED
FEB 19 1968
Denver, Colorado

Mr. J. William Hasler
Field Officer Region III
Office of Mineral Exploration
U.S. Geological Survey
Denver Federal Center
Building 25, Room 2284
Denver, Colorado 80225

Dear Bill:

Please attach the enclosed bids from Sprague & Henwood, Inc. to the Leadville Lead OME Application (Docket No. OME 6615).

Thank you,

Duane

Duane N. Bloom

Enc.

SPRAGUE & HENWOOD, Inc.
Contract Division
REGIONAL OFFICE
2151 North Redwood Road (P.O. Box 2556)
Salt Lake City 10, Utah DAvis 8-4271
DIAMOND DRILLING • MINERAL EXPLORATION • SOIL SAMPLING • PRESSURE GROUTING
S&H SINCE 1883
EXECUTIVE OFFICES & PLANT
SCRANTON, PENNSYLVANIA

February 15, 1968

OME Region III
RECEIVED
FEB 19 1968
Denver, Colorado

Earth Sciences, Inc.
Golden, Colorado 80401

Attention: Duane N. Bloom

Gentlemen:

In response to your invitation dated January 19, 1968, we offer herewith, our proposal for drilling near Leadville, Colorado in the Mt. Sherman Area.

Proposal

Item 1. Mobilization and demobilization - Lump Sum $2,760.00

Item 2. Core Drilling - Per Foot -
(S&H Wireline Equipment)

	NX	BX	AX
0 - 250' depth	$ 7.75	$ 7.60	$ 7.50
250 - 500' depth	7.90	7.75	7.65
500 - 750' depth	8.15	8.00	7.90
750 - 1000' depth	8.50	8.35	8.25
1000 - 1250' depth	8.95	8.80	8.70
1250 - 1500' depth	9.55	9.40	9.30
1500 - 1750' depth	10.30	10.15	10.05
1750 - 2000' depth	11.20	11.05	10.95
2000 - 2250' depth		12.00	11.50
2250 - 2500' depth		13.00	12.00
2500 - 2750' depth		14.00	13.00
2750 - 3000' depth		15.00	14.00

continued page 2

Earth Sciences, Inc.
Golden, Colorado 80401

February 15, 1968
Proposal continued

Item 2. continued

	NX	BX	AX
3000 - 3250' depth	$	$16.00	$15.00
3250 - 3500' depth		17.00	16.00

Item 3. Cementing and Drilling-out Cement -	Per Hour	$22.50
Item 4. Setting-up (see conditions)	Per Hour	17.00
Item 5. Reaming - All Sizes		
0 - 1000' depth	Per Foot	5.30
1000 - 2000' depth	Per Foot	6.65
2000 - 3000' depth	Per Foot	9.00
3000 - 3500' depth	Per Foot	10.00

Item 6. Casing - Per Foot -

	NX	BX
(a) Installation		
0 - 1000' depth	$0.25	$0.25
1000 - 2000' depth	0.50	0.50
2000 - 3500' depth	1.00	1.00
(b) Left in holes by request, or unable to recover	3.00	2.50

Item 7. Standby time, water or transportation delays or waiting on instructions.		
(a) With Crew	Per Hour	22.50
(b) Without Crew	Per Hour	12.50
Item 8. Deflection procedures (see Conditions)	Per Hour	22.50
Item 9. Cement, drilling mud, and additives and soluble oil.		@ Cost f.o.b. jobsite

continued page 3

Earth Sciences, Inc.
Golden, Colorado 80401

February 15, 1968
Proposal continued

Conditions

1. Set-up time will commence from unloading point until tools are on bottom, ready to advance depth. Diamond bits consumed during clean-out of previously drilled holes, will be charged to customer.

2. Item 8 - Hours chargeable will commence with retrieving tools from hole, until tools are back on bottom ready to advance depth. It is understood that all materials used in deflection procedures will be furnished by customer.

3. Water for drilling will be pumped to drillsite at no cost to contractor.

4. Customer will furnish transportation from parking area to drillsites, for drill crews, equipment and fuel.

5. Cores will be placed in containers, provided by customer, at drill sites. Further handling of cores is customer's responsibility.

6. Sprague and Henwood, Inc. will furnish 2 complete S&H #142 hydraulic core drills (skid or truck-mounted), all accessary equipment to drill to desired depths, including diamond bits, 2 full-time non-drilling supervisors, 6 two-man drill crews.

   Work schedule would be conducted on a 3-shift (8 hours) basis, 6 days per week. If hole conditions warrant continuous operation, drills would continue to operate on 7th day.

7. Due to seasonal commitments, we reserve the right to withdraw this proposal after April 15th, 1968.

We appreciate the opportunity to bid this work and trust our proposal is submitted in acceptable form.

Very truly yours,

SPRAGUE AND HENWOOD, INC.

Vincent D. Nourse

Vincent D. Nourse
Manager, Western Branch

VDN:rp

Copy to Washington 4-12-68

EARTH SCIENCES, INC.

GEOLOGY GEOCHEMISTRY GEOPHYSICS Golden, Colorado 80401

303-279-7733

OME Region III RECEIVED FEB 7 - 1968 Denver, Colorado

Bill,

Here are 2 copies of Boyles bid on the Hilltop project. They should be attached to the Leadville Lead OME application. I expect we will be able to get additional bids.

Duane

CONSULTING, RESEARCH AND SERVICES FOR MINERAL EXPLORATION

DIAMOND CORE DRILLING
DIAMOND DRILLING EQUIPMENT
GROUTING
FOUNDATION TESTING
MINING
QUARRYING
SHAFT SINKING
TUNNEL DRIVING
MINE PLANT DESIGN
AND FABRICATION

Boyles Bros. DRILLING COMPANY

CONTRACTORS-ENGINEERS-GEOLOGISTS

15865 West 5th Avenue
GOLDEN, COLORADO 80401
Phone (303) 279-7913

General Offices and Plant
1624 Pioneer Road P. O. Box 58
SALT LAKE CITY, UTAH 84110
Phone 487-7595

BRANCH OFFICES
ARIZONA (PHOENIX)
CALIFORNIA (AUBURN)
COLORADO (GOLDEN)
NEVADA (SPARKS)
WASHINGTON (SPOKANE)
CHILE (SANTIAGO)
CABLE: BOYLESBROS
MEXICO, D.F.
PERU (LIMA)
CABLE: BOYLESCOP

OME Region III
RECEIVED
FEB 7 - 1968
Denver, Colorado

January 30, 1968

Earth Sciences, Inc.
1101 Washington St.
Golden, Colorado

Attention: Mr. Duane Bloom

Dear Mr. Bloom:

We submit the following rates and conditions for your 1968 drilling program for the Hilltop Exploration project near Leadville, Colorado.

1. Mobilization of men and equipment, each rig. $500.00

2. Drilling overburden, plus bit cost, per hour. $ 17.50

3. Drilling bedrock.

	NX	BX & AX
0 to 500 feet, per foot.	$10.00	$ 8.95
500 to 1000 feet, per foot.	11.45	9.55
1000 to 1500 feet, per foot.		10.50
1500 to 2000 feet, per foot.		11.50
2000 to 2500 feet, per foot.		13.20
2500 to 2750 feet, per foot.		14.20
2750 to 3000 feet, per foot.		15.30
3000 to 3250 feet, per foot.		16.55
3250 to 3500 feet, per foot.		18.25
3500 to 3750 feet, per foot.		20.25
3750 to 4000 feet, per foot.		23.00

4. Reaming, if required.

0 to 500 feet, per foot.	$ 5.25
500 to 750 feet, per foot.	6.45
750 to 1000 feet, per foot.	6.80
1000 to 1250 feet, per foot.	7.40
1250 to 1500 feet, per foot.	8.15

5. Standby time and delays, per hour. $ 14.25

DIAMOND CORE DRILLING
DIAMOND DRILLING EQUIPMENT
GROUTING
FOUNDATION TESTING
MINING
QUARRYING
SHAFT SINKING
TUNNEL DRIVING
MINE PLANT DESIGN
AND FABRICATION

Boyles Bros.
DRILLING COMPANY
CONTRACTORS-ENGINEERS-GEOLOGISTS
15865 West 5th Avenue
GOLDEN, COLORADO 80401
Phone (303) 279-7913

General Offices and Plant
1624 Pioneer Road P. O. Box 58
SALT LAKE CITY, UTAH 84110
Phone 487-7595

BRANCH OFFICES
ARIZONA (PHOENIX)
CALIFORNIA (AUBURN)
COLORADO (GOLDEN)
NEVADA (SPARKS)
WASHINGTON (SPOKANE)
CHILE (SANTIAGO)
CABLE: BOYLESBROS
MEXICO, D.F.
PERU (LIMA)
CABLE: BOYLESCOP

6. Drilling ice out of holes and working on frozen in rods, per hour. $ 17.50

7. Cementing time, and Casing time plus cost of cement, packers, drilling mud, additives, & antifreeze solutions, per hour. $ 17.50

8. Casing and drill rods lost in hole, will be charged at our cost, at the job site.

9. Setting up, tearing down and moving for a two man crew, per hour. $ 14.25

10. Rig time for deflecting, plus cost of all materials and supplies, including bits, per hour. 22.50

11. Technical engineer for deflections, to be furnished at no cost to Boyles Bros.

12. Water to be furnished at drill site, at no cost to Boyles Bros.

13. Vehicles for transporting crews from automobile road to drill sites, will be charged at our cost of rental rates, fuel and maintaince, or may be furnished by Earth Sciences, Inc.

Very truly yours,

BOYLES BROS. DRILLING COMPANY

George E. Lensch

George E. Lensch, District Manager

Copy sent to Washington 1-12-68
sent to all contractors
in area

OME Re
RECEIVED
JAN 26 1968
Denver, Colorado

REQUEST FOR DIAMOND DRILLING BID

The Leadville Lead Corporation is planning to have five core holes drilled, totaling between 5000 and 17,500 feet, in the area of Mt. Sherman, 6 miles west of Leadville, Colorado. Each hole will be between 1000 and 3500 ft. long, and will plunge approximately -15° from the horizontal. Sites are located at an elevation of approximately 13,000 ft. Prior to moving the core drilling rigs on site, it is planned that each hole will be drilled by rotary percussion to a depth of between 100 ft. and 200 ft. and cased with iron casing having an inside diameter of 3.07 inches. A three legged tripod will have been erected for pulling 20 ft. rods, and a concrete slab will have been poured to accomodate the drill rig. Transportation between the drill site and a county maintained road will be furnished for men, fuel and materials. Water will be pumped to a 500 gallon tank located at each site.

The holes will be drilled in the Leadville formation. A nearly pure, fine grained dolomite.

At certain intervals, it is expected that the holes will be deflected by normal whipstocking procedures. When this is done, the deflections will be controlled by a representative of the company and materials, including expansion packers, whipstocks, bits, etc., will be at no cost to the drill contractor.

Core drilling is expected to commence with 5 rigs between June 1, 1968 and June 15, 1968, and will continue around the clock until the job is finished.

Bids are solicited for this project including the following items:

1. Mobilization and demobilization.
2. Set up cost/hour
3. Drilling cost/ft. for AX, BX, NX, and NXC cores from 0 to 3500 ft. divided into 250 ft. intervals.
4. Grouting and drilling grout cost/hour.
5. Reaming, cost/ft. for AX, BX, NX and NXC hole broken into 250 ft. intervals.
6. Casing cost/ft. for AX, BX, NX, and NXC cores from 0 to 3500 ft. divided into 250 ft. intervals
7. Standby time due to lack of water at the site or transportation, or on company instructions with crews on site.
8. Standby time with crews not on site.
9. Trip time for setting wedges, etc., for deflections.

Copy sent to Washington 1-29-68

EARTH SCIENCES, INC.

GEOLOGY GEOCHEMISTRY GEOPHYSICS Golden, Colorado 80401

303-279-7633

OME Region
RECEIVED
JAN 26 1968
Denver, Colorado

January 23, 1968

Mr. J. William Hasler
Field Officer Region III
Office of Mineral Exploration
U.S. Geological Survey
Denver Federal Center
Building 25, Room 2284
Denver, Colorado 80225

Dear Bill:

During our meeting with Mr. Johnson and members of the OME technical staff in Washington D.C., it was suggested that the Leadville Lead application for OME assistance (Docket No. OME-6615) be revised. It was stated that it would be desirable to apply only for the first stage drilling described in the addendum of November 27, 1967. In the event that this stage is successful, Mr. Johnson indicated that continued assistance could be made for the program outlined in the proposal of February 2, 1967. The Leadville Lead Corp. would have to carry the expense of the program while the application for extension was peing processed. However, it was stated, the OME would recover the expenses incurred during consideration of the extension request if ultimately approved. It was also suggested that application to extend a program in progress would be expedited so that the time lag would not be unduly deleterious to the program.

In my letter of November 27, 1967, I noted the progress we had made in the program to that date. About that time, during a lull in the weather, we moved an air track rotary percussion rig to the area of drill hole IG-2 to intersect the mineralized structures found by IG-2. The first rotary hole was located 120' south of IG-2 and intersected 40' of low grade mineralization thus providing a strike on the vein. A -60° hole was then drilled which had to be abandoned prior to completion, because of weather. The last 5 feet of this hole showed marginal ore grade mineralization. It appears that the odds of establishing a significant tonnage of ore on this structure are very good.

We feel that the work last fall contributed valuable knowledge which will materially help us to accomplish the objectives of the program. The following items may be noted:

1. Water supply, weather and road conditions necessitate that all activity in the area be accomplished between May 15 and Oct. 1.

2. The initial 100 ft. of each hole will be difficult to core drill because of intense near surface fracturing. Rotary percussion drilling through this zone is relatively easy, much less expensive and 5 times as fast.

3. It appears that the attitude of a core hole, with respect to the bedding, can be determined by careful inspection of the core, including analysis of oriented thin sections.

4. Preparation of sites and set up of the drills is more difficult and costly than originally anticipated due to high altitude and a larger amount of slide rock than we originally estimated in the area of IG-1 and IG-4.

5. Drilling should be conducted around the clock, seven days per week to gain maximum efficiency under the freezing conditions encountered.

6. Hole deflections to gain additional intercepts on mineralized structures should be accomplished at the last stage of the program with the deepest deflections attempted first. This will take some of the risk of losing the hole during deflection procedures off of the project.

7. Water should be pumped to a reservoir near the site of IG-1 and fed by gravity to 500 gallon reservoirs at the remaining sites. This will be cheaper and safer than trucking, saving wear and tear on the road, the cost of a truck and a driver, and make water availability more certain.

Taking into account that the OME staff has indicated that the proposed program should be designed to test individual targets in the shear zone, the program has been altered so that the maximum number of specific targets are tested for the least cost. This can be accomplished by drilling IG-1 1300 ft.,

IG-2 1700 ft., IG-3 1500 ft., IG-4 1500 ft. and IG-5 1200 ft. The 6200 ft. of drilling will thus test 22 targets. Since it is planned that the first 100 ft. of IG-1 and IG-3-5 be drilled by rotary percussion and IG-2 is already drilled to 229 ft., the program would thus entail 5,571 ft. of additional core drilling.

The Leadville Lead Corp. has the funds available to rehabilitate and finish putting in the access road, construct the sites and install the water supply system, drill each hole to a depth of 100 ft. and case for NX
It is felt that this can be accomplished so that core rigs can be moved on site between June 1 and June 15, 1968. The company would like to obtain initial OME assistance to core drill 5,571 ft. The estimated cost of the program is as shown in the enclosed addendum.

As you know, our exploration-development drilling in the area of the old workings is continuing through the winter. Our success ratio has been excellent. It appears certain that if we can prove a single ore bearing structure in the area north of the old workings during the summer drilling progrm, the company will have the funds to begin development of the entire area from the west slope during 1968. Mine plant, beneficiation and surface transportation studies are now being conducted and should allow the mine to go into full production in late 1969 or early 1970.

Sincerely,

Duane

Duane N. Bloom

Enc.

Copy sent to Washington ~~1-29-68~~ 4-12-68

EARTH SCIENCES, INC.

GEOLOGY GEOCHEMISTRY GEOPHYSICS Golden, Colorado 80401

303-279-7733

January 23, 1968

Dear Bill,

I've been holding back on sending in an amended request, hoping to receive contractor bids. Time is running out to get this thing in motion, so rather than wait any longer I'm enclosing a copy of the request for participation in an amended program with an estimate of the costs. When I receive bids from the contractors I will forward you the originals with the figures typed in. Perhaps this will at least start the ball rolling.

Sincerely,

Duane

Duane N. Bloom

OME Region III
RECEIVED
JAN 26 1968
Denver, Colorado

Copy sent to Washington ~~1-29-68~~ 4-12-68
sent to all contractors in area

OME Re
RECEIVED
JAN 28 1968
Salida, Colorado

REQUEST FOR DIAMOND DRILLING BID

The Leadville Lead Corporation is planning to have five core holes drilled, totaling between 5000 and 17,500 feet, in the area of Mt. Sherman, 6 miles west of Leadville, Colorado. Each hole will be between 1000 and 3500 ft. long, and will plunge approximately -15° from the horizontal. Sites are located at an elevation of approximately 13,000 ft. Prior to moving the core drilling rigs on site, it is planned that each hole will be drilled by rotary percussion to a depth of between 100 ft. and 200 ft. and cased with iron casing having an inside diameter of 3.07 inches. A three legged tripod will have been erected for pulling 20 ft. rods, and a concrete slab will have been poured to accomodate the drill rig. Transportation between the drill site and a county maintained road will be furnished for men, fuel and materials. Water will be pumped to a 500 gallon tank located at each site.

The holes will be drilled in the Leadville formation. A nearly pure, fine grained dolomite.

At certain intervals, it is expected that the holes will be deflected by normal whipstocking procedures. When this is done, the deflections will be controlled by a representative of the company and materials, including expansion packers, whipstocks, bits, etc., will be at no cost to the drill contractor.

Core drilling is expected to commence with 5 rigs between June 1, 1968 and June 15, 1968, and will continue around the clock until the job is finished.

Bids are solicited for this project including the following items:

1. Mobilization and demobilization.
2. Set up cost/hour
3. Drilling cost/ft. for AX, BX, NX, and NXC cores from 0 to 3500 ft. divided into 250 ft. intervals.
4. Grouting and drilling grout cost/hour.
5. Reaming, cost/ft. for AX, BX, NX and NXC hole broken into 250 ft. intervals.
6. Casing cost/ft. for AX, BX, NX, and NXC cores from 0 to 3500 ft. divided into 250 ft. intervals
7. Standby time due to lack of water at the site or transportation, or on company instructions with crews on site.
8. Standby time with crews not on site.
9. Trip time for setting wedges, etc., for deflections.

Copy sent to Washington 1-29-68

EARTH SCIENCES, INC.

GEOLOGY GEOCHEMISTRY GEOPHYSICS Golden, Colorado 80401

303-279-7733

January 23, 1968

OME Region I
RECEIVED
JAN 26 1968
Denver, Colorado

Mr. J. William Hasler
Field Officer Region III
Office of Mineral Exploration
U.S. Geological Survey
Denver Federal Center
Building 25, Room 2284
Denver, Colorado 80225

ADDENDUM TO LEADVILLE LEAD PROPOSAL
OF 2/67 (DOCKET NO. OME 6615)

The discussions we have had with the OME technical staff, the necessity of utilizing new bids and the subsequent experience we gained in the area have made it desirable to modify the Leadville Lead application for exploration assistance.

It is proposed that the program be altered to provide for 5 diamond drill holes with a total length of 5,571 ft. and located as shown on the enclosed map. The holes will start in the "ore horizon" of the Leadville formation and be oriented east, down the dip of the host rock (approximately -15°). The holes will be controlled to remain in the ore horizon by directional drilling techniques. The 5 holes will be spaced between 650 ft. and 750 ft. apart, the southern most station being approximately 900 feet north of the Hilltop Mine workings. The holes will vary from 700 to 1500 ft. in length and are expected to intersect potential ore bearing structures 22 times as shown on the enclosed cross sections. The Leadville Lead corporation will bear the expense of providing access to the area, preparing the sites, constructing facilities for obtaining drill water and putting cased holes into each site to a depth of approximately 100 feet. Request is made for OME assistance to extend each of these holes to the following depths:

IG-1	1300 ft.
IG-2	700 ft.
IG-3	1500 ft.
IG-4	1500 ft.
IG-5	1200 ft.

It is expected that the advance preparation for core drilling will be completed between June 1 and June 15, 1968. Drilling should be carried on around the clock on a 7-day week until completed. Past experience suggests that each rig will average approximately 60 ft./day; thus the program should be completed 31 days after moving on site (set up and teardown - 4 days, drilling - 25 days, miscellaneous down time - 2 days).

ESTIMATE OF COSTS

Assumptions

1. 100 hours cementing time/2000 ft. of drilling.
2. The holes will have to be deflected one time for each 500 ft. drilled to remain in the "ore horizon" and the average deflection will require 4 hours rig time.

a. Independent contracts

1. Mobilization and demobilization of 5 surface drilling units @ $500/unit — $2500.00

2. Set up and tear down 5 units 160 hours @ — = 2016.00

3. Diamond core drilling
   a. 100-250 ft. 4 holes, 229-250 ft. 1 hole, 621 ft. NX wl @

   b. 250-500 ft. 5 holes 1250 ft. NX wl @

   c. 500-750 ft. 4 holes, 500-700 ft. 1 hole 1200 ft. BX wl @

   d. 750-1000 ft. 4 holes 1000 ft. BX wl @

   e. 1000-1250 ft. 3 holes, 1000-1200 ft. 1 hole 950 ft. BX wl @

   f. 1250-1500 ft. 2 holes 1250-1300 ft. 1 hole 550 ft. BX wl @ — = 50,139.00

4. Lost casing

   a. 400 ft. of NX casing @ $28.00/10 ft. — $1120.00

   b. 1000 ft. of BX casing @ $18.15/10 ft. — $1815.00

5. Lost rods

   a. 1000 ft. BX rod @ $19.35/10 ft. — $1935.00

6. Cement and hole plugging agents 50¢/ft. drilled
   5,571 ft x 50¢ — $2785.50

7. Cementing and redrilling
   1 hr/20 ft. drilled
   $\frac{5,571 \text{ ft.}}{20} \cong 279$ hrs @ — ≃ 4,350.00

8. Rig time casing
   1 hr./80 ft. drilled
   $\frac{5,571 \text{ ft.}}{80} \cong 70$ hrs @ — ≃ 1,100.00

9. Card board core boxes
   557 boxes @ $1.00/box — $ 557.00

10. Hole deflections (includes engineer, tools, and bits).
    1 deflection/500 ft.
    $\frac{5571 \text{ ft.}}{500} \cong 11$ deflections
    @ $650/deflection — $7150.00

11. Rig time for hole deflections
    11 deflections x 4 hrs. each
    44 hrs. @ — ≃ 970.00

12. Standby time miscellaneous (water, road problems etc.)
    1 hr. per 50 ft. drilled
    $\frac{5571 \text{ ft.}}{50} \cong 111$ hrs. — ≃ 1,400.00

b. Personal services

1. Senior geological engineer
35 days @ $93.40/day (includes $75/day fee, 20 miles @ $.12/mile round trip from Leadville and $16 per diem) $3269.00

2. Two Senior field technicians
35 days @ $61.00/man day (includes $75/day fee, 20 miles @ $.12/mile round trip from Leadville and $16 per diem) $3660.00

3. Draftsman
40 hours @ $5.00/hr. $ 200.00

c. Operating materials and supplies

1. fuel for water pump
20 gal/day for 30 days
600 gals @ 35¢/gal $ 210.00

d. Operating equipment

1. "Eastman Single Shot" survey instrument. 30 days @ $75/5 days +$8/day over 5 days $ 275.00

2. Field office (rental)
30 days @ $5/day + $100 moving costs $ 250.00

3. Water pump rental
30 days @ $20/day $ 600.00

4. two 4-wheel drive vehicles
30 days/vehicle @ $10/day/vehicle $ 600.00
600 miles @ 25¢/mile $ 150.00

e. Initial rehabilitation and repairs none

f. New buildings, fixtures, installations none

g. Miscellaneous

1. spectrographic analyses for five elements
5 ft. samples $\frac{5571}{5} \cong 1114$ samples
@ $2.50/sample $2785.00

2. assays 5 assays/target, 22 targets
110 assays for 5 elements @ $7 — $ 770.00

3. thin sections
one thin section/100 ft.
$\frac{5571}{100} \cong 56$ thin sections @ $3 — $ 168.00

4. reproductions and drafting supplies — $ 50.00

TOTAL ≃ $90,824.

TOTAL OME PARTICIPATION REQUESTED 62½% ≃ $57,000

LEADVILLE LEAD PARTICIPATION 37½% ≃ $34,000

DIAMOND CORE DRILLING
DIAMOND DRILLING EQUIPMENT
GROUTING
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SHAFT SINKING
TUNNEL DRIVING
MINE PLANT DESIGN
AND FABRICATION

Boyles Bros.
DRILLING COMPANY
CONTRACTORS-ENGINEERS-GEOLOGISTS
15865 West 5th Avenue
GOLDEN, COLORADO 80401
Phone (303) 279-7913

General Offices and Plant
1624 Pioneer Road P. O. Box 58
SALT LAKE CITY, UTAH 84110
Phone 487-7595

BRANCH OFFICES
ARIZONA (PHOENIX)
CALIFORNIA (AUBURN)
COLORADO (GOLDEN)
NEVADA (SPARKS)
WASHINGTON (SPOKANE)
CHILE (SANTIAGO)
CABLE: BOYLESBROS
MEXICO, D.F.
PERU (LIMA)
CABLE: BOYLESCOP

July 24, 1967

Mr. Duane Bloom
Earth Sciences, Inc.
1101 Washington St.
Golden, Colorado 80401

Dear Mr. Bloom:

This letter will serve to clearify items 1 and 6 in my letter, dated March 10, 1967.

1. Demobilization is included in the rate of $500.00 for each rig.

6. Drilling cement will be charged at the rate of $15.50 per hour, this is considered cementing.

Cardboard core boxes to hold ten feet of core each are $1.00 each.

Very truly yours,

BOYLES BROS. DRILLING COMPANY

George E. Lensch

George E. Lensch, District Manager

JUL 25 1967

DIAMOND CORE DRILLING
DIAMOND DRILLING EQUIPMENT
GROUTING
FOUNDATION TESTING
MINING
QUARRYING
SHAFT SINKING
TUNNEL DRIVING
MINE PLANT DESIGN
AND FABRICATION

BOVIE BROS.
DRILLING COMPANY
CONTRACTORS - ENGINEERS - GEOLOGISTS

15865 W. 5th. Ave.
Golden, Colorado 80401
Phones: Alpine 5-9244
Alpine 5-0855

General Offices and Plant
1624 Pioneer Road P. O. Box 58
SALT LAKE CITY 10, UTAH
HUnter 7-7595

BRANCH OFFICES
PHOENIX
RENO
SPOKANE
DENVER
SACRAMENTO
ST. LOUIS

March 10, 1967

Mr. Duane Bloom
Earth Science, Inc.
1101 Washington Street
Golden, Colorado

Dear Sir:

We submit the following rates and conditions for your surface drilling program at the Mt. Champion mine area, near Leadville, Colorado, for the Hilltop Exploration project.

1. Mobilization of men and equipment - each rig. $ 500.00

2. Drilling overburden - per linear foot. 9.10

3. Drilling bedrock:

	NX	BX and AX	
0 - 500	$ 8.70	$ 7.90	
500 - 1000	9.90	8.40	8.95
1000 - 1500		9.20	
1500 - 2000		10.30	
2000 - 2500		11.80	
2500 - 2750		12.60	
2750 - 3000		13.60	13.75
3000 - 3250		14.70	
3250 - 3500		16.05	
3500 - 3750		17.65	
3750 - 4000		19.60	

4. Reaming:

0 - 500 feet - per foot	$ 4.60
500 - 1000 feet - per foot	5.80
1000 - 1500 feet - per foot	7.00

5. Standby time and delays - per hour $ 12.60

6. Cementing plus cost of cement, drill mud and packers - $ 15.50

7. Casing and drill rods lost in hole will be charged at our cost at job site.

8. Setting up, tearing down and moving, per two man crew - per hour $ 12.60

9. Timber for setup will be charged at our cost at job site.

10. Rig time for deflections will be charged at $ 22.00 per hour, plus cost of diamond bits, packers, wedges, survey instrument, all special equipment and technical engineer to run tools. We further estimate the cost of a deflection to be $ 660.00 plus the cost of engineer to run tools. Technical engineer, if requested, would be charged for at the rate of $ 100.00 per day plus living and travel expences.

11. Water to be furnished at the drill site free of charge, or could be furnished by Boyles Bros.. Our cost of truck rental is $ 220.00 per month plus .12¢ per mile and the drivers wages and payroll taxes.

With a very busy season ahead and the unavailability of equipment and trained personnel to supply the demand, it may be difficult to supply more than one rig for this operation.

We would appreciate immediate notice of acceptance to enable us to schedule as much equipment and personnel as possible to satisfy your needs.

We appreciate your interest in our Company and would strive to supply your needs to the best of our ability.

Very truly yours,

BOYLES BROS. DRILLING COMPANY

George E. Lensch

George E. Lensch, District Manager

GEL/bf

Nu-Mine Coal Company, Inc.

BOX 419

GUNNISON, COLO. 81230

PHONE: 641-0694

March 18, 1967

MAR 20 1967

Earth Sciences
Golden, Colorado

Attention: Duane Bloom

Dear Duane,

I am hereby submitting my bid for the work as per our telephone conversation on the access road eight miles East of Leadville, Colorado.

As you will notice the cost is somewhat higher than last year because of the rise in operating cost, but have tried to keep it within reason.

173 HP. H. D. 16 Allis Chalmers dozer (140- 200 hrs.)	$18.00 per hrs.
Backhoe	12.00 per hr.
Compressor, Ingersoll Rand 125 cfm Rotary Drill Gardner Denver 55 # 7/8" chuck and two men to operate. (includes steel, bits, hose,) (This does not include powder and caps.)	15.00 per hr.
Moving charge (one way) (We feel that we can afford to move out for no charge on this amount of work)	150.00

Thank you for the opportunity to bid on this. Hope to see you in Mid-June.

Yours very truly,

NU-MINE COAL COMPANY, INC.

Robert L. Vinson

Robert L. Vinson (Washington mine)

RV/iv

July 25, 1967

BID ON ROADWORK

To: Earth Sciences, Inc.
1101 Washington Ave.
Golden, Colorado

From: Wayne L. Jensen
12505 W. 44th Ave.
Wheatridge, Colorado 80033

Breakdown of cost per hour using D-6 Cat.

0-100 hrs. is $18.00 per hour.

101-200 hrs. is $16.00 per hour.

201-300 hrs. is $14.00 per hour.

D-6 Cat not powerful enough at 66-4p

Cost per hour on 5 exploration sites using D-6 Cat. is $16.00 per hour.

Move-in charge included in cost per hour rate providing job exceeds 100 working hours.

Approximate starting date-August 1, 1967.

Work site- 8 miles from Leadville.

JUL 26 1967

Wayne L. Jensen

Box 469
Salida, Colo.

Dear Sir:

Had a meeting with Mr Ponsi this morning, and thought I had better get you out a Quote on the work, you have asked about a Leadville.

Mr Ponsi Cat is pretty good size, and my Equipment is almost all new, and in good shape. We are sure we could do this job quite fast for you people.

He gets 20.00 per Hr for his Cat and Operator. And I get 20.00 per Hr for all equipment plus Labor. Compressor, drills Steel + Bit, Powder Caps + Fuse + Labor.

Or we can do this for you by the yard, we will furnish all Equipment for 3.00 per yard. You will probably get a Quote for less, but I am sure it will be on Smaller Equipment.

If you come down we will be real glad to talk with you, and furnish Truck

to go up to Road Site.

Hope to hear from you.

Yours Truly,

S. B. McQuade

Box 469

Salida, Colo.

The only other available whipstock engineer is with Boyles Brothers — a bid (or estimated cost) per deflection is listed as paragraph 10 on p. 2 of Boyles Bros. bid for drilling contract

EMB

DIRECTIONAL SYSTEMS, INC.

7590 W. 16TH AVE.
DENVER, COLORADO 80215
PHONE: 303 237-7872

P. O. BOX 6498
TUCSON, ARIZONA 85716

March 12, 1967

Dr. Duane N. Bloom
Earth Sciences, Inc.
Golden, Colorado 80401

Dear Dr. Bloom:

In response to your request for information regarding costs of "small bore-hole" directional drilling, I am submitting the following:

Costs per deflection utilizing the 4½ degree recoverable whipstock technique.

Instruments & whipstocker	$ 150.00
Bore-hole expansion packer	50.00
Depreciation of whipstock	50.00
Limber hookup tools	20.00
Mileage from Denver to drill site and return 12¢/mile	
Food and lodging if whipstocker retained over 8 hours at rig	
	$ 270.00 +

The use of additional tools or another whipstocking technique will necessitate an adjustment of the above. I hope this bid gives you an idea of what our costs will be for directional control of a bore-hole. I will send you under separate cover our general tool price list and service charges.

Sincerely,

J. E. Sharp

J. E. Sharp
President

D I R E C T I O N A L S Y S T E M S , I N C .

7590 W. 16th Ave.
Denver, Colorado 80215
Phone: 303 237-7872

P.O. Box 6498
Tucson, Arizona 85716

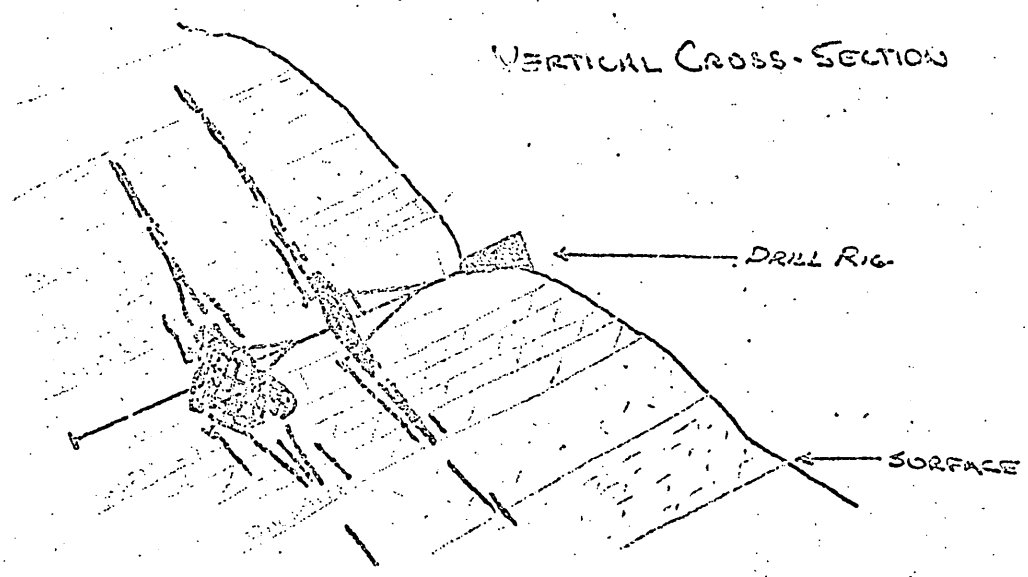
7 May 1967

DIRECTIONAL DRILLING NEWSLETTER CASE I & II

Directional Drilling and Mineral Exploration

Multiple drill holes from a single parent hole can save time and money. With proper directional control, hundreds of feet of drilling can be saved, new setups eliminated, and yet drilling objectives attained.

Case I -- A mining company is developing a series of high-grade lead-zinc-silver veins (see sketch 1). The veins intersect a gently dipping sequence of stratigraphic units consisting of shale, quartzite, limestone, and dolomite at a high angle. The economic ore occurs chiefly as replacement deposits in a relatively soft limestone adjacent to the veins. The mining company, in advance of mine development, requires accurate information on the location, attitude, thickness, and grade of the ore bodies, and the continuity of the thickness and grade of the ore parallel to the veins.

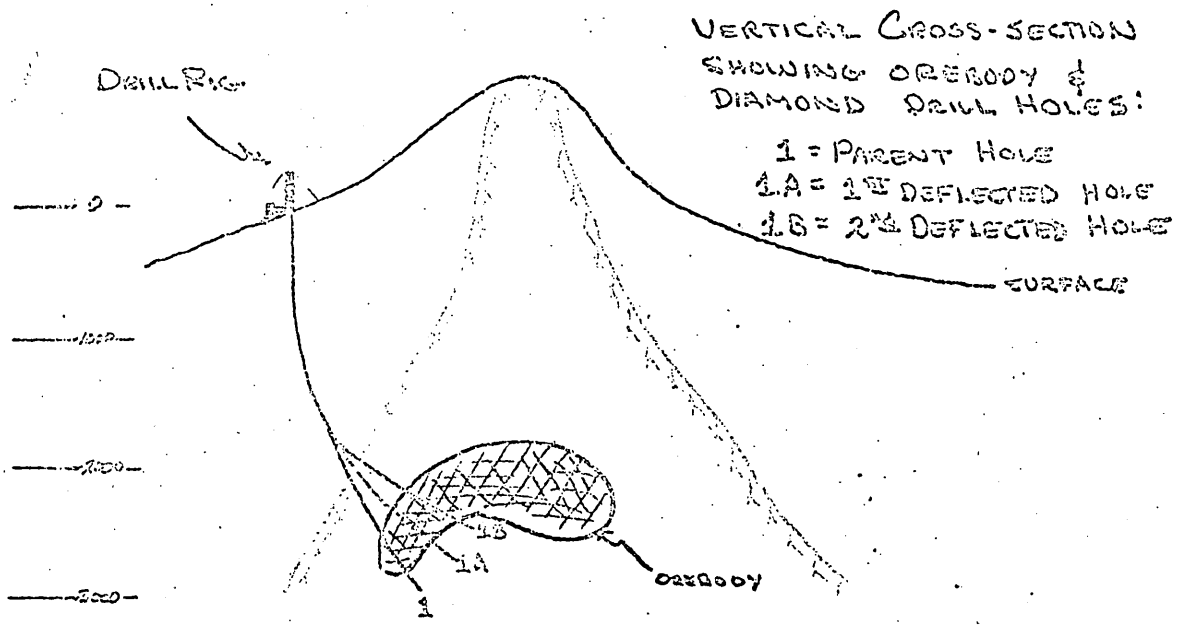


SKETCH 1

The most economic way to obtain this information would be to establish a drill rig on the outcrop of the ore-bearing unit, and to drill a core hole parallel to the dip of the unit. This core hole can be controlled so that it will intersect the first vein at the middle of the unit. Then, by use of a recoverable whipstock, additional core holes can be deflected from the parent hole in any desired direction. The recoverable whipstock can then be removed, and the parent core hole advanced and controlled to intersect the second vein.

The recoverable whipstock can again be used to deflect core holes in any desired direction. From this procedure, the attitude and grade of ore can be determined with a minimum amount of drilling, and the drilling can be restricted to the most easily drilled stratigraphic unit.

Case II -- A mining company has discovered a large disseminated ore body at an average depth of 2000 feet below the surface. For adequate grade and tonnage calculations, the company feels that core is required for analyses from holes on approximately 200 foot centers. A parent hole is drilled and controlled to intersect the ore body as shown in Sketch 2. Then by setting an expansion packer and using a whipstock and arc-cutting tools, a hole is started at the desired elevation and angled from the parent hole so that core may be taken from the ore body along line 1A as shown on Sketch 2. This procedure can be repeated one or more times and will yield equivalent information on the ore body as could be obtained from vertical holes, but each deflection saves more than 1000 feet of drilling.



SKETCH 2

The above two cases are only theoretical. Actual case histories will be published and mailed to you as they develop.

Sincerely,

James E. Sharp

D I R E C T I O N A L S Y S T E M S , I N C .

7390 W. 16th Ave.
Denver, Colorado 80215
Phone: 303 23'-7872

P.O. Box 6498
Tucson, Arizona 85716

15 May 1967

TOOLS

A brief description of the tools available from Directional Systems, Inc. and the instruments used to control small diameter drill holes follows:

1-1/2 Degree Non-recoverable Whipstock-
Bottom Hole Settings

This 1-1/2 degree Whipstock provides a 1-1/2 degree deflection from a parent hole without reduction of parent hole size. The whipstock is set in the hole by shearing a dropper bar that has been pinned to the whipstock face. The dropper bar is fitted with an orientation sleeve and pin, thus allowing orientation of the whipstock before shearing. This tool is available in Ax, Bx, and Nx sizes.

1-1/2 Degree Non-recoverable Whipstock-
Off-bottom hole setting

This 1-1/2 degree whipstock is the same as one described above except that an expansion packer is fitted to the bottom of the whipstock. The packer is pinned to the whipstock and is set by rotating the whipstock in the hole until the packer expands against the side of the hole. The whipstock is freed for orientation from the packer when the torque-shear pin is sheared after maximum expansion. The whipstock thus freed is ready for orientation. After orientation of the whipstock, it is set back down on the packer and the pinned dropper bar is sheared off the face of the whipstock. This whipstock-packer combination is available in Ax, Bx, and Nx sizes.

4-1/2 Degree Recoverable Whipstock

The 4-1/2 degree recoverable whipstock requires reduction of parent hole size. To regain hole size, reaming is required unless a reduced hole diameter is permissable. This whipstock has the advantages of a large deflection angle, and re-usability. The disadvantages are the reduction of parent hole size, and the two strings of different size drill rod required. This whipstock is available in Ax, Bx, and Nx sizes.

Arc Cutting Tools

Arc cutting tools are available in all sizes and have the distinct advantages of cutting smooth arcs. They are used in conjunction with the whipstocks described above. Arcs of 1 degree per 10 feet of hole can be cut with these tools. The disadvantages are, difficulty of directional control, inability to collect core while drilling with them, and arc predictability. These tools work exceptionally well, however, when the building of angle is desirable.

Expansion Packers

The bore-hole expansion packer can be used in conjunction with a whipstock or by itself. The expansion packers provide a solid platform upon which to set a heavy object in the hole. Multiple packers can be used to provide accurately spaced stagings within a hole. The disadvantage in using these packers is that once set in a hole, they are costly to drill out. These packers are available in Ex, Ax, Bx, and Nx sizes.

Additional Tools

Additional tools can be made up or ordered depending upon job requirements. Large bore hole equipment such as 4-1/2 inch, to 9-1/2 inch whipstocks, providing deflections up to 7 degrees can be obtained and used effectively by Directional Systems, Inc., but are not stocked as standard items.

Another tool designed to aid the geologist is our oriented core collection tool. This tool is available in Ax, Bx, and Nx sizes.

Instruments

Only the Eastman Oil Well Survey Companies, Single-Shot survey and orientation instruments are used by Directional Systems, Inc. The high accuracy, consistency, and ease of operation make this the true nucleus of directional drilling. The photographic principles utilized by this instrument provide an exacting record of engineering data and allows successful directional control. The instrument is used for bore hole surveys in any size hole at any angle. It is also used for whipstock and core orientations.

Details of prices, contract agreements, rentals, and engineering charges can be found in our current price list catalog.

D I R E C T I O N A L S Y S T E M S , I N C .

7390 W. 16th Ave.
Denver, Colorado 80215
Phone: 303 237-7872

P.O. Box 6498
Tucson, Arizona 85716

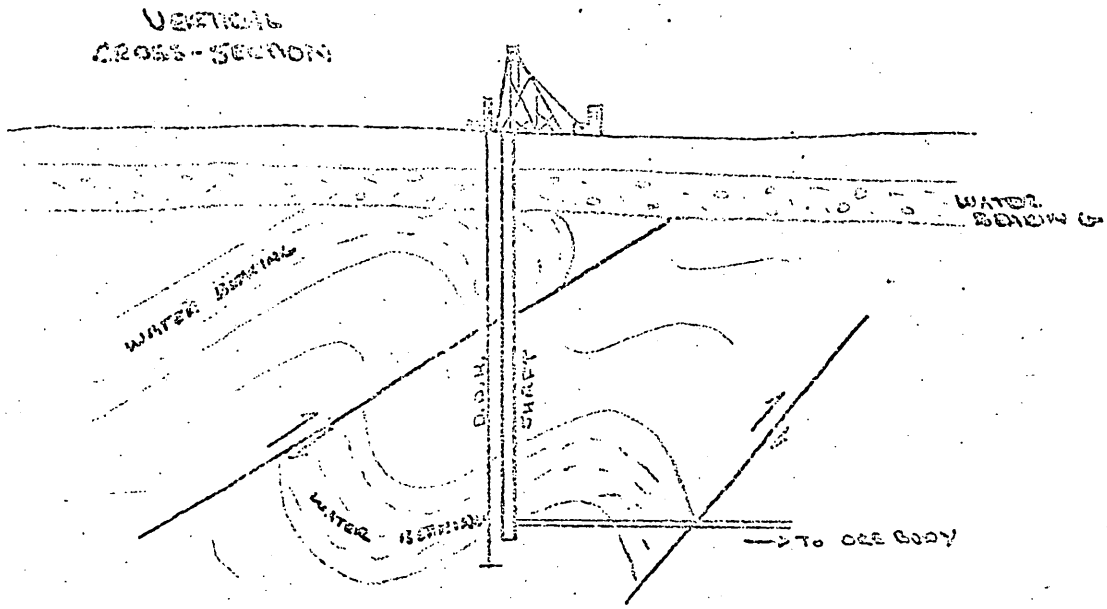
15 May 1967

DIRECTIONAL DRILLING NEWSLETTER CASE III & IV

Directional Drilling and Core Orientation for Engineering Purposes

Directional control of core holes and obtaining oriented core for engineering and geologic studies can be used for the design of underground construction, ground water drainage, grouting, and rock mechanic instrumentation.

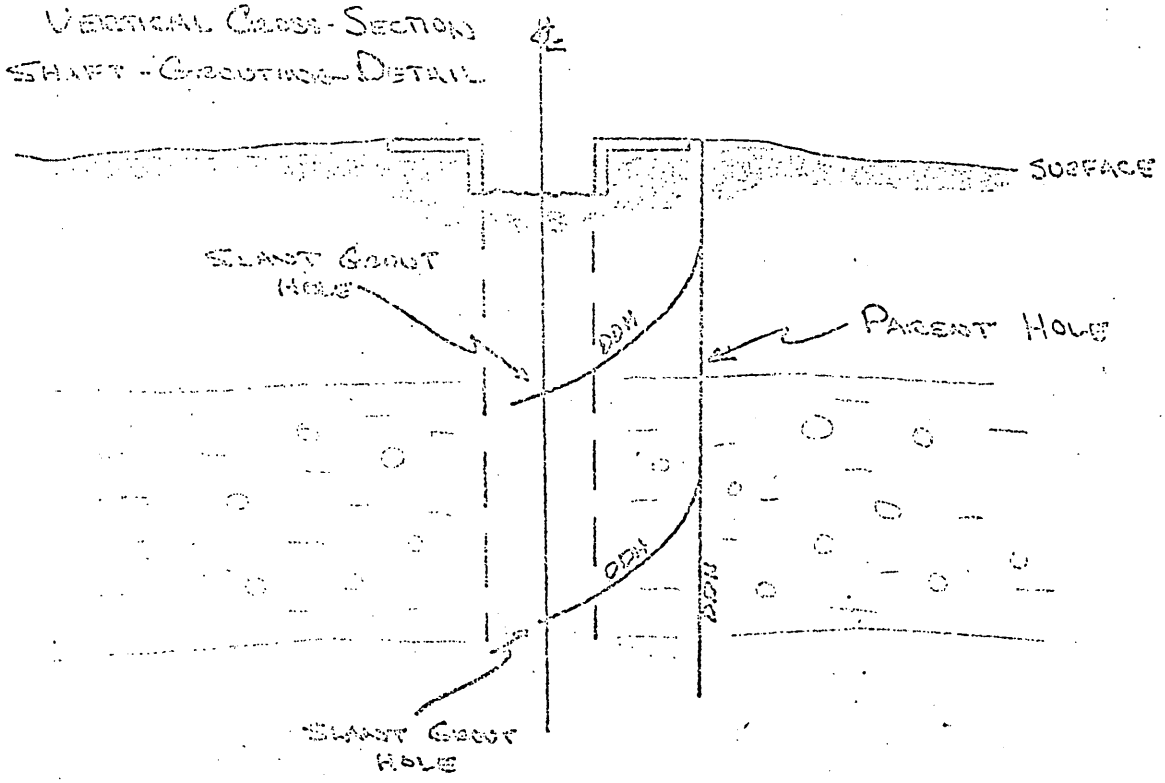
Case III --- A mining company proposes to sink a shaft to develop an ore body in a sequence of folded and faulted sedimentary rocks covered by flat-lying younger sedimentary rocks. Engineering geologic information and hydrologic information are required for the design of the shaft and for submittal to contractors for bidding purposes. In addition, it is proposed that the shaft drill hole be instrumented to determine stress distribution, and changes in stress with shaft construction, for use in the design of development workings and mining procedures. A verticle drill hole is started 30 feet from the center line of the proposed shaft, with the requirement that the hole shall not deviate by more than 1.5 feet from the vertical (Sketch 1).



SKETCH 1

With supervision from Directional Systems, Inc., the drill hole can be surveyed every 10 feet and realigned with whipstocks when the total deflection of the hole for a 60 foot interval exceeds 1.5°. Oriented core can be taken every 50 feet and at any change in lithology for structural and laboratory analysis. Hydrologic characteristics of stratigraphic units and fault zones could be tested with the use of removable expansion packers. On completion of the hole rock mechanic instruments can be installed.

Case IV — In construction of shafts, it is often desirable to grout off anticipated heavy water flows in advance of sinking. Using directional drilling of grout holes, this is possible without interferring with the shaft sinking schedule. An example is illustrated in Sketch 2.



SKETCH 2

A parent hole is drilled under control parallel to the shaft. Hydrologic characteristics of rock units or fractured zones to be encountered in shaft sinking, if not previously known, can be determined from this hole. Grouting holes at desired elevations can then be deflected from the parent hole with recoverable whipstocks and arc-cutting tools, so that grout may be pumped to seal off water in advance of shaft sinking. This can be done contemporaneous with the shaft sinking and not interfer with the sinking schedule.

The above cases are only theoretical. Actual case histories will be published and mailed to you as they develop.

Sincerely,

Jim Sharp

James E. Sharp

EARTH SCIENCES, Inc.

GEOLOGY GEOCHEMISTRY GEOPHYSICS Golden, Colorado 80401

303-279-7733

November 27, 1967

OFFICIAL COPY
O. M. E.
RECEIVED
NOV 29 1967
INITIALS CODE
delivered during Conference 11/29/67
120 P

Mr. J. William Hasler
Field Officer Region III
Office of Mineral Exploration
U.S. Geological Survey
Denver Federal Center
Building 25, Room 2284
Denver, Colorado 80225

SUBJECT: ADDENDUM TO LEADVILLE LEAD PROPOSAL OF 2/67 (Docket No. OME-6615)

Dear Bill:

The following is offered as a revised program for the Leadville Lead application for OME assistance. The revised program provides for an initial drilling stage to begin approximately June 1, 1968, consisting of five 750 ft. holes. These holes will be located in the "ore horizon" and oriented to cut faults known to be mineralized at some positions along their lengths. The holes should yield at least 16 target intersections.

The second drilling stage would extend each of the five holes to 2500 ft. This drilling should yield at least 20 additional target interesections on known mineralized faults.

An accurate estimate of the costs of this program cannot be made without contractor bids for work in the summer of 1968. However, an approximation can be made on the basis of bids submitted and costs for the 1967 field season.

1. Construction of access road 1700 ft. @ $1/ft.	$1700.00
2. Preparation of drill sites 4 sites @ $2260/site	$9040.00
3. Stage 1 drilling 4 holes drilled to 750 ft., extend 1 hole from 220 ft. to 750 ft. 3530 ft. @ $23.30/ft.	$82,249.00
Sub Total	$92,989.00

4. Stage 2 drilling
   5 holes extended from 750 ft. to 2500 ft.
   8750 ft. @ $23.30/ft. $203,875.00

Total Program $296,864.00

I feel this program would substantially reduce the exploration risk on the project. The majority of the known faults in the area of interest are within 2500 ft. of the outcrop of the ore horizon on the west slope of the Mosquito Range.

This past September we (1) put in the first 5000 ft. of access road, (2) installed a pump system (which will adequately supply the rigs with water), (3) put in a site for drill hole IG-2 and (4) drilled IG-2 to a depth of 219 ft. The road-cut exposed several faults carrying ore grade mineralization and drill hole IG-2 intersected two mineralized veins 10 ft. wide and one which is 30 ft. wide. The lead, zinc and some of the silver minerals have been leached from these veins (because of their proximity to surface). However, the gold and silver content of the gossan indicates that the veins should carry ore grade mineralization in areas where they are deeper.

We are hoping to obtain OME assistance to carry out this program during the 1968 field season.

Sincerely,

Duane N. Bloom

Duane N. Bloom

IN REPLY REFER TO:

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
FEDERAL CENTER, DENVER, COLORADO 80225

Office of Minerals Exploration

March 29, 1967

Memorandum

To: Chief, OME

From: Field Officer, Region III

Subject: Leadville Lead Corporation (Silver, gold, copper)
Hilltop Property
Park and Lake Counties, Colorado

Transmitted herewith is one copy of an application on the above-stated subject for your attention and consideration. The other copy is being retained in the Field Office files, Region III.

J. William Hasler

J. William Hasler,
Field Officer, Region III
Office of Minerals Exploration

Office of Minerals Exploration

March 28, 1967

Leadville Lead Corporation
1677 Wadsworth Boulevard
Denver, Colorado 80215

Subject: Leadville Lead Corporation(Silver, gold, copper)
Hilltop Property
Park and Lake Counties
Colorado

Dear Mr. Knecht:

One copy of your application for financial assistance in minerals exploration on the above-stated subject has been forwarded to the Washington Office of Minerals Exploration for their attention and consideration.

The other of the two copies delivered by Mr. Duane Bloom last Thursday, March 23, is being retained in the Denver Office of Minerals Exploration, Region III.

Sincerely yours,

J. William Hasler

J. William Hasler,
Field Officer, Region III
Office of Minerals Exploration

MSClark/mc/3/29/67

cc: Chief, OME
Hasler chron
OME chron
Leadville Lead Corporation Application File

EARTH SCIENCES, INC.

GEOLOGY GEOCHEMISTRY GEOPHYSICS Golden, Colorado 80401

303-279-7733

February 24, 1967

Mr. J. William Hasler
Field Officer Region III
Office of Minerals Exploration
U. S. Geological Survey
Denver Federal Center
Building 25, Room 2284
Denver, Colorado 80225

Dear Mr. Hasler:

Enclosed are two copies of the Leadville Lead Corporation OME proposal. The large exhibits (maps etc.) which accompany each proposal are contained in separate folders.

If any questions arise concerning the application, please give me a call at 279-7733.

Sincerely,

Duane N. Bloom

dal

Enc.

TO

MR. J. WILLIAM HASLER
FIELD OFFICER, REGION III
OFFICE OF MINERALS EXPLORATION

APPLICATION FOR O.M.E. ASSISTANCE IN MINERAL EXPLORATION ON THE HILLTOP MINING PROPERTY PARK AND LAKE COUNTIES, COLORADO

FEBRUARY 24, 1967

PREPARED FOR

LEADVILLE LEAD CORPORATION

BY

DUANE N. BLOOM, D.Sc.
GEOLOGICAL ENGINEER

EARTH SCIENCES, INC.

MME Form 40
Jan. 65

Budget Bureau No. 42-R1508
Approval expires Dec. 31, 1968

OFFICIAL
O. M. S.
RECEIVED
APR 3 1967
INITIALS | CODE

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

APPLICATION FOR FINANCIAL ASSISTANCE IN MINERALS EXPLORATION

Pursuant to Public Law 85–701 (72 Stat. 700; 30 U.S.C. 641)

NAME OF APPLICANT *(Full legal name and mailing address as they should appear on contract if one is executed.)*

Leadville Lead Corporation
1677 Wadsworth Blvd.
Denver, Colorado

APPLICANT DO NOT USE THIS BLOCK

DOCKET NUMBER 6615

DATE RECEIVED 4-3-67

REGION III

DIVISION CODE

BUSINESS ORGANIZATION *(Check one)*

- INDIVIDUAL
- CORPORATION *
- PARTNERSHIP
- OTHER *(Specify)*

LIST CORPORATE OFFICERS OR PARTNERS HERE, IF APPLICABLE

NAME	ADDRESS	TITLE
Robert G. Risk	401 E. 34th Street Indianapolis, Indiana	President/Director
Robert A. Knecht	1677 Wadsworth Blvd. Denver, Colorado	Vice-President Treasurer/Directo
George E. Lohr	Suite 1200 American National Bank Bldg. Denver, Colorado	Secretary

STATE IN WHICH ORGANIZED Colorado

Continued on back

MINERAL(S) FOR WHICH YOU WISH TO EXPLORE Silver, Gold, Copper

ESTIMATED COST OF PROJECT $ 367,199.90

PROPERTY NAME Milltop

LOCATION COUNTY Park and Lake STATE Colorado

GENERAL INSTRUCTIONS

Before filling out this application, please read the *OME Regulations for Obtaining Federal Assistance in Financing Explorations for Mineral Reserves* (30 CFR Chap. III). To assure prompt action, your application must provide all applicable material and information specified on the back of this application form. Avoid unnecessary correspondence and delays by submitting complete and accurate information. *Please submit two copies of this application and all accompanying papers* except as otherwise noted. Place your name and address on each sheet. Each item of information, maps, and reports required as a part of this application is described on the back of this form. Identify each attached statement by the item number to which it applies. If an item does not apply to your application, show the item number on your statement and after it write "not applicable." Maps or sketches should be used to supplement narrative descriptions of the property location and boundaries in item 2, existing mine workings and geology in item 3, and the proposed exploration work in item 5. When this information is not too complex, all of it may be shown on one map or sketch. All documents and other attachments submitted as a part of this application, except those in item 3(g) which you mark to be returned, become the property of the Government and will not be returned to the applicant. Send true copies, *not originals*, of leases, contracts, and other documents which are an essential part of your business records. *File this application with the Office of Minerals Exploration, Department of the Interior,* ~~Washington, D.C., or with the OME Field Office.~~ Washington, D. C., 20242, or with the nearest OME Field Office.

CERTIFICATION

The undersigned, whether as an individual, corporate officer, partner, or otherwise, both in his own behalf and acting for the applicant, certifies that the information set forth in this form and accompanying papers is correct and complete, to the best of his knowledge and belief, and that he would not ordinarily undertake the proposed exploration under current conditions and circumstances at his sole expense.

February 24, 1967
DATED

Robert A. Knecht
(Signature)

Vice-President Treasurer
TITLE

A wilfully false statement or certification to any Department or Agency of the United States Government is a criminal offense. U. S. Code, Title 18, Sec. 1001.

Corporate Officers (Continued)

Kenneth W. Miller	2690 South Steele Street Denver, Colorado	Director
Marshall A. Denby	838 East Ellsworth Avenue Denver, Colorado Apt. 301	Director
Allen W. Clowes	238 East 38th Street Indianapolis, Indiana	Director
Hans Lundberg	67 Yonge Street, Suite 512 Toronto 1, Ontario, Canada	Director

INFORMATION REQUIRED WITH THIS APPLICATION

1. Financial Eligibility:

(a) Submit evidence of efforts made within 90 days preceding the filing of this application to obtain credit from your bank of account and at least one other banking institution or other private source of credit. Such evidence shall include true copies of correspondence which show: (1) date of loan request, (2) amount and terms requested, (3) proposed use of loan funds, and (4) the replies from credit sources. If the loan was offered under terms which you consider unreasonable, state why you consider them so.

(b) List names and addresses of affiliated, parent, or controlling companies or organizations and state extent and nature of their interest.

(c) State how you propose to furnish your share of the cost of the exploration work.

2. Applicant's Rights in Land:

(a) State your interest in the land and mineral rights, whether owner, lessee, purchaser under contract, or other. If you are not the owner, submit one true copy of the lease, contract, or other document (with address of owner) under which you control the property. Describe all liens, mortgages, or other encumbrances on the land and state book and page number and official place where recorded.

(b) State the legal description (section, township, and range; metes and bounds; patent number of claims) of the land upon which you wish to explore and all adjacent land which you own or control. Describe any part of the land or workings which should not be subject to Government royalty and liens. If the land consists of unpatented claims, state book and page number for each recorded location notice, including amended locations, and official place where recorded. State all the names by which you know the property.

(c) For all land or mineral rights encumbered or not owned, submit five copies of Lien and Subordination Agreements on MME Form 52. If the agreements cannot be obtained, state reasons and provide copies of letters of refusal.

3. Physical Description:

(a) Describe in detail and illustrate with maps or sketches all mining or exploration operations which you know have been or are being conducted upon the land. Include existing mine workings and all production facilities.

(b) State your interest, if any, in operations described in (a).

(c) State, if you know, the past and current production, supporting your statement with copies of settlement sheets, mine records, or published data if available.

(d) Describe known ore reserves, giving quantities and grades and sampling methods used. Support your statement with copies of assay certificates and assay maps if available.

(e) Describe by narrative and maps or sketches the geologic features of the property, including ore minerals, geologic formations if known, and type of deposit (vein, bedded, etc.).

(f) State your reasons for expecting to find ore, and if you have sampled the area you propose to explore, show where the samples were taken, describe sampling methods used, and provide copies of assay certificates.

(g) Send with your application at least *two* copies of all geologic or engineering reports, assay maps, or technologic information which you have, indicating whether you require their return.

4. Accessibility of Property:

(a) To aid the OME representative who may examine the property, state name and address of person who will meet him; give directions for reaching the property; and describe accessibility of property and of any mine workings.

(b) Name the shipping and supply points and state the distances to the property.

5. Exploration Work:

(a) Describe fully the proposed exploration work giving individual footages and sizes of openings *for each item of work*. Use narrative, maps, plans, and sections as necessary. Show location of the proposed work as related to geologic features such as veins, ore-bearing beds, contacts of rock formations, etc. Show also the relation of the proposed work to any existing mine workings and to *land boundaries* or to the closest identifiable corner.

(b) If an access road must be built, show the proposed location on the property map and state the length, type and construction methods proposed.

(c) If an OME contract is executed, state how soon thereafter work would be started and finished. State your anticipated average daily or monthly rate of progress for each type of work.

6. Experience:

State your operating experience and background to conduct this exploration work and also that of the person who will supervise the work.

7. Estimate of Costs:

Furnish detailed estimates of the necessary costs *for each item of the work proposed in 5(a)* under the headings listed below with a total for each heading and the estimated total cost of the work. Costs for any work to be performed by an independent contractor should be listed separately under category (a) below. Costs for any work that is not to be performed by an independent contractor should be listed under categories (b) through (g).

(a) Independent contracts. State the total cost of any proposed independent contract for all or any part of the work, and the number of units and the unit cost for each type of work, such as per foot of drilling, per foot of drifting, per hour of bulldozer operations, or per cubic yard of material moved. Cost estimates should be supported by bids from three contractors if possible. (*Note*—If none of the work is to be contracted, write "none" after this item.)

(b) Personal services. The cost of supervision, engineering and geological services, outside consultants, and labor should be itemized by numbers and classes of employees; rates of wages, salaries or fees; and periods of employment. State whether these services are available.

(c) Operating materials and supplies. List items of material and supplies giving quantity and cost of each. Include under this heading power, water, and fuel, and units of equipment and tools costing less than $50 each.

(d) Operating equipment. List items of equipment and tools costing $50 or more per unit. Give specifications and indicate how each item is to be acquired—i.e., rented, purchased or provided by the applicant. If rented or purchased, state the estimated rental or purchase price. If furnished by the applicant, state condition and present fair market value.

(e) Initial rehabilitation and repairs. Describe the type and the cost of *initial* rehabilitation or repair of existing buildings, fixtures, installations (exclusive of mine workings), and movable operating equipment now owned by the applicant which will be used in the exploration work.

(f) New buildings, fixtures, installations. Describe each building, fixed improvement, and installation to be purchased, constructed, or installed for the exploration work, stating specifications and cost including labor, materials, and supervision.

(g) Miscellaneous. Describe the type and estimate the cost of repairs and maintenance of the operating equipment listed in 7(d). Do not repeat initial repairs listed in 7(e). Show also the costs of analytical work, accounting, workmen's compensation and employees' liability insurance, payroll taxes, and other required costs that do not fall within the previous categories. [*Note*—The Government will not contribute to costs incurred before the date of the contract, or to costs of or incident to: (1) acquiring, using, or possessing land and any existing improvements, facilities, buildings, installations, and appurtenances, or the depreciation and depletion thereof; (2) general overhead, corporate management, interest and taxes (other than payroll and sales taxes); (3) insurance (other than employees' liability insurance); and (4) damages to persons or property (other than authorized repair to or replacement of equipment or other property used in the work).]

INT.-DUP. SEC., WASH., D.C

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A Correspondence to Establish Financial Eligibility . . . . . Exhibit Folder

B Claim Map of Subordinated Ground . . . . . Exhibit Folder

C Leadville Lead Corporation Property Map Horseshoe District . . . . . Exhibit Folder

D Composite Map of the Hilltop Mine, Park County, Colorado . . . . . Exhibit Folder

E Data Pertaining to Past Production . . . . . Exhibit Folder

F Assay Certificates on Samples Collected During the 1966-1967 Drilling Program . . . Exhibit Folder

G Stratigraphic Section, Horseshoe District, Park County, Colorado. . . . . Exhibit Folder

H Geologic Map of the Hilltop Mining Property. . Exhibit Folder

J Geologic Sections Through the Hilltop Mining Property. . . . . Exhibit Folder

K Equal Area Plots of Geologic Structures in the Hilltop Mining Area . . . . . Exhibit Folder

L Major Faults in the Vicinity of the Leadville Lead Property. . . . . In Text facing page 8

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N Longitudinal section along the Mosquito Range. . . . . page 11

P Sketch Showing Whipstocking Procedure . . . . . page 13

Q Geologic and Engineering Reports . . . . . Exhibit Folder

R Contractors Bids . . . . . Exhibit Folder

LEADVILLE LEAD CORPORATION
OME PROPOSAL
FEBRUARY 1967

1 FINANCIAL ELGIBILITY

a The financial elgibility of the Leadville Lead Corporation for OME assistance on the exploration program described below is shown by the correspondence in Exhibit A. The credit sources contacted (the First National Bank of Denver and the First National Bank of Golden) both indicated that the project was too high a risk venture for their participation.

b The Leadville Lead Corporation is a registered stock company with approximately 1800 individual stockholders.

c The company plans to obtain its share of the exploration funds by loans from stockholders and banks secured with land, equipment and ore reserves.

2 APPLICANTS RIGHTS TO LAND

a The proposed exploration program is to be conducted on a block of ground consisting of 33 patented claims and 9 unpatented mining locations, as listed below and shown on Exhibit B. Property taxes have been kept up to date on the patented ground and assessment work has been accomplished and filed on the unpatented locations. This block of ground is a portion of the Hilltop Mining property of the Leadville Lead Corporation which consists of approximately 3700 acres of patented and unpatented claims as shown in Exhibit C.

b List of subordinated claims (all located in Sec. 36, T9S, R79W).

Unpatented Claims

Date Filed	Name of Claim	Park County Book	Park County Page	Lake County Book	Lake County Page
9/18/48	Arthur No. 2	42	162	273	176
9/18/48	Van Statts	42	162	273	177
9/20/48	Cowell	48	246		
9/20/48	Col. Chivington			273	179
9/20/48	Davis			273	180
9/20/48	Mc Tas			273	181
9/20/48	Boggess			273	181
9/24/48	Crutcher	48	246		
12/15/66	LL-39	77	291		

Patented Claims

Survey Number	Name	Acreage	Survey Number	Name	Acreage
5356	Hill	10.330	7316	Glass	10.331
5357	Silver Chief	8.071	7316	Phoebe	10.331
5972	Wyoming	10.12	7316	Atlixco	10.331
6188	Taylor		7316	Wright	10.331
6188	Reynolds	17.127	7316	Continental Divide	10.235
6454	Equator	9.500	7933	Monument	
6455	Slide	2.81	7933	Lehigh	27.408
6508	Silver Cliff	10.133	7933	Mauch Chunk	
6590	Summit		12096	Humboldt	8.38
6590	Summit No. 2	20.156	13664	Laguna	10.331
6877	Astor	10.18	13717	Gloucester	
6877	Vanderbilt	10.259	13717	Joe Horner	
6920	Diamond Field	4.408	13717	Oregon	
6921	Old Judge	10.331	13717	Stromboli	51.428
6921	Perique	10.331	13717	Maud S	
6921	Durham	10.331	13717	Confidence	
7316	Minnie	10.331			

Total Patented Acreage 303.524

c The patented ground subordinated in this proposal is owned by the Leadville Lead Corporation and is free of liens and mortgages. The mining locations were filed by or for the Leadville Lead Corporation and are believed to be valid.

3 PHYSICAL DESCRIPTION

HISTORY OF MINING IN THE HILLTOP AREA

a **History of Mining in the Horseshoe District**

Prospecting began in the Horseshoe district about 1860, when gold prospectors spread out from Tarryall, Hamilton and Fairplay in search of new deposits. The severe weather, rough topography and high elevations made exploration difficult. By 1867 approximately 60 lodes had been located, and the prospectors realized they were in a new silver, lead, zinc district. Samuel McMillan made the first major discovery, in 1869, on the Last Chance claim in Four-Mile Amphitheater. Approximately 1300 feet long and averaging over 1000 square feet in cross section, this vein later developed into the Hilltop ore zone, (Exhibit D), the most productive zone mined in the district. At about this time the Sedgewick deposit was discovered, 1400 feet to the east.

By 1873 a town had become established in the valley of Four-Mile Creek, 6 miles east of the Last Chance discovery. This town is frequently referred to as Horseshoe, but throughout its short existence it had many names, including "Old Town", "The Shoe," "East Leadville,""Horseshoe Camp," and "Horseshoe Town." At about this time lead-silver deposits were discovered 1½ miles south of the Last Chance in the saddle between Peerless and Horseshoe Mountain. In 1876 the Dauntless claim was staked just east of the Sedgewick, by George Worth and associates. A smelter was erected at Horseshoe about 1877, and the Last Chance supplied it with ore. The mill was apparently unsuccessful.

About 1878, the Sedgewick deposit, by this time known as the Badger Boy, came under control of the Horseshoe Mining Co. and in 1880 the Badger Boy Mining Co. was formed by consolidating five claims. During that year the Badger Boy vein produced from 5 to 10 tons per day, averaging 25 ounces silver per ton and 5 percent lead. During that year, the County Line Lode was discovered in the vicinity of the Peerless workings. Horseshoe, whose population had risen to nearly 1000 people, was incorporated in 1881. The Last Chance operation began shipping ore to Fairplay in 1884, and began constructing a mill at what was later to be the town of Leavick, 4 miles upstream from the town of Horseshoe. The Last Chance Mining and Milling Company failed in 1885, after the new mill began operating. In 1885 some employees of the company and their associates "jumped" certain Last Chance claims and staked the Hilltop, Ptarmagin and Leslie De Claims along the extension of the Last Chance ore shoot. Soon afterward, the Top Hill, Rush Enterprise, Astor and Vanderbilt claims were staked. These eight claims formed the nucleus of what was later known as the Hilltop group. In 1886 the Only Chance Mining and Milling Company was incorporated and acquired the Last Chance and Cato claims. During 1887 the mill at Leavick began operating at capacity, and the Hilltop Endline shaft was sunk to intersect the extension of the Last Chance vein.

A major boom in the Horseshoe district started in 1888. The Only Chance Co. had 96 men working and the main shaft was down 100 feet. Ore was intersected in the Hilltop Endline shaft, which was deepened to 122 feet, and the first Hilltop ore went to the railhead at Fairplay. In that year the Hilltop shipped ore valued at $675,000. In October the Only Chance Co. went bankrupt. The failure appears to have resulted from poor management and the inability of the New mill to beneficiate the ore, rather than a lack of ore. During that year a shaft was begun on the Thurman claim; this shaft was deepened to over 120 feet, but little mineralization was encountered.

Hilltop production increased and by March of 1889 had reached nearly 70 tons per day, averaging 200 ounces of silver per ton. Towards the end of the year the Hilltop began shipping ore to the mill at Leavick. Total production from the Hilltop group in 1889 was approximately $303,000. A shaft being sunk on the Ingersol claim encountered ore at 200 feet, and production began but nothing is known as to grade or tonnage. In that same year a shaft on the Lime King No. 3 lode struck ore at 265 feet, but there appears to be no production records.

In 1890 the Cato Mining Company obtained control of the Last Chance property and began production. The Dauntless properties also began production in 1890 after a long period of litigation. Leasing commenced on the Hilltop Mine, and the production for 1890 dropped to $150,000. The Hilltop shaft was begun, eventually reaching a depth of 505 feet.

Mining continued on a decreasing scale until 1893, when the "Silver Panic" forced most operations to cease. In 1896, the Hilda Mining Company was formed, acquiring ground held by the Cato Mining Company and ten additional claims to the south. Rehabilitation of the Hilltop Mine was initiated, and a railroad spur was completed between Fairplay and Leavick. In 1897 a 1300 foot aerial tram was completed between Leavick and the Hilltop shaft. Production reached a new high, with the tram moving 110 tons of ore per day to the mill.

The Hilda Mining Company operated until 1902, when the company was reorganized as the New Chance Mining Company, which immediately leased the properties to the Cerussite Mining and Milling Company, who operated them until 1907. The Hilltop Mine was operated under lease from about 1900 to 1906 and little is known of the operations. In 1902, the main Hilda tunnel was started, resulting in over 1,050 feet of headings and 156 feet of winzes being driven. Although it is known that commercial production resulted from this operation, figures are lacking.

About 1907 the Hilltop Mine produced the first zinc carbonate ore found in commercial quantities in the Leadville and Mosquito Range region. In 1908 production from the Lind and Stewart stopes of the Hilltop Mine approached 100 tons per day. Prior to 1913 the Humboldt claim was added to the Hilltop group, bringing the total to nine claims. In that year the New Chance Mining Company was reorganized to form the Big Chief Mining Company with the same fourteen-claim group. From 1914 to 1923 the Hilltop was operated under a series of leases, with Sam Doran serving as mine superintendent throughout much of this time. In 1923, a drop in the price of silver occurred with the expiration of the Pittman Silver Purchase Act, and essentially all mining activity in the Horseshoe district was terminated for a period of about 20 years.

Work was initiated again in 1943, when the Horseshoe Zinc Company leased the nine claims of the Hilltop Group and opened the Endline shaft. Under the direction of James N. Redman, the company started consolidating properties in Four-Mile Amphitheater

b In August 1945, the Horseshoe Zinc Company was reorganized to form the Leadville Lead Corporation, (under Colorado laws) with authorized capital of $300,000. On February 11, 1947, authorized capital stock was increased to $750,000 in shares of $1 par. The Company controlled the fourteen-claim Last Chance group, the twenty-one claim Dauntless group, the ten-claim Fulton group, several claims in the west Hilltop area and the nine-claim Hilltop group. With assistance from the county, a road was built from Highway 285, near Fairplay, to the district. Between 1947 and 1952 an exploration-development program was conducted, financed in part by DMEA funds (Loan 1463X Lead-Zinc). During this program, the Dauntless tunnel was extended to 2200 feet, a point beneath the old Hilltop ore body, and core drilling tested the Manitou and Peerless Formations in that area. Consolidation of the properties in Four-Mile Amphitheater continued for several years.

A public stock sale and a second DMEA loan (Docket No. DMEA-4572, Contract N. Idm-E1124, 1957) provided funds for another exploration program, which included an airborne electromagnetic survey, followed by ground surveys in anomalous areas. Between 1954 and 1959, the Dauntless lateral was driven and four raises were made to provide access tothe old workings. Although drilling and drfting failed to prove up commercial ore in the vicinity of electromagnetic anomalies, the Dauntless Lateral penetrated a substantial ore zone. This find resulted in the extraction of a total of 6300 tons of ore from three ore bodies (1038, 1038A and 1038B). The mine closed down from 1959 to 1963. During this interval the geology of the Horseshoe District and accessable underground workings were mapped. In 1963 the Four-Mile Mining Company obtained a lease on a portion of the Leadville Lead holdings and commenced mining in the 1038 area. A 50-ton per day mill employing a jig concentrator was erected near the Dauntless portal. At expiration of the lease in June 1966, the Four-Mile Mining Company had shipped 4,268.0245 tons of ore from the 1038 zone.

In June of 1966, the Leadville Lead Corporation began a long hole drilling program to discover new ore bodies in the vicinity of the old workings and determine the grade and tonnage of known low grade extensions. As of February 1, 1967, this program had succeeded in proving up approximately 100,000 tons of "ore" with an estimated grade of .04 oz/Au/T, 8 oz Ag/T, 0.5% Cu, 3% Pb and 2% Zn. This ore occurs chiefly as a single body beneath the main Hilltop stope (Shown on Exhibit D).

c Production

There are many intervals during the 100 years of mining activity in the Horseshoe district for which no records are available. Large dumps of unknown origin can be seen in areas where the Leadville Dolomite crops out along the south slope of White Ridge, in the eastern portion of the Horseshoe Cirque, and in the vicinity of Peerless Mountain. Most of these workings have caved and many of the portals and shafts have been covered by slide rock. The lack of records makes it difficult to estimate the production of the district. Incomplete records suggest that the original nine-claim Hilltop group produced in excess of $2,700,000 worth of ore prior to 1923. During much of this time, lead was valued at 4 cents per pound and silver at 56 cents per ounce, thus at today's prices this ore would probably have a gross value in excess of $6,000,000.

Records on the production from the Hilda, Last Chance, Badger Boy, Dauntless, Peerless and Peerless Maude mines are even more sketchy. Taking the size of the dumps into account, a total production of $4,000,000 at today's prices seems reasonable; thus putting the production of the entire district at approximately $10,000,000. The average grade of ore produced in early operations appears to have been about .04 oz Au/T, 15.7 oz Ag/T, 0.5% Cu, 15.7% Pb and 5.2% Zn. Much of this ore was hand sorted (culling out the lighter material) which resulted in an increase in grade and an upgrading of the lead-zinc content relative to silver. The most recent production from the 1038 zone (1963-1966) had a weighted average grade of .032 oz Au/T., 11.42 oz Ag/T, 0.49% Cu, 9.7% Pb and 2.9% Zn. Copies of available settlement sheets and other data giving an indication of the past production are shown in Exhibit E.

d Known Ore Reserves

The current Hilltop exploration program began in June 1966.

The method being used to explore for and prove up the remaining deposits in the vicinity of the Hilltop workings is rotary-percussion drilling. The sample cuttings are collected as a sludge on plastic sheets, each sample representing 4 ft. As of February 1, 1967, one ore body has been drilled giving proven reserves estimated to be in excess of 100,000 tons with an approximate grade of .04 oz Au/T, 8 oz Ag/T, 0.5% Cu, 3% Pb and 2% Zn (Exhibit D). In addition approximately 30,000 tons of material having an estimated 7 oz Ag/T and 5.7% Pb are present on the main Hilltop shaft dump (U.S. Bureau of Mines War Minerals Report No. 194),

and approximately 6000 tons of dump material remain on the Last Chance and Hilltop Endline dumps. According to company records these dumps were sampled by Ellis Webster in 1945 with the following results (Last Chance and Hilltop Endline dumps respectively): 0.01, .02 oz Au/T; 6.9, 5.3 oz Ag/T; 7, 0.5% Cu; 5.8, 15.9% Pb; 3.0, 8.5% Zn. The dumps were likely bulk sampled with hand shovels.

Copies of assay certificates showing the grade of ore encountered in the present drilling program are enclosed as Exhibit F. Assay maps and accurate tonnage-grade calculations are presently being prepared.

o <u>Geologic Features of the Property</u>

The following description is based primarily on observations as recorded in Colorado School of Mines thesis 1019, 1965.

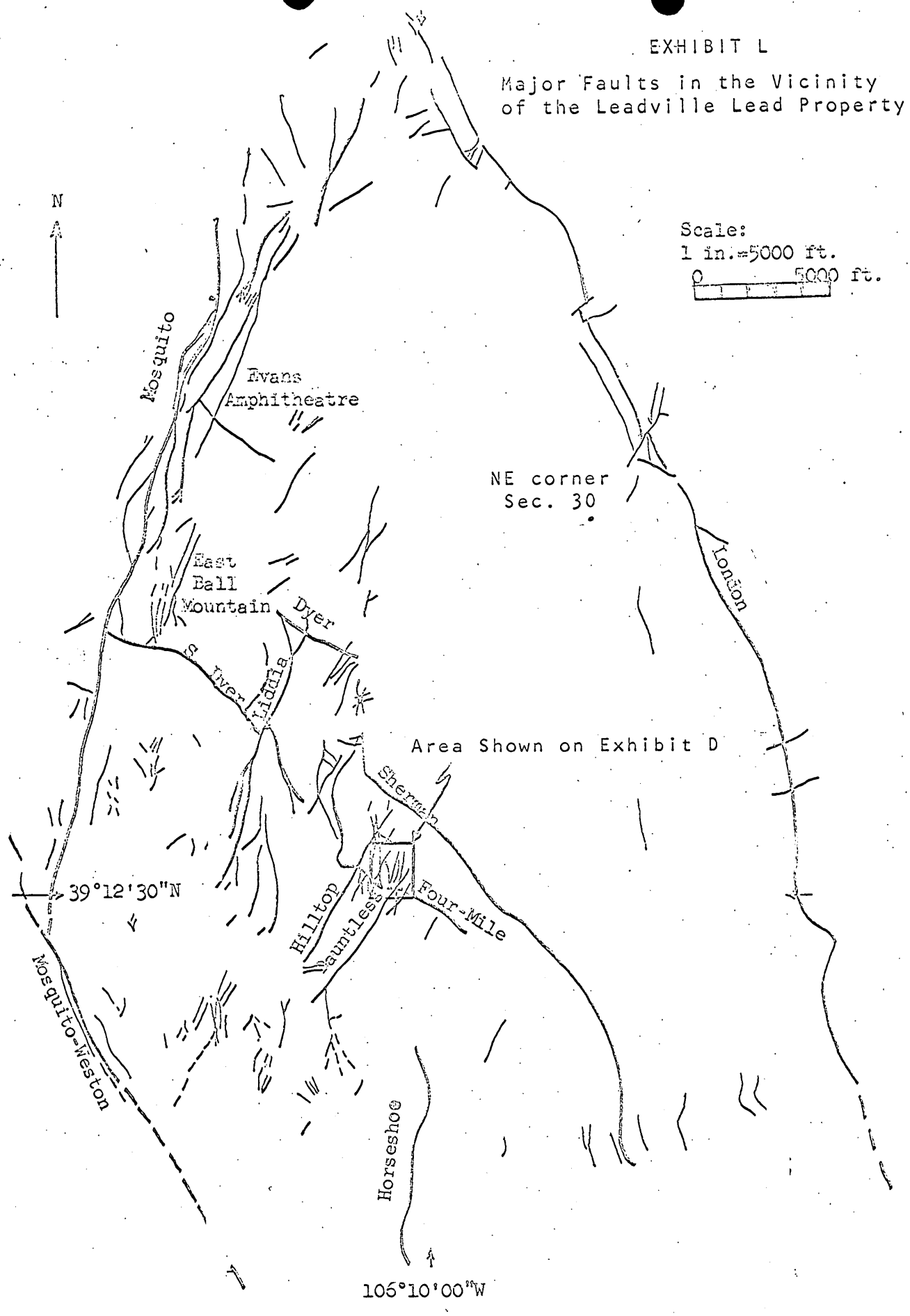
Bedrock in the Hilltop Mining Area, Horseshoe district is made up of Precambrian metamorphic and granitic rocks, Paleozoic sediments and Paleocene (?) intrusives, as shown on Exhibits G and H. Pre-Pennsylvanian sediments consist of 570 feet of dolomite, sandstone, and quartzite, typical of the shelf deposits of the Cordilleran Foreland. The upper surface of the Leadville Dolomite (Mississippian) has a karst topography upon which the Belden Formation (Pennsylvanian), 460 feet of shale, sandstone, and limestone, was deposited. The Belden, in turn, is overlain by at least 1000 feet of alluvial fan and deltaic sediments comprising the Coffman Formation (Pennsylvanian).

Paleocene (?) granodiorite and quartz monzonite porphyries occur as sills and dikes in all of the sedimentary rocks of the district, as can be seen on Exhibit J. The principal intrusive is a sill of granodiorite porphyry which lies immediately above the Leadville Dolomite in the vicinity of known ore deposits of the Hilltop Mine, and had a pre-erosion thickness in excess of 1500 feet. A sill of quartz monzonite porphyry with a thickness in excess of 1000 ft. overlies the granodiorite porphyry on the northeastern part of the property.

Structurally the district lies in an intensely faulted area between the Front Range and Sawatch uplifts. Deformation appears to have been a result of compression along a nearly horizontal stress axis oriented approximately N60°E. Stress was relieved by folding, followed by reverse faulting, both accompanied by strike-slip faulting. Post-compression collapse can be observed on many of the high angle faults. Intrusives were emplaced throughout the period of deformation.

EXHIBIT L

Major Faults in the Vicinity of the Leadville Lead Property



The fracture pattern in post-Precambrian rocks is very similar to the Precambrian fracture pattern (Exhibit K), suggesting that the Precambrian fabric had a strong influence on later deformation. The north-south regional tension zone shown on Exhibit L is of great economic significance and appears to be present in the Precambrian rocks as a contact between predominantly metasediments (east) and granitic rocks (west). Several intrusives were injected into this zone in the Tertiary.

The known ore deposits of the district consist of northwest to northeast-trending elongate pods, consisting principally of galena, quartz, pyrite, anglesite, cerrusite and smithsonite. The pods appear to lie in a north south trending tension zone mentioned above. This mineralized zone has a width of at least 1½ miles and a length of at least 4 miles. Single ore pods vary from 10,000 tons to more than 300,000 tons. The silver content of the ore is chiefly in the form of freibergite, argentite and cerargyrite, with small amounts in solid solution within the galena. Silver content of the galena, ore and gangue mineralogy and the form of the ore bodies suggest that the ores were deposited under hydrothermal conditions at approximately 200°C.

The wall-rock is highly fractured and has a leached iron-stained appearance. Wall-rock bleaching, silicification, and recrystallization are minor or absent. Muscovite (1M), present in minor amounts within the host rock, was unaffected by the process of mineralization. Primary dispersion aureoles are restricted to fractures. Silica as quartz veinlets forms the largest primary aureoles. Secondary dispersion of the ore elements is marked, the size of the supergene aureoles varying directly with the aqueous solubility of the supergene minerals. Calcium, magnesium, strontium and barium were released by the dissolution of dolomite in sulfuric-acid-rich solutions and exhibit mobilities proportional to the aqueous solubilities of their respective sulfates.

The ore bodies occur in breccia zones and "bc" (longitudinal) fractures along left lateral strike-slip faults in the Upper Leadville Dolomite. The main ore horizon consists of a zone extending from 30 feet to 90 feet below the top of the Leadville formation. Mineralization is enhanced where fractures intersect and where the controlling fracture changes strike or dip.

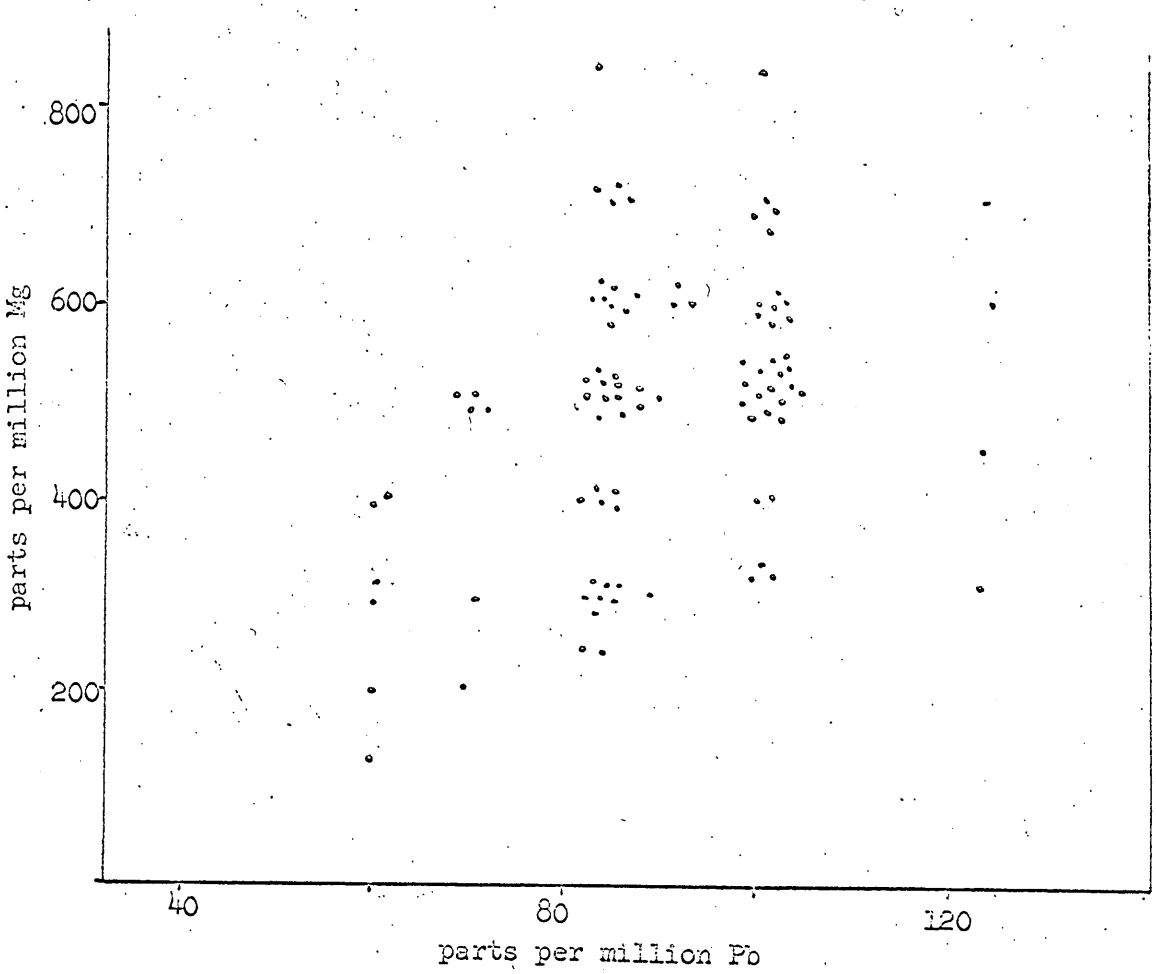
The localization of mineralization in the Upper Leadville Dolomite appears to be chiefly due to the close proximity between that horizon and the main Early White Porphyry sill. A study of thin sections of the Early White Porphyry in combination with a study of the trace element content of the samples strongly suggested that the least altered samples have the highest ore metal content and that

EXHIBIT M

Trace-Element Content of White Porphyry Samples with Various Degrees of Alteration

Early White Porphyry Sample	Parts Per Million											
	Mg	Pb	Zn	Cu	Ba	Mn	Ti	Ag	Sr	Ca	Fe	Cr
750	8500	60	<15	30	3000	40	250	0.5	175	4,000	5000	10
2	7000	85	30	40	3000	60	15	<.2	250	>10,000	5000	5
353	3000	40	15	30	1200	150	70	<.2	85	>10,000	2500	5
427	1500	25	<15	20	600	35	<10	<.2	250	4,000	3500	<5
276	500	30	<15	20	1500	500	175	<.2	175	>10,000	5000	<5

Increasing Alteration ↓



Mg:Pb ratios in altered White Porphyry in vicinity of Hilltop Mine.

the amount of magnesium varies in a perfect inverse fashion with the degree of alteration. Scatter diagrams prepared by plotting the magnesium:heavy metal ratios in Early White Porphyry samples strongly support the concept that the porphyry was depleted in the ore metals in the vicinity of the ore deposits (Exhibit M). This data in addition to data from fluid inclusion studies has led to the postulation that dilute H_2S-HCl solutions, within the solidified and cooling porphyry, sericitized the silicate minerals and became enriched with silica, iron, sodium, calcium, magnesium and the ore elements. These solutions, carrying the heavy metals as chloride complexes, descended through the porphyry and were funneled into intensely fractured zones in the underlying Leadville Formation. Reaction with the dolomite neutralized the solutions causing sulfide deposition.

f Reasons for Expecting to Find Ore

1. The stratigraphic horizon which contains all of the known ore deposits of the district is present in the area to be explored.

Significant exploration has been carried out on the 3700 acre Hilltop Mining property only in or immediately adjacent to areas where glaciation has exposed the ore horizon (Exhibits H and N) i.e.

Peerless Mining Area (Horseshoe Amphitheater)
Hilltop Mining Area (Four-Mile Amphitheater)
Continental Chief Mining Area (Iowa Amphitheater)
Upper Sacramento Mining Area (Sacramento Amphitheater)
White Ridge Mining Area (south slope of White Ridge)

2. The known ore bodies of the property lie in a north-south zone of intense fracturing. The best defined unexplored portion of this zone (between the Hilltop and Continental Chief Mines) is to be explored by this program.

Geologic mapping shows a north-south zone of intense fracturing at least 1½ miles wide traversing the Leadville Lead property, a distance of 3 miles (Exhibit L). Northwest striking thrust faults (and associated, ore-bearing northeast striking tear faults) have been identified chiefly in the southern and western parts of the property where Paleozoic sediments outcrop. However, a thrust fault has also been recognized in the Pennsylvanian conglomerates in the extreme northeast part of the property (Exhibit H) and a series of tear faults offset the London Fault (high angle reverse) in this same locality (Exhibit L). Taking into account the difficulty of recognizing structure in

the igneous rocks and coarse clastic sediments of post-Mississippian age, it appears likely that just as dense a fracture pattern exists in areas where these rocks outcrop as in the area where the ore horizon has been exposed, the shear zone recognized, and mineralization found.

3. The Area to be explored is capped by highly altered Early White Porphyry (most probable source of the components of the ore-bodies) which had a pre-erosion thickness in excess of 1500 feet--at least as thick as anywhere in the district.

The theory of ore genesis delineated in section 3e, states that the ore elements were (1) derived from the solidified and cooling porphyry, (2) carried by aqueous solutions which were funneled into intensely fractured zones and (3) precipitated as sulfides by neutralization in the underlying dolomite. It would logically follow that the magnitude of the mineralization would vary with amount of porphyry, the degree of alteration and the frequency of dilatent fractures of appropriate age.

4. The area to be explored includes the most probable locations of the source vent for the Early White Porphyry.

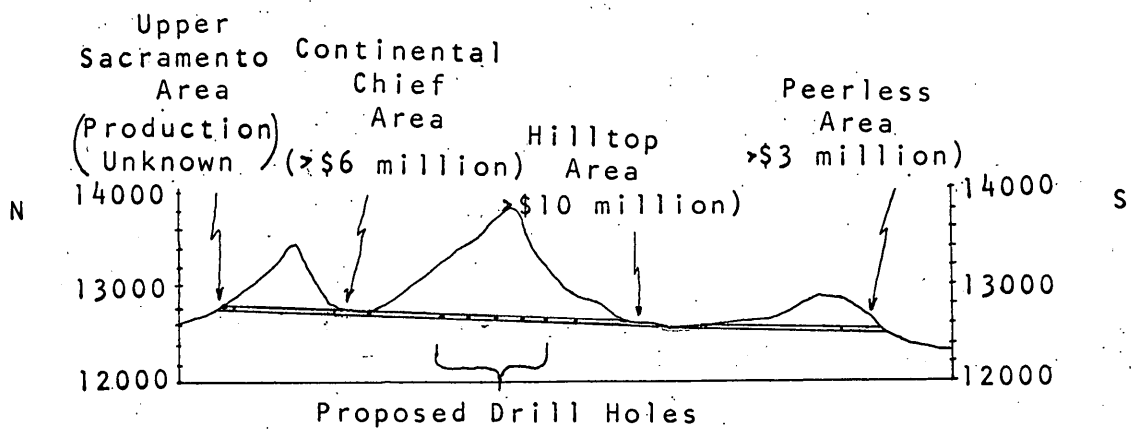
Regional geologic mapping (Emmons, 1886, p. 155) and more recent petrofabric studies (Bloom, 1965, p. 115) suggest that the major source vent for the Early White Porphyry in the Mosquito Range region lies in the vicinity of Mount Sherman. If a major vent is found by the drill program, it would increase the probability that ore will be found in several horizons (Leadville, Dyer, Manitou and Peerless Formations) as occurred in the vicinity of the Breece Hill Plug of the Leadville District.

5. The potential yield of the area to be explored is in excess of $36 million and the total potential of the Leadville Lead property is in excess of $488 million.

Production from the main stopes of the Hilltop mine (Last Chance, Hilltop, Lind, Stewart, McGillis, Last Hope, Fulton and 1038) has exceeded $7 million at todays prices. These workings lie on approximately 53 acres (Exhibit D). If the potential yield per acre on the ground to be explored (approximately 272 acres) is assumed to be equivalent, a yield of $36 million is indicated. If analogous reasoning is applied to the entire Hilltop Property (3700 acres) a potential yield of $488 million is indicated. Obviously if additional ore horizons are found (as occurred at Leadville) the potential yield would be increased.

6. The identification of the shear zone, the ore horizon and the probable source of the mineralization provides very favorable odds for finding ore in the proposed program.

Exhibit N shows a north-south longitudinal section along the Mosquito range within the zone of fracturing. Ore bodies within 3500 feet of the outcrop of the ore horizon on the west slope of the range are projected to the section. If glaciation had not exposed mineralizatoon in the areas noted, a drill program such as that proposed would have successfully located all of the orebodies that have thus far been found in the zone.



- ☐ Tertiary porphyry sills
- ☐ Known ore bodies within 3500 ft of ore horizon outcrop on west slope of range
- ☐ Ore horizon
- ☐ Paleozoic and Precambrian rocks

$7 million approximate production at present prices

Vertical Scale 1 inch = 2000 feet

Horizontal Scale 1 inch = 5000 feet

EXHIBIT N

Longitudinal Section Along Mosquito Range

9 Geologic and Engineering Reports

Included with this proposal (Exhibit Q) are copies of each of the geologic and engineering reports which have been prepared on land held by the Leadville Lead Corporation in the Horseshoe district (Exhibit N). The return of items designated on the folder is hereby requested, after their use in conjunction with the proposal is terminated.

4 ACCESSIBILITY OF PROPERTY

The Hilltop Mining property lies in the crestal area of the Mosquito range in the western part of Park County and the eastern part of Lake County. Access to the present workings (Dauntless Portal) is by 13 miles of maintained county road which departs west from U. S. Highway 285 one mile south of Fairplay, Colorado.

Access to the drill sites for the proposed program is by way of 7 miles of county road up Iowa Gulch (east) from Leadville, Colorado.

a Arrangements to visit the property should be made with Duane H. Bloom of Earth Sciences, Inc., 1101 Washington, Golden, Colorado. Phone (303) 279-7733.

b Future development of the property is planned from the west side of the Mosquito Range to provide the railroad access, personnel, service and supply facilities of Leadville, Colorado, an established mining community with a population in excess of 10,000.

5 EXPLORATION WORK

a The proposed exploration program consists of 5-3500 foot diamond drill holes (BX wire line). The holes will start in the outcrop of the ore horizon (Upper Leadville Formation) on the west slope of the Mosquito Range and be oriented east down the dip of the host rock (approximately -15° see Exhibits C and H). The holes will be controlled to remain with the ore horizon by use of directional drilling techniques (whipstocking). The stratigraphic position of the holes will be determined by:

a. trace element analysis of the drill sludge. The Upper Leadville Dolomite commonly has a trace element content significantly different from that of the Lower Leadville Dolomite.

b. down hole resistivity--the Belden Shale, a unit with a marked low resistivity, lies 30 feet above the top of the ore horizon.

The 5 holes will be spaced 700 feet apart, the southernmost station being 700 feet north of the Hilltop Mine workings. When significant ore grade mineralization is penetrated, the rods will be pulled, a recoveralbe $4\frac{1}{2}^{o}$ whipstock will be placed 175 ft. before the intersection and an upward deflection with an AX bit will be made. The rods will again be pulled and an arc cutter will be used to obtain an intersection on the structure approximately 30 feet above the original intersection. The rods will again be pulled and a $4\frac{1}{2}^{o}$ whipstock will be placed 322 feet before the original intersection. An arc cutter will be used to obtain a third intersection 100 feet to the north or south of the original. (Exhibit P) Data from the three intersections will be used to determine whether the structure should be tested by additional drilling from future underground workings.

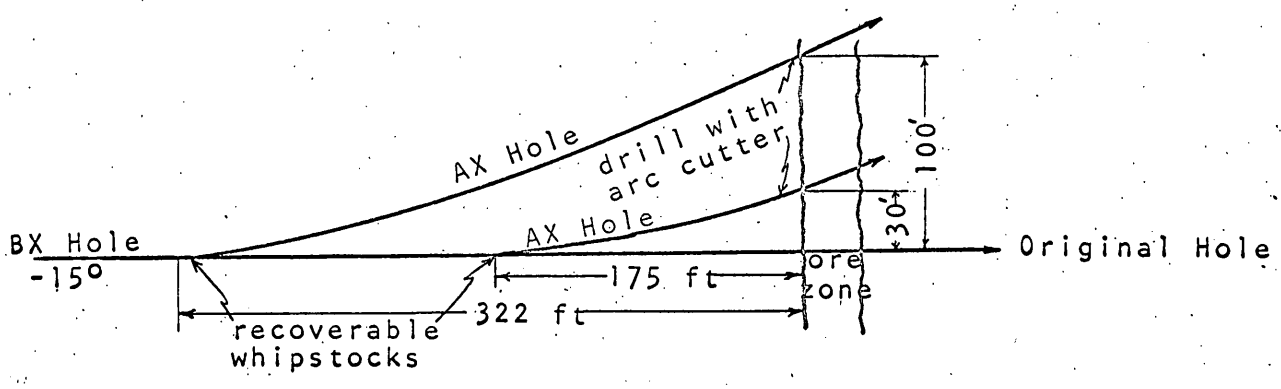


EXHIBIT P

Sketch showing deflections obtained in BX Holes by drilling off of $4\frac{1}{2}^{o}$ whipstock with AX bit and arc cutter.

If during the course of the drilling, trace element analyses suggest that the hole has deviated from the ore horizon, a resistivity survey will be conducted to determine the distance to the overlying Belden Shale and the hole will be surveyed with an Eastman "Single Shot" survey instrument. If stratigraphic deviation is shown, the hole will be deflected to compensate for the drift.

When each hole is terminated, induced polarization resistivity and self-potential surveys will be run to predict whether mineralization exists between the holes or in the underlying formations.

A report containing (a) survey plots, (b) lithologic logs, (c) trace element profiles, (d) geophysical data, (e) assay data and (f) recommendations will be prepared at the termination of the exploration program.

The program has been divided into 2 stages as follows:

Stage 1

a. construct access road

b. prepare sites and water supply

c. drill 5 holes 2000 feet each

d. compile data and prepare report

Stage 2

a. extend each hole to 3500 feet

b. compile data and prepare report

The drilling in Stage 1 will effectively explore the ore horizon in the area where, it is predicted, the vent for the Early White Porphyry is located. If significant mineralization is found, Stage 2 will be initiated to explore the ore horizon to the east down to an elevation (12,000 ft) equivalent to the lowest access adit which could be reasonably driven from Iowa Amphitheater. Ground further to the east could be best explored by drilling from underground workings.

b A 7000 foot access road will have to be constructed from the Continental Chief road along the outcrop of the Leadville Formation as shown on Exhibit C and H. The stations will be prepared by making a cut into the talus slope to bedrock with a bulldozer and/or backhoe. The sides of the cut may have to be cribbed. It is tentatively

planned that a reservoir will be constructed at the center drill station (elevation 13,000 ft.). Water will be pumped 1600 ft. from the point where the stream crosses Iowa Gulch to the reservoir 680 ft. above. The other four drill stations will then be gravity fed with water through 3000 feet of plastic water hose.

c Construction of the access road and preparation of the sites should be completed within 2 weeks of the time the program is initiated. Utilization of 5 drilling rigs for two 8-hour shifts per day (assuming 25 feet/rig-shift) should allow completion of Stage 1 approximately 7 weeks after the drilling commences. Stage 2 should take an additional 6 weeks. In order to complete the program prior to October 15 (after which time bad weather may hamper the drilling) the program should be initiated by June 15.

6 EXPERIENCE

The geological, geophysical and analytical portions of the program will be carried out by Earth Sciences, Inc. under the direction of Dr. Duane Bloom who has studied the deposits of the district for the past seven years, and is directing the current drilling program in the old workings of the Hilltop Mine.

7 ESTIMATE OF COSTS

STAGE 1

CONSTRUCTION OF ACCESS ROAD

a. Independent Contracts

1. D-6 bulldozer and operator 7000 ft at 25 ft/hr 280 hrs @ $14/hr	$ 3,920.00
2. miner, miners helper, mobile compressor rotary percussion drill 14 days @ $100/day	$ 1,400.00

b. Personal Services

senior geological engineer 4 days @ $103.80/day (includes $75 day/fee and 240 miles @ $.12/mile round trip from Golden)	$ 415.20

c.	Operating Materials and Supplies dynamite 10 cases @ $25/case	$ 250.00
d.	Operating Equipment	none
e.	Initial Rehabilitation and Repairs	none
f.	New Buildings, Fixtures, Installations	none
g.	Miscellaneous	none
	TOTAL	$ 5,985.20

SITE PREPARATION

a.	Independent Contracts	
	1. D-6 bulldozer with backhoe and operator 8 hrs per site, 5 sites 40 hrs @ $12.50/hr	$ 500.00
	2. miner, miners helpers, mobile compressor, rotary percussion drill 3 days/site x 5 sites 15 days @ $100/day	$ 1,500.00
b.	Personal Services	
	senior geological engineer 4 days @ $103.80/day (includes $75/day fee and 240 miles @ $.12/mile round trip from Golden)	$ 415.20
c.	Operating Materials and Supplies	
	lumber (for drill sheds)	$ 250.00
d.	Operating Equipment	
	diesel driven (75 BHP) Peerless TUAP, Model 2½, 13½ water pump (purchase)($4,725 assume 50% resale value)	$ 2,362.50
	1600 ft of 4" iron pipe & couplings @ $1.65/ft	$ 2,640.00
	3000 ft of 2" plastic water line @ $.24/ft	$ 720.00
e.	Initial Rehabilitation and Repairs	none
f.	New Building, Fixtures, Installations	none
g.	Miscellaneous	none
	TOTAL	$ 8,387.70

DRILLING

In estimating the cost of this phase the following will be assumed:

1. 100 hours cementing time/2000 ft drilling.

2. Each hole will intersect one target each 1000 ft of drilling, each target requiring 2 additional intercepts (550 feet of additional drilling).

3. Two hole deflections for the purpose of additional ore structure intercepts will require 5 trips (in and out with rods) assume 4 hours rig time/trip = 20 hrs rig time.

4. Each hole will have to be deflected twice each 1000 ft to remain in the proper horizon.

5. Each deflection for stratigraphic purposes will require one trip or 4 hours rig time.

a. <u>Independent Contracts</u>

1. drilling - 5(2000 ft +2(550)ft) = 15,500 ft @ $8.95/ft — $138,725.00

2. cementing time 100 hrs/2000 ft — $ 12,012.50
$\frac{15,500'}{2000'}$ x 100 = 775 hrs @ $15.50/hr

3. rig time for hole deflections — $ 6,160.00
28 hrs/1000 ft
$\frac{10,000'}{1000'}$ x 28 = 280 hrs @ $22/hr

4. directional drilling — $ 11,952.00
4 deflections/1000 ft
$\frac{10,000'}{1000'}$ x 4 = 40 deflections @ $298.80/deflection

b. <u>Personal Services</u>

1. senior geological engineer — $ 3,922.80
42 days @ $93.40/day (includes $75/day/fee, 20 miles @$.12/mile round trip from Leadville and $16 per diem)

2. junior geologist $ 3,192.00
42 days @ $76.00/day
(includes $60/day fee and $16 per diem)

3. senior geophysical engineer $ 1,453.20
14 days @ $103.80/day (includes $75/day fee and 240 miles @ $.12/mile round trip from Golden)

c. Operating Materials and Supplies

diesel fuel (pump) $ 252.00
42 days x 30 gal/day = 1260 gal @ $.20/gal

d. Operating Equipment
"Eastman Single Shot" survey instrument (rental) $ 427.00
49 days $75/5 days + $8/day over 5 days
house trailer (35 ft) for field office (rental) $ 590.00
49 days @ $10/day + $100 moving cost
induced polarization-resistivity instrument (rental) 14 days @ $40/day $ 560.00

e. Initial Rehabilitation and Repairs none

f. New Building, Fixtures, Installations none

g. Miscellaneous

1. spectrographic analyses for 5 elements $ 7,750.00
5 ft samples, $\frac{15,500'}{5'}$ = 3100 samples
@ $2.50/sample

2. assays 3 assays/1000 ft $ 210.00
$3\left(\frac{10,000'}{1000'}\right)$ = 30 assays @ $7

TOTAL $187,206.50

COMPILE DATA PREPARE REPORT

a. Independent Contracts none

b. Personal Services

consultant 10 days @ $75/day $ 750.00
draftsman 144 hrs @ $5/hr $ 720.00

c. Operating Materials and Supplies

reproductions, drafting supplies $ 100.00

d. Operating Equipment none

e.	Initial Rehabilitation and Repairs	none
f.	New Building, Fixtures, Installations	none
g.	Miscellaneous	none
	TOTAL	$ 1,570.00
	TOTAL STAGE 1	$188,776.50

STAGE 2

DRILLING

In estimating the cost of this phase the following will be assumed:

1. 100 hrs cementing time/2000 ft drilling.
2. Each hole will intersect one target each 1500 ft of drilling, each target requiring 2 additional intercepts (550 feet of additional drilling).
3. Two hole deflections for the purpose of additional ore structure intercepts will require 5 trips (assume 11 hrs rig time/trip = 55 hrs rig time).
4. Each hole will have to be deflected once each 1500 ft to remain in the proper horizon.
5. Each deflection for stratigraphic purposes will require one trip or 11 hours rig time.

a. Independent Contracts

1. drilling - extend each 2000 ft hole (Stage 1) to 3500 ft; (5(1500 ft +550 ft) = 10,250 Ft @ $13.75/ft. — $140,937.50
2. cementing time 100 hrs/2000 ft — $ 7,943.75
   $\frac{10,250'}{2000'} \times 100 = 512.5$ hrs @ $15.50/hr
3. rig time for hole deflections — $ 6,600.00
   66 hrs/1500 ft, $\frac{7500'}{1500'} \times 66 = 330$ hrs @ $20/hr
4. directional drilling — $ 4,482.00
   3 deflections/1500 ft
   5 (3) = 15 deflections @ $298.80/deflection

b. Personal Services

1. senior geological engineer $ 3,362.40
36 days @ $93.40/day (includes $75/day fee, 20 miles @ $.12/mile round trip from Leadville and $16 per diem)

2. junior geologist $ 2,736.00
36 days @ $76/day (includes $60/day fee and $16 per diem)

3. senior geophysical engineer $ 1,453.20
14 days @ $103.80/day (includes $75/day fee and 240 miles @ $.12/mile round trip from Golden)

c. Operating Materials and Supplies

diesel fuel (pump) 36 days x 30 gal/day $ 216.00
1080 gal @ $.20/gal

d. Operating Equipment

"Eastman Single Shot" survey instrument $ 288.00
rental for 36 days @ $8/day
field office (rental) 36 days @ $10/day $ 360.00
induced polarization-resistivity instruments $ 560.00
(rental) 14 days @ $40/day

e. Initial Rehabilitation and Repairs

f. New Buildings, Fixtures, Installations

g. Miscellaneous

1. spectrographic analyses for 5 elements $ 5,125.00
5 ft samples $\frac{10,250'}{5'}$ = 2050 samples
@ $2.50/sample

2. assays 3 assays/1000' $ 105.00
$3\left(\frac{7500'}{1500'}\right)$ = 15½ assays @ $7

TOTAL $177,287.80

COMPILE INFORMATION PREPARE REPORT

a. Independent Contracts none

b. Personal Services

consultant 5 days @ $75/day $ 375.00
draftsman 140 hrs @ $5/hr $ 700.00

c.	Operating Materials and Supplies	none
d.	Operating Equipment	none
e.	Initial Rehabilitation and Repairs	none
f.	New Buildings, Fixtures, Installations	none
g.	Miscellaneous	none
	TOTAL	$ 1,075.00
	TOTAL STAGE 2	$178,362.80
	TOTAL PROGRAM	$367,139.30

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Klugman, M. A., Bloom, D. N. and Stevens, D. N., 1964, Mg/Ca ratios in carbonate wall-rock in the Alma-Horseshoe district, Colorado; Am. Inst. Mining Metall. Petroleum Engineers Trans., June, p. 140-150.

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EXHIBIT A

1. Letter to Mr. John Fortune, First National Bank of Golden
2. Letter from same Mr. Fortune
3. Letter to Albert D. Latham, First National Bank of Denver
4. Letter from same Mr. Latham
5. Recent financial statement of Leadville Lead Corporation
6. Letter from Robert A. Knecht, Vice President, and Treasurer, Leadville Lead Corporation

EARTH SCIENCES, INC.

GEOLOGY GEOCHEMISTRY GEOPHYSICS Golden, Colorado 80401

303-279-7733

February 17, 1967

Mr. John Fortune
President
First National Bank of Golden
Golden, Colorado

Dear Mr. Fortune:

The Leadville Lead Corporation is preparing to embark on a $400,000 exploration program for silver-gold-base metal deposits in the Horseshoe and Sacramento Mining districts of Park County, Colorado. In order to conduct this exploration program it is necessary for the corporation to obtain the funds from outside credit sources. The enclosed proposal describes the program and the anticipated costs. We would appreciate it if you would study the proposal and write a letter stating whether or not you would be interested in loaning the corporation the funds needed to carry out the program.

Sincerely,

Duane N. Bloom, D.Sc.
Consulting Geologist

Enc.

BANK-ROLL Plan

THE FIRST NATIONAL BANK IN GOLDEN

1301 Jackson Street • Golden, Colorado • 80402

Telephone
279-4563

March 15, 1967

Leadville Lead Corporation
c/o Earth Sciences
Golden, Colorado 80401

Gentlemen:

This is to advise that the loan submission by the Earth Sciences Corporation on your behalf has been considered.

Due to the speculative nature of this operation, we regret that we cannot accommodate you. It should be noted that this $400,000 request for exploration funds is above the bank's maximum loan limitation, and we feel that it would be impossible toarrange any additional funds through our correspondent banks.

NG

We appreciate your contacting us and wish you the best of success in your new venture.

Very truly yours,

Francis X. Sweeney

Francis X. Sweeney
Asst. Vice President

FXS:TW

EARTH SCIENCES, INC.

GEOLOGY GEOCHEMISTRY GEOPHYSICS Golden, Colorado 80401

303-279-7733

February 17, 1967

Mr. Albert D. Latham
Vice President
First National Bank of Denver
Denver, Colorado

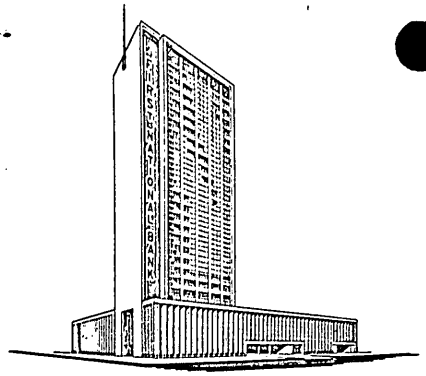
Dear Mr. Latham:

The Leadville Lead Corporation is preparing to embark on a $400,000 exploration program for silver-gold-base metal deposits in the Horseshoe and Sacramento Mining districts of Park County, Colorado. In order to conduct this exploration program it is necessary for the corporation to obtain the funds from outside credit sources. The enclosed proposal describes the program and the anticipated costs. We would appreciate it if you would study the proposal and write a letter stating whether or not you would be interested in loaning the corporation the funds needed to carry out the program.

Sincerely,

Duane N. Bloom, D.Sc.
Consulting Geologist

Enc.



THE FIRST NATIONAL BANK OF DENVER

P. O. BOX 5808 TELEPHONE 266-2211

DENVER, COLORADO 80217

ALBERT D. LATHAM
VICE PRESIDENT

March 15, 1967

Mr. Duane N. Bloom, D. Sc.
Consulting Geologist
Earth Sciences, Inc.
Golden, Colorado 80401

Re: The Leadville Lead Corporation
$400,000 Loan

Dear Dr. Bloom:

This will acknowledge receipt of your letter of February 17, 1967 requesting a loan to The Leadville Lead Corporation in the amount of $400,000 for an exploration program to be conducted in the Horseshoe and Sacramento Mining districts of Park County, Colorado.

After reviewing the enclosures, we must respectfully decline your application at this time as we believe this is too high a risk venture with too many unknown factors, namely adequate collateral security satisfactory to the bank, proven ability to repay the loan over a reasonable period of time and unknown asset value or reserves.

We would be pleased to reconsider your request should circumstances change.

Very truly yours,

Al Latham
Vice President

AL:ms

EARTH SCIENCES, INC.

GEOLOGY GEOCHEMISTRY GEOPHYSICS Golden, Colorado 80401

303-279-7733

February 17, 1967

Mr. J. William Hasler
Field Officer Region III
Office of Minerals Exploration
U. S. Geological Survey
Denver Federal Center
Building 25, Room 2284
Denver, Colorado 80225

Dear Mr. Hasler:

The OME application by the Leadville Lead Corporation covers an exceedingly ambitious exploration program which could not under current conditions, be undertaken at the sole expense of the Corporation.

The officers and mineral consultants of the company are in total agreement that the program has an excellent chance of successfully locating substantial new deposits which could have a definite impact on the supply of silver in the United States. The discovery of new ore bodies in the area to be explored would result in access workings which would link the rail facilities of Leadville with the potentially rich gronnd of the Horseshoe district. This would reduce the amount of surface transport from the district by approximately 30 miles and permit the extraction of substantially lower grade deposits.

Sincerely,

Robert A. Knecht

Robert A. Knecht
Vice President
Leadville Lead Corporation

EXHIBIT F

Assay certificates on samples collected from the Hilltop Mine during the 1966-67 Drilling Program.

The cuttings from each four foot interval were spectrographically analyzed to get approximate grade. The samples with significant mineralization were then combined by volume and assayed.

XERO COPY XERO COPY XERO COPY XERO COPY

2114 CURTIS STREET

TELEPHONE 623-1852

CHARLES O. PARKER & CO.

CHEMISTS ○ ASSAYERS ○ ENGINEERS

DENVER, COLORADO 80205

Folio 8527

Date Feb. 21, 1966.

Earth Sciences, Inc.,
Box 737,
Golden, Colorado.

We hereby Certify, that the samples assayed for you gave the following results:

DESCRIPTION	GOLD OUNCES PER TON	SILVER OUNCES PER TON	COPPER PER CENT (WET)	LEAD PER CENT (WET)	ZINC PER CENT	IRON PER CENT	INSOLUBLE PER CENT	VALUE PER TON
G-101-L	0.02	17.74	0.400	4.26	1.01			

Gold at _____ per ounce Copper at _____ per unit

Silver at _____ per ounce Zinc at _____ per unit

Lead at _____ per unit

Charge $ 7.00

CHARLES O. PARKER & CO.
CHEMISTS, ASSAYERS and ENGINEERS

CHARLES O. PARKER & CO.

CHEMISTS ○ ASSAYERS ○ ENGINEERS

DENVER, COLORADO 80205

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[redacted] G-102-L	0.04	13.06	0.712	2.18	1.98			

Gold at _____ per ounce Copper at _____ per unit

Silver at _____ per ounce Zinc at _____ per unit

Lead at _____ per unit _____

Charge $ 7.00

CHARLES O. PARKER & CO.
CHEMISTS, ASSAYERS and ENGINEERS

2114 CURTIS STREET

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G-103-L	0.04	13.96	0.484	6.66	2.16			

Gold at _____ per ounce Copper at _____ per unit

Silver at _____ per ounce Zinc at _____ per unit

Lead at _____ per unit _____

Charge $ 7.00

CHARLES O. PARKER & CO.
CHEMISTS, ASSAYERS and ENGINEERS

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G-104-U	0.06	4.74	0.062	2.34	0.71			

Gold at _____ per ounce Copper at _____ per unit

Silver at _____ per ounce Zinc at _____ per unit

Lead at _____ per unit _____

Charge $ 7.00

CHARLES O. PARKER & CO.
CHEMISTS, ASSAYERS and ENGINEERS

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2114 CURTIS STREET TELEPHONE 623-1852

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G-105-U	0.05	11.21	0.047	0.38	0.06			

Gold at _____ per ounce Copper at _____ per unit

Silver at _____ per ounce Zinc at _____ per unit

Lead at _____ per unit _____

Charge $ 7.00

CHARLES O. PARKER & CO.
CHEMISTS, ASSAYERS and ENGINEERS

CHARLES O. PARKER & CO.

CHEMISTS ○ ASSAYERS ○ ENGINEERS

DENVER, COLORADO 80205

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G-106-U	0.04	9.72	0.426	3.12	0.38			

Gold at _____ per ounce Copper at _____ per unit

Silver at _____ per ounce Zinc at _____ per unit

Lead at _____ per unit _____

Charge $ 7.00

CHARLES O. PARKER & CO.
CHEMISTS, ASSAYERS and ENGINEERS

CHARLES O. PARKER & CO.

CHEMISTS ○ ASSAYERS ○ ENGINEERS

DENVER, COLORADO 80205

Folio 8527

Date Feb. 21, 1966.

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Box 737,
Golden, Colorado.

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G-107-U	0.06	10.04	0.094	1.33	0.28			

Gold at _____ per ounce Copper at _____ per unit

Silver at _____ per ounce Zinc at _____ per unit Charge $ 7.00

Lead at _____ per unit _____

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TELEPHONE 623-1852

CHARLES O. PARKER & CO.

CHEMISTS ○ ASSAYERS ○ ENGINEERS

DENVER, COLORADO 80205

Folio 8527

Date Feb. 21, 1966.

Earth Sciences, Inc.,
Box 737,
Golden, Colorado.

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G-108-U	0.02	3.78	0.203	4.36	0.78			

Gold at _____ per ounce Copper at _____ per unit

Silver at _____ per ounce Zinc at _____ per unit Charge $ 7.00

Lead at _____ per unit _____

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CHEMISTS, ASSAYERS and ENGINEERS

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2114 CURTIS STREET TELEPHONE 623-1652

CHARLES O. PARKER & CO.

CHEMISTS ○ ASSAYERS ○ ENGINEERS

DENVER, COLORADO 80205

Folio 8527

Date Feb. 21, 1966.

Earth Sciences, Inc.,
Box 737,
Golden, Colorado.

We hereby Certify, that the samples assayed for you gave the following results:

DESCRIPTION	GOLD OUNCES PER TON	SILVER OUNCES PER TON	COPPER PER CENT (WET)	LEAD PER CENT (WET)	ZINC PER CENT	IRON PER CENT	INSOLUBLE PER CENT	VALUE PER TON
G-109-U	0.04	3.76	0.062	2.92	1.45			

Gold at _____ per ounce Copper at _____ per unit

Silver at _____ per ounce Zinc at _____ per unit

Lead at _____ per unit _____

Charge $ 7.00

CHARLES O. PARKER & CO.
CHEMISTS, ASSAYERS and ENGINEERS

CHARLES O. PARKER & CO.

CHEMISTS ○ ASSAYERS ○ ENGINEERS

DENVER, COLORADO 80205

Folio 8527

Date Feb. 21, 1966.

Earth Sciences, Inc.,
Box 737,
Golden, Colorado.

We hereby Certify, that the samples assayed for you gave the following results:

DESCRIPTION	GOLD OUNCES PER TON	SILVER OUNCES PER TON	COPPER PER CENT (WET)	LEAD PER CENT (WET)	ZINC PER CENT	IRON PER CENT	INSOLUBLE PER CENT	VALUE PER TON
G-110-U	0.08	5.96	0.182	4.06	5.06			

Gold at _____ per ounce Copper at _____ per unit

Silver at _____ per ounce Zinc at _____ per unit

Lead at _____ per unit _____

Charge $ 7.00

CHARLES O. PARKER & CO.
CHEMISTS, ASSAYERS and ENGINEERS

2114 CURTIS STREET

TELEPHONE 623-1852

CHARLES O. PARKER & CO.

CHEMISTS • ASSAYERS • ENGINEERS

DENVER, COLORADO 80205

Folio 3629

Date August 20, 1966

Earth Sciences, Inc.,
Box 737,
Golden, Colorado.

We hereby Certify, that the samples assayed for you gave the following results:

DESCRIPTION	GOLD OUNCES PER TON	SILVER OUNCES PER TON	COPPER PER CENT (WET)	LEAD PER CENT (WET)	ZINC PER CENT	IRON PER CENT	INSOLUBLE PER CENT	VALUE PER TON
G-5-A	0.07	7.48	0.33	0.20	0.05			
G-17-Comp	0.03	7.21	0.10	6.80	0.31			
G-18	0.02	2.54	0.04	1.62	0.80			
G-22	0.14	2.70	0.16	3.62	8.45			

Gold at _____ per ounce Copper at _____ per unit

Silver at _____ per ounce Zinc at _____ per unit

Lead at _____ per unit _____

Charge $ 28.00

CHARLES O. PARKER & CO.

CHEMISTS, ASSAYERS and ENGINEERS

2114 CURTIS STREET

TELEPHONE 623-1852

CHARLES O. PARKER & CO.

CHEMISTS • ASSAYERS • ENGINEERS

DENVER, COLORADO 80205

Folio 8678

Date Oct. 7, 1966.

Earth Sciences, Inc.,
Box 737,
Golden, Colorado.

We hereby Certify, that the samples assayed for you gave the following results:

Milton Mining Co. Samples:

DESCRIPTION	GOLD OUNCES PER TON	SILVER OUNCES PER TON	COPPER PER CENT (WET)	LEAD PER CENT (WET)	ZINC PER CENT	IRON PER CENT	INSOLUBLE PER CENT	VALUE PER TON
G-36 0-44'	0.06	3.88	0.144	3.03	1.95			
G-37 12'-40'	0.03	3.73	0.165	13.95	3.50			
G-40 0-44'	0.055	4.65	0.180	4.02	4.90			
G-41 0-28'	0.040	3.66	0.175	5.04	13.70			
28-60'	0.03	3.07	0.170	1.95	3.65			
60-140'	0.05	2.45	0.149	0.98	0.90			
G-42 0-72'	0.09	6.91	0.206	7.08	6.20			
G-43 0-92'	0.04	2.46	0.175	4.18	7.70			
G-44 0-12'	0.055	4.35	0.216	15.13	5.30			
R-6 0-50'	0.03	2.97	0.134	3.72	2.15			
Channel Sample across--	0.095	11.48	0.185	13.52	5.25	--Last Chance Trench.		

Gold at _____ per ounce Copper at _____ per unit

Silver at _____ per ounce Zinc at _____ per unit

Lead at _____ per unit _____

Charge $ 77.00

CHARLES O. PARKER & CO.
CHEMISTS, ASSAYERS and ENGINEERS

2114 CURTIS STREET

TELEPHONE 623-1852

CHARLES O. PARKER & CO.

CHEMISTS • ASSAYERS • ENGINEERS

DENVER, COLORADO 80205

Folio 8708

Date Nov. 9, 1966.

Earth Sciences, Inc.,
Box 737,
Golden, Colorado.

We hereby Certify, that the samples assayed for you gave the following results:

DESCRIPTION	GOLD OUNCES PER TON	SILVER OUNCES PER TON	COPPER PER CENT (WET)	LEAD PER CENT (WET)	ZINC PER CENT	IRON PER CENT	INSOLUBLE PER CENT	VALUE PER TON
K-1 0-28' Composite	0.01	2.84	0.25	2.55	18.70			
K-2 0-16' " "	0.015	4.03	0.21	4.65	14.45			
G-39 24-55' " "	0.03	7.74	0.31	13.76	9.50			
G-46 0-12' " "	0.08	6.75	0.208	3.46	7.90			
G-49 0-16' " "	0.01	2.05	0.23	2.12	9.57			
G-46 12.72' " "	0.07	2.33	0.165	1.45	2.20			
G-50 0-52' " "	0.005	1.50	0.04	0.78	8.97			
G-52-2 0-16' "	0.01	3.45	0.27	3.84	24.10			
G-52 0-16' "	0.02	3.58	0.25	2.96	20.00			
G-6 48-68' "	0.02	2.18	0.31	0.68	1.40			
R-9 0-45' "	0.005	1.50	0.24	0.54	5.60			

Gold at _____ per ounce Copper at _____ per unit

Silver at _____ per ounce Zinc at _____ per unit

Lead at _____ per unit _____

Charge $ 77.00

CHARLES O. PARKER & CO.
CHEMISTS, ASSAYERS and ENGINEERS

2114 CURTIS STREET

TELEPHONE 623-1852

CHARLES O. PARKER & CO.

CHEMISTS • ASSAYERS • ENGINEERS

DENVER, COLORADO 80205

Folio 8733

Date Dec. 21, 1966.

Earth Sciences, Inc.,
1101 Washington Ave.,
Golden, Colorado.

We hereby Certify, that the samples assayed for you gave the following results:

DESCRIPTION	GOLD OUNCES PER TON	SILVER OUNCES PER TON	COPPER PER CENT (WET)	LEAD PER CENT (WET)	ZINC PER CENT	IRON PER CENT	INSOLUBLE PER CENT	VALUE PER TON
G-19- 8'-12'	0.03	1.07	0.094	1.76	2.95			
G-20 0'-28'	0.02	0.48	0.062	0.16	1.05			
G-21 4'-12'	0.01	2.00	0.015	0.10	0.55			
G-24 0'-20'	0.03	0.35	TRACE	0.10	5.15			
G-45 0'-52'	0.03	2.97	0.075	3.06	1.56			
G-47 0'-4'	0.02	1.98	0.10	6.24	22.88			
G-47 4'-12'	0.02	0.60	0.083	1.60	7.30			
G-48 4'-12'	0.04	2.86	0.22	6.84	19.28			
G-48 12'-44'	0.01	0.33	0.19	1.20	15.70			
G-49 16'-40'	0.03	2.31	0.17	4.04	10.38			
G-51 4'-20'	0.02	3.26	0.21	8.60	11.00			
G-51 20'-52'	0.02	0.78	0.17	2.00	3.25			
G-52 16'-52'	0.02	1.08	0.088	0.64	5.53			
L-1 8'-20'	0.01	3.13	0.25	2.24	1.20			
L-2 36'-40'	0.08	5.32	0.094	7.64	9.70			
L-3 12'-16'	0.04	1.06	0.135	0.96	0.40			
L-9 4'-28'	0.03	1.61	0.094	0.20	0.25			
L-9A 0'-16'	0.04	2.50	0.16	3.42	0.38			
L-9A 56'-60'	0.04	2.76	0.19	1.56	0.40			
L-11 0'-48'	0.03	3.07	0.124	1.80	2.00			
L-12 0'-28'	0.02	3.04	0.114	2.82	0.38			
~~XXXXXXXXXX~~	~~XXXX~~							
M-1 0'-12'	0.02	3.32	0.094	2.80	0.62			

Gold at _____ per ounce Copper at _____ per unit

Silver at _____ per ounce Zinc at _____ per unit

Lead at _____ per unit _____

Charge $ 154.00

CHARLES O. PARKER & CO.

CHEMISTS, ASSAYERS and ENGINEERS

2114 CURTIS STREET

TELEPHONE 623-1852

CHARLES O. PARKER & CO.

CHEMISTS • ASSAYERS • ENGINEERS

DENVER, COLORADO 80205

Folio 8757

Date Feb. 22, 1967.

Earth Sciences, Inc.,
1101 Washington Ave.,
Golden, Colorado.

We hereby Certify, that the samples assayed for you gave the following results:

DESCRIPTION	GOLD OUNCES PER TON	SILVER OUNCES PER TON	COPPER PER CENT (WET)	LEAD PER CENT (WET)	ZINC PER CENT	IRON PER CENT	INSOLUBLE PER CENT	VALUE PER TON
Ghee - N-5 - 0'-32' 2/22/67	0.01	5.49	0.083	4.87	0.69			
Ray - N-6 - 0'-32' 2/22	0.01	4.40	0.094	2.90	0.56			
Smitty-N-7 - 0'-16' 2/22	0.04	9.36	0.374	1.38	0.48			
Ray N-11- 0'-40' 2/22	0.01	2.80	0.094	0.98	1.12			
Ghee N-12 0'-16'	0.005	0.29	0.020	0.98	1.00			
N-12 48'-60'	0.04	5.06	0.177	1.61	0.16			

Gold at _____ per ounce Copper at _____ per unit

Silver at _____ per ounce Zinc at _____ per unit

Lead at _____ per unit _____

Charge $ 48.00

CHARLES O. PARKER & CO.
CHEMISTS, ASSAYERS and ENGINEERS

2174 CURTIS STREET

TELEPHONE 623-1852

CHARLES O. PARKER & CO.

CHEMISTS • ASSAYERS • ENGINEERS

DENVER, COLORADO 80205

Folio 8761

Date Feb. 28, 1967.

Earth Sciences, Inc.,
1101 Washington Ave.,
Golden, Colorado.

We hereby Certify, that the samples assayed for you gave the following results:

DESCRIPTION	GOLD OUNCES PER TON	SILVER OUNCES PER TON	COPPER PER CENT (WET)	LEAD PER CENT (WET)	ZINC PER CENT	IRON PER CENT	INSOLUBLE PER CENT	VALUE PER TON
L-4 0-28	TRACE	TRACE	0.015	TRACE	0.20			
Q-5 16-24	0.005	0.30	0.02	0.16	0.75			
Q-6 4-8	0.03	7.17	0.062	6.16	0.55			
T-1 72-80	0.03	4.77	0.104	2.90	1.40			

Gold at _____ per ounce Copper at _____ per unit

Silver at _____ per ounce Zinc at _____ per unit

Lead at _____ per unit _____

Charge $ 28.00

CHARLES O. PARKER & CO.

CHEMISTS, ASSAYERS and ENGINEERS

2114 CURTIS STREET TELEPHONE 623-1852

CHARLES O. PARKER & CO.

CHEMISTS • ASSAYERS • ENGINEERS

DENVER, COLORADO 80205

Folio 8763

Date Feb. 28, 1967.

Earth Sciences, Inc.,
1101 Washington Ave.,
Golden, Colorado.

We hereby Certify, that the samples assayed for you gave the following results:

	DESCRIPTION	GOLD OUNCES PER TON	SILVER OUNCES PER TON	COPPER PER CENT (WET)	LEAD PER CENT (WET)	ZINC PER CENT	IRON PER CENT	INSOLUBLE PER CENT	VALUE PER TON
2/23/67	G-28 0'-4'	0.08	16.12	0.228	1.62	1.50			
	G-41 (X) 140'-164'	0.01	1.48	0.104	1.40	0.96			
	G-41 (X) 164'-228'	0.005	1.14	0.125	1.04	0.85			
	L-5 0'-20'	0.02	4.08	0.115	1.90	1.10			
	L-6 0'-28'	0.03	7.87	0.098	3.50	0.08			
	M-6 0'-20'	0.01	4.50	0.145	3.64	0.25			
	M-7 48'-76'	0.01	5.80	0.224	1.50	0.42			
	N-1 0'-16'	0.05	8.65	0.166	1.40	0.20			
	N-3 0'-12'	0.07	9.83	0.198	16.40	0.25			
	N-3 72'-88'	0.015	2.78	0.053	4.70	0.10			
	N-3 12'-36'	0.01	1.69	0.082	7.60	0.15			
	N-4 0'- 8'	0.03	[illegible]	0.073	5.60	0.18		Silver: 6.77 oz./ton.	
	N-14 0'-16'	0.03	5.27	0.098	1.00	0.15			
	N-14 16'-40'	0.015	2.28	0.115	0.80	1.50			
	N-15 0'-32'	0.04	9.16	0.168	1.20	0.12			
	N-15 32'-40'	0.03	6.23	0.122	2.30	0.30			
	N-16 0'-40'	0.03	4.23	0.153	0.60	0.16			
	N-19 0'-12'	0.03	10.27	0.312	3.00	0.58			
	N-20&N-21 0'-4'	0.03	7.17	0.236	11.16	0.21			
	N-22 0'-16'	0.03	6.87	0.092	7.00	0.50			
	N-23 0'-48'	0.03	6.27	0.079	0.90	1.50			
	O-4 20'-88'	0.005	1.30	0.053	1.45	4.60			
	O-5 0'-64'	0.01	3.39	0.175	3.16	4.00			
	O-6 0'-52'	0.01	2.80	0.104	2.40	3.85			
	O-7 0'-60'	0.02	5.78	0.124	7.76	3.70			

Gold at _____ per ounce Copper at _____ per unit

Silver at _____ per ounce Zinc at _____ per unit

Lead at _____ per unit _____

Charge $ 135.00

CHARLES O. PARKER & CO.
CHEMISTS, ASSAYERS and ENGINEERS

2114 CURTIS STREET

TELEPHONE 623-1852

ARTHUR S. O. PARKER & CO.

CHEMISTS • ASSAYERS • ENGINEERS

DENVER, COLORADO 80205

Folio 8763-9

Date Feb. 28, 1967.

Earth Sciences, Inc.,
1101 Washington Ave.,
Golden, Colorado.

We hereby Certify, that the samples assayed for you gave the following results:

DESCRIPTION	GOLD OUNCES PER TON	SILVER OUNCES PER TON	COPPER PER CENT (WET)	LEAD PER CENT (WET)	ZINC PER CENT	IRON PER CENT	INSOLUBLE PER CENT	VALUE PER TON
R-1 0'-12	0.03	5.07	0.027	1.40	0.20			
R-2 0'-12	0.03	3.77	0.022	0.96	0.20			
N-8 0'-72'	0.09	4.21	0.027	1.84	1.38			
N-9 0-32	0.04	6.66	0.008	5.48	0.38			
~~N-9A~~ 0-36 N-9A	TRACE	1.79	TRACE	0.84	0.40			
N-13 0-8	0.02	1.68	TRACE	0.56	TRACE			
N-10 0-36	TRACE	1.20	0.012	0.30	0.38			
N-17 0-8	0.02	2.38	TRACE	0.90	0.45			
N-18 0-24	0.03	6.45	0.113	1.36	1.00			
B-S-2 40-108	TRACE	0.20	TRACE	TRACE	TRACE			
AA-1 0-20	TRACE	0.09	TRACE	0.16	0.25			
AA-2 0-44	TRACE	0.08	TRACE	0.10	0.38			
AA-3 0-12	TRACE	0.18	TRACE	0.20	0.20			
AA-4 0-20	TRACE	0.06	TRACE	0.21	0.20			
AA-5 0-36	0.015	0.41	0.02	0.64	0.50			
G-26 0-8	0.02	3.10	0.32	0.80	1.12			
G-27 0-12	0.03	4.87	0.089	2.04	0.23			
G-30 0-8	0.05	4.17	0.075	0.16	0.40			
G-38 20-28	0.005	1.90	0.042	4.10	10.90			
Q-8 0-8	0.02	1.44	0.132	TRACE	TRACE			
Q-7 8-12	0.02	1.78	0.042	0.18	TRACE			
Q-7 24-32	0.01	1.71	TRACE	0.16	TRACE			

2M4 CURTIS STREET

TELEPHONE 623-1852

CHARLES O. PARKER & CO.

CHEMISTS • ASSAYERS • ENGINEERS

DENVER, COLORADO 80205

Folio 8774

Date March 13, 1967.

Earth Sciences, Inc.,
1101 Washington Ave.,
Golden, Colorado.

We hereby Certify, that the samples assayed for you gave the following results:

DESCRIPTION	GOLD OUNCES PER TON	SILVER OUNCES PER TON	COPPER PER CENT (WET)	LEAD PER CENT (WET)	ZINC PER CENT	IRON PER CENT	INSOLUBLE PER CENT	VALUE PER TON
3/3 BB-1 0'-20' Comp.	0.005	0.19	0.008	0.20	0.20			
3/3 BB-1 60'-68' Comp.	0.03	6.43	0.140	3.90	0.90			
3/3 R-4 0'-32' Comp	0.015	3.20	0.100	0.52	1.12			
3/2 PS-3 0'-100' Comp	0.01	0.29	TRACE	0.09	0.25			
3/3 CC-2 24'-32' Comp.	0.02	8.28	0.10	0.60	0.40			

Gold at _____ per ounce Copper at _____ per unit

Silver at _____ per ounce Zinc at _____ per unit

Lead at _____ per unit _____

Charge $ 35.00

CHARLES O. PARKER & CO.

CHEMISTS, ASSAYERS and ENGINEERS

EXHIBIT K

Equal Area Plots of Geologic Structures
In The Hilltop Mining Area

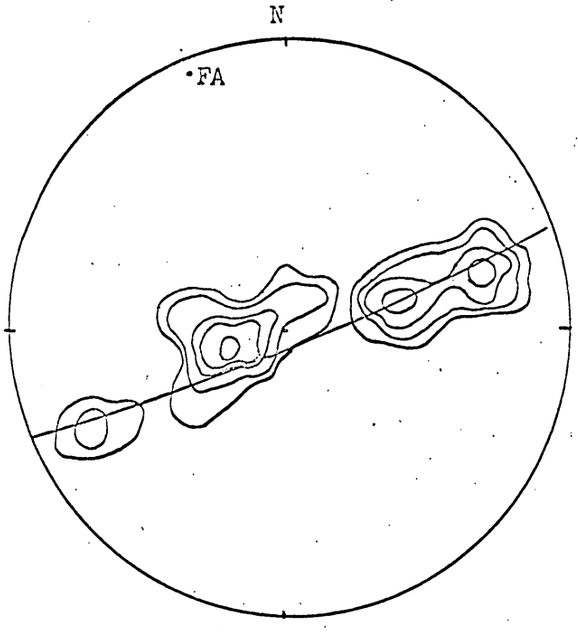

Fig. 58 - Equal-area plot of poles to bedding planes in the vicinity of the Sherman fault on Lamb Ridge. Contours at 2, 5, 10,15 and 30 percent of the points per 1 percent area. Points plotted on lower hemisphere. FA = fold axis plunging 5°, N20°W.
(54 measurements)

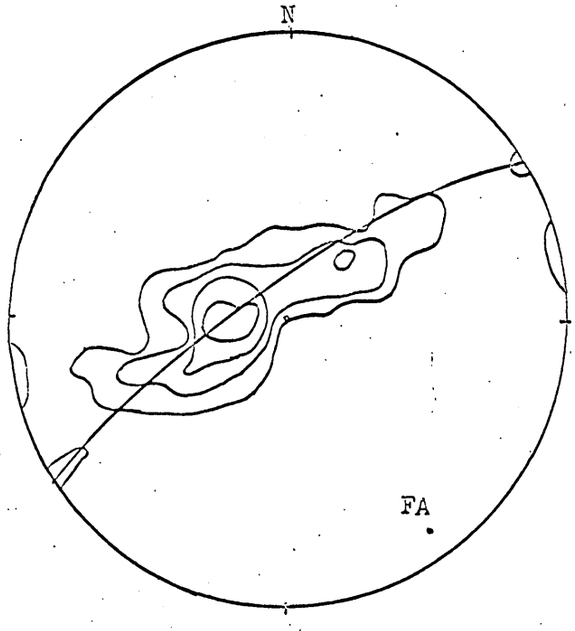

Fig. 59 - Equal-area plot of poles to bedding planes in the vicinity of the Sherman fault on White Ridge. Contours at 2, 5, 10 and 20 percent of the points per 1 percent area. Points plotted on lower hemisphere. FA = fold axis plunging 10°, S34°E.

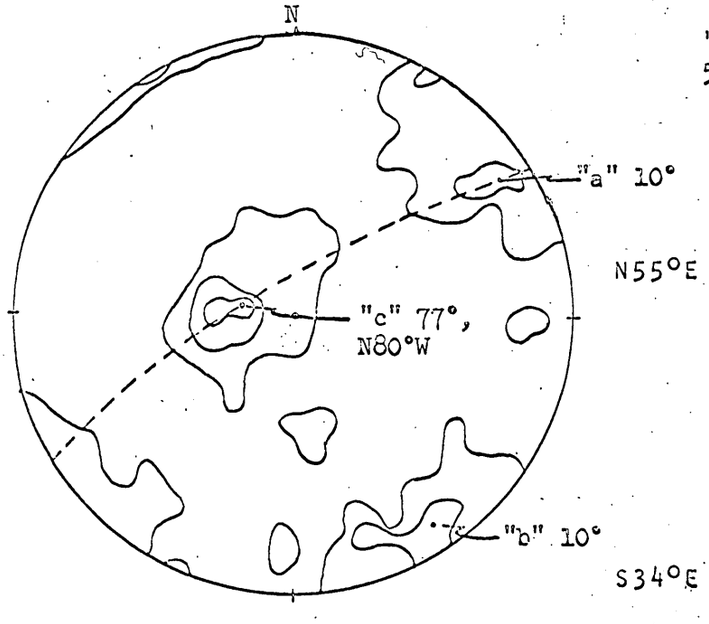

Fig. 65 - Equal-net plot combining lineations and poles to fractures measured in the vicinity of White Ridge. Dashed line represents girdle of poles to folded bedding plane fractures. Contours represent 1.5, 3 and 5 percent of points per 1 percent area.
(530 measurements)

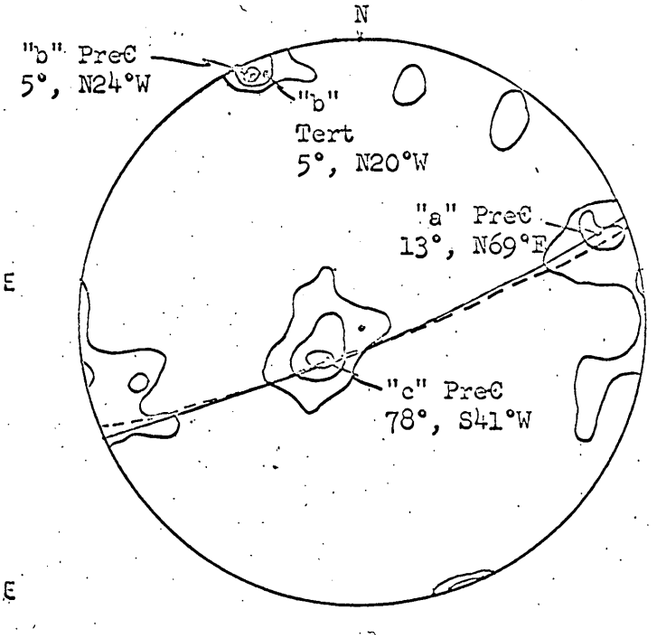

Fig. 68 - Equal-area plot combining lineations and poles to fractures measured in Precambrian metamorphic rocks of Horseshoe Amphitheatre. Contours represent 2, 5 and 7.5 percent of points per 1 percent area. Solid girdle represents folded bedding plane surfaces in metamorphic rocks. Dashed girdle represents Pennsylvanian bedding planes in the vicinity of the Sherman fold on Lamb Ridge (134 Precambrian measurements)

DIAMOND CORE DRILLING
DIAMOND DRILLING EQUIPMENT
GROUTING
FOUNDATION TESTING
MINING
QUARRYING
SHAFT SINKING
TUNNEL DRIVING
MINE PLANT DESIGN
AND FABRICATION

Boyles Bros.
DRILLING COMPANY
CONTRACTORS - ENGINEERS - GEOLOGISTS

~~2960 W. 7th Avenue~~ 15865 W. 5th. Ave.
~~DENVER, COLORADO~~ Golden, Colorado 80401
Phones: ALpine 5-9244
ALpine 5-0855

General Offices and Plant
1624 Pioneer Road P. O. Box 58
SALT LAKE CITY 10, UTAH
HUnter 7-7595

BRANCH OFFICES
PHOENIX
RENO
SPOKANE
DENVER
SACRAMENTO
ST. LOUIS

March 10, 1967

Mr. Duane Bloom
Earth Science, Inc.
1101 Washington Street
Golden, Colorado

Dear Sir:

We submit the following rates and conditions for your surface drilling program at the Mt. Champion mine area, near Leadville, Colorado, for the Hilltop Exploration project.

1. Mobilization of men and equipment - each rig. $ 500.00

2. Drilling overburden - per linear foot. 9.10

3. Drilling bedrock:

	NX	BX and AX	
0 - 500	$ 8.70	$ 7.90	
500 - 1000	9.90	8.40	
1000 - 1500		9.20	8.95
1500 - 2000		10.30	
2000 - 2500		11.80	
2500 - 2750		12.60	
2750 - 3000		13.60	13.75
3000 - 3250		14.70	
3250 - 3500		16.05	
3500 - 3750		17.65	
3750 - 4000		19.60	

4. Reaming:

0 - 500 feet - per foot	$ 4.60
500 - 1000 feet - per foot	5.80
1000 - 1500 feet - per foot	7.00

5. Standby time and delays - per hour $ 12.60

6. Cementing plus cost of cement, drill mud and packers - $ 15.50

7. Casing and drill rods lost in hole will be charged at our cost at job site.

8. Setting up, tearing down and moving, per two man crew - per hour $ 12.60

9. Timber for setup will be charged at our cost at job site.

10. Rig time for deflections will be charged at $ 22.00 per hour, plus cost of diamond bits, packers, wedges, survey instrument, all special equipment and technical engineer to run tools. We further estimate the cost of a deflection to be $ 660.00 plus the cost of engineer to run tools. Technical engineer, if requested, would be charged for at the rate of $ 100.00 per day plus living and travel expences.

11. Water to be furnished at the drill site free of charge, or could be furnished by Boyles Bros.. Our cost of truck rental is $ 220.00 per month plus .12¢ per mile and the drivers wages and payroll taxes.

With a very busy season ahead and the unavailability of equipment and trained personnel to supply the demand, it may be difficult to supply more than one rig for this operation.

We would appreciate immediate notice of acceptance to enable us to schedule as much equipment and personnel as possible to satisfy your needs.

We appreciate your interest in our Company and would strive to supply your needs to the best of our ability.

Very truly yours,

BOYLES BROS. DRILLING COMPANY

George E. Lensch

George E. Lensch, District Manager

GEL/bf

Nu-Mine Coal Company, Inc.

BOX 419

GUNNISON, COLO. 81230

PHONE: 641-0694

March 18, 1967

MAR 20 1967

Earth Sciences
Golden, Colorado

Attention: Duane Bloom

Dear Duane,

I am hereby submitting my bid for the work as per our telephone conversation on the access road eight miles East of Leadville, Colorado.

As you will notice the cost is somewhat higher than last year because of the rise in operating cost, but have tried to keep it within reason.

H. D. 16 Allis Chalmers dozer (140- 200 hrs.)	$18.00 per hrs.
Backhoe	12.00 per hr.
Compressor, Ingersoll Rand 125 cfm Rotary Drill Gardner Denver 55 # 7/8" chuck and two men to operate. (includes steel, bits, hose,) (This does not include powder and caps.)	15.00 per hr.
Moving charge (one way) (We feel that we can afford to move out for no charge on this amount of work)	150.00

Thank you for the opportunity to bid on this. Hope to see you in Mid-June.

Yours very truly,

NU-MINE COAL COMPANY, INC.

Robert L. Vinson

Robert L. Vinson

RV/iv

PRICE QUOTATION

PHONE (303) 744-6371
560 SOUTH LIPAN STREET • DENVER, COLORADO 80223
Colorado Pump & Supply Co.

March 22, 1967 № 7410

TO: Earth Science
1101 Washington Street,
Colden, Colorado 80401

FOR: LEADVILLE JOB.

ATTENTION: Mr. Dwain Bloom

	UNIT PRICE	TOTAL
Dear Dwain: Pursuant to our recent conversation regarding a booster pump for your Leadville Job, we are pleased to offer the following for your consideration:		
CONDITION OF SERVICE: 140 GPM @ 737' TDH		
One (1) Peerless Pump Model 2-1/2 TUAP-13-1/2 2-stage horizontal split case bronze fitted centrifugal pump base and powered by a I. H. Model UDT-361 75 H.P. @ 2400 RPM, 6 cylinder diesel engine. Engine to be equipped with Turbo Charger, base engine and pump sheaves, 10 Vee belts, 2 pillow blocks, jack shaft, 1 - 3" 125# Companion flange w/nuts, bolts and gaskets, 1 - 4" 250# Companion flange w/nuts, bolts and gaskets, 1 - 4" x 2-1/2" 250# Flange, 90° Ell w/nuts, bolts and gaskets, 1 - 4" Check Valve, 1 - 4" galvanized union, 1 - 4" x 12" galvanized nipple, 1617' - 4" black pipe threaded and coupled.		$ 7,755.00
Weight: 1 - Pump, engine and accessories - 4000# 2 - Pipe - 17,787#		
If we may be of any additional service, please feel free to contact us.		
TERMS Net 30 days. DELIVERY 1) - 3-4 weeks - 2) - Stock FOB POINT Denver, Colorado WEIGHT As indicated.		
Yours very truly,	TOTAL	

This quotation subject to acceptance within 30 days. All quotations are subject to conditions beyond our control. Errors subject to correction. Please read this quotation carefully to ascertain whether it is complete for purpose intended. Guarantees: Standard Manufacturers' guarantees will apply.

MHS:bk

ACCEPTANCE:
FOR
BY
DATE

COLORADO PUMP & SUPPLY CO.
BY: M. H. Strong

Rec'd 7/5/77

United States Department of the Interior

GEOLOGICAL SURVEY
Box 25046
Denver Federal Center
Denver, Colorado 80225
Mail Stop 932

IN REPLY REFER TO:

MEMORANDUM

July 1, 1977

TO : Chief, Office of Minerals Exploration

FROM : Field Officer, Region III

SUBJECT: Monthly Report of OME Activities for June 1977

Received 47 inquiries and requests for information and literature. There were no interim or final field inspections made during June. Did Technical Review on Robert Hall's alunite resource report June 10 to 14.

Reviewed C. H. Turner's preliminary report on OME docket 6885, San Juan Mine. Contract work was terminated March 17, 1977. Turner submitted the Operator's final report by mail June 24, which arrived in this office June 27. This report was transmitted to Washington July 1, 1977. My report on OME docket 6885 will be submitted shortly.

Prepared and submitted CRIB data on 45 OME dockets, 13 DMA and DMEA dockets. Some 400 dockets have now been submitted to Eleanor Keefer for computer printouts.

I escorted Dr. Abdul Aziz Hussein, of the Egyptian Geological Survey to Climax and Leadville, Colorado to visit the Climax Molybdenum Operations, as well as ASARCO's Black Cloud, and Day Mines Inc. Sherman Mine. The Sherman Mine is the outgrowth of an earlier OME application on the Hill Top Mine, OME docket 6615. As you recall their proposal was to explore the area from Iowa gulch west of the Continental Divide via a long access tunnel under Mt. Sherman north of the Hill Top property to intersect steeply dipping near vertical veins cutting gently dipping Leadville limestone for replacement type ore bodies containing primary and secondary silver, lead, zinc, and gold.

After several millions of dollars had been spent by Leadville Lead Corporation in exploration, mine development and metallurgy, Day Mines Inc., Wallace, Idaho purchased the mine about two years ago and are now producing some 800 tons of ore per day assaying 30-1200 ounces of silver per ton, milling it at Leadville, and shipping to Bunker Hill. The ore is much the same as was mined during early day production at

AMERICAN REVOLUTION BICENTENNIAL 1776-1976 ©

Leadville, that is, high grade silver values with lead, zinc, and some gold. Alan Heyl and Richard Taylor accompanied us at the Sherman Mine. We did extensive sampling for work in conjunction with massive, replacement-type ore body studies in Colorado.

Keith Drosti, now General Manager for Day Mines, formerly geologist with Bunker Hill Mines, and Garth Crosby, Chief Geologist, Day Mines, indicate that the Sherman Mine Operation is still a touch and go situation, with tricky metallurgy and all.

J. William Hasler
Field Officer, Region III
Office of Minerals Exploration

Mail Stop 932

July 1, 1977

Mr. Keith J. Drosti, General Manager
Day Mines Incorporated
P.O. Box 1010
Wallace, Idaho 83873

Dear Keith:

Thank you for your time, hospitality, and permission to visit the Sherman Mine last Thursday, June 23 during Dr. Hussein of the Egyptian Geological Survey and our visit to the Leadville area.

Robert Johansing gave us a real "Cook's" tour of the Sherman Mine. He seems a bright energetic young geologist and is certainly doing a fine job for you.

Allen Heyl and Richard Taylor of the Survey arrived at the mine just after lunch and thoroughly enjoyed their visit, as did I.

Allen has been busy identifying the many minerals collected from the various working faces and brought a list of them to me yesterday. He said this is at least a beginning in determining the suite of specimens collected.

Bob Johansing is planning to spend some time in the Survey's laboratories here this fall or winter with Allen and Richard.

Again, Keith, thank you.

Best regards,

Bill

J. William Hasler
Geologist

cc: Chief, OME
OME file
Hasler chron

HK 7/6/9

Mail Stop 932

July 1, 1977

Mr. Robert Johansing, Geologist
Day Mines Incorporated
Box D
Leadville, Colorado 80461

Dear Robert:

Thank you for conducting us through the Sherman Mine last Thursday. We certainly appreciated your hospitality, time, and effort in showing us around. Dr. Hussein, Allen Heyl, Richard Taylor, and I thoroughly enjoyed the visit.

We hope we can visit the mine at another time. Thank you again.

Sincerely yours,

J. William Hasler
Geologist

cc: Chief, OME
OME file
Hasler chron

Mail Stop 932

July 1, 1977

Mr. Garth Crosby, Chief Geologist
Day Mines Incorporated
P.O. Box 1010
Wallace, Idaho 83873

Dear Garth:

Dr. Hussein, Egyptian Geological Survey, Allen Heyl, Richard Taylor, and I had a most informative and interesting visit to the Sherman Mine in Leadville last Thursday. Thanks to you and Keith.

I was most surprised to see Keith at the Leadville Mine office Wednesday. We had a fine visit with him but were sorry that he had made the trip to Leadville under such tragic circumstances.

Enclosed is a preliminary determination of the suite of minerals collected by Bob Johansing and us. Allen Heyl brought the list up yesterday and said it is at least a beginning.

Bob Johansing is planning a visit to Denver sometime this fall or winter and will spend some time with Richard Taylor and Allen Heyl in our laboratories.

Thank you again, Garth, and I hope we'll see you again before too long.

Best regards,

Bill

J. William Hasler
Geologist

cc: Chief, OME
OME file
Hasler chron

✓ HK 7/6/77

Mail Stop 932

July 1, 1977

Mr. Lyman Thorpe, Resident Geologist
ASARCO
Box 936
Leadville, Colorado 80461

Dear Mr. Thorpe:

Thank you for your hospitality and time during Dr. Hussein, of the Egyptian Geological Survey, and my visit to the Black Cloud Mine last Thursday.

It is always interesting to see the Leadville replacement deposits from time to time, and it was especially interesting to Dr. Hussein. He expressed his appreciation to us for the visit to Leadville. Thank Leroy Swanson for the guidance underground.

Sincerely yours,

Bill

J. William Hasler
Geologist

cc: Chief, OME
OME file
Hasler chron

HR 7/6/77

Mail Stop 932

July 1, 1977

Mr. Vaughn E. Surface, Resident Geologist
AMAX Climax Molybdenum
Geology Department
Leadville, Colorado 80429

Dear Vaughn:

Thank you for your time and hospitality in conducting Dr. Abdel Aziz Hussein, of the Egyptian Geological Survey and me through the open pit operations June 22.

I know your taking time with "visiting firemen" prevents you from doing essential work and we appreciate your many kindnesses.

We were returning to Denver last Thursday via Climax and the large "moving" block of ground you pointed out to us with the snow crevasse on the northwest side of the glory hole is certainly visible as one is approaching Climax from Leadville.

Dr. Hussein was most impressed by your explanation of the geology of Climax, and stated "He certainly left me with no questions to ask." He really seemed to enjoy the visit to Climax. Again, thank you.

Sincerely yours,

Bill

J. William Hasler
Geologist

cc: Chief, OME
OME file
Hasler chron

United States Department of the Interior

GEOLOGICAL SURVEY
RESTON, VIRGINIA 22092

August 26, 1975

Memorandum

To: Field Officer, Region III

From: Chief, Office of Minerals Exploration

Subject: OME-6615 (Ag, Au, Cu)
Leadville Lead Corporation
Hilltop Property
Park and Lane Counties, Colorado

If the geologists from Day Mines, Inc., wish copies of maps or other material in the subject docket file, which they will review in your office, please advise us and we will forward the desired maps, etc., to Cooper-Trent for duplication as the geologists request and at their expense.

In the meantime, we will recall the docket from the Records Center in anticipation of this procedure.

Harold Kirkemo, Chief
Office of Minerals Exploration

DRF
MR Rdg.
OME Rdg.
OME Files
Mr. Kirkemo

HKirkemo/gpw

HK 9/25/75

United States Department of the Interior

GEOLOGICAL SURVEY
Denver Federal Center
Denver, Colorado 80225

IN REPLY REFER TO: Bldg. 53 E-2400

August 22, 1975

Memorandum

To: Chief, Office of Minerals Exploration

From: Field Officer, Region III

Subject: OME-6615 (Ag, Au, Cu)
Leadville Lead Corp.
Hilltop Property
Park and Lake Counties, Colorado

Garth Crosby, Chief Geologist for Day Mines, Inc., Wallace, Idaho talked with me on August 8, 1975 concerning the release of information included in the application for assistance in minerals exploration by Leadville Lead Corporation on the Hilltop Property, Park and Lake Counties, Colorado.

Day Mines, Inc., assumed management of the property of the Leadville Corporation at Leadville, Colorado, last September. According to Mr. Crosby, the Leadville Lead Corporation people here in Golden are unable to locate the original or any copies of the above-referenced application.

I instructed Mr. Crosby to obtain permission from the owner to furnish this office with a letter requesting that the data be released or made available to Day Mines, Inc.

Enclosed is a letter dated August 14, 1975 from RobertG. Risk, President, Leadville Corporation giving us permission to release the application to Day Mines, Inc.

I think, that at some time after their application was denied, Leadville Lead Corp. requested that one of their applications be returned to them. They applied for assistance on three different properties one of which went to contract (OME-6719), New Orphan Boy; the others, OME-6615, the Hilltop Property and OME-6620, Colorado Central, were denied. It may be that one of these two applications was returned to them. I vaguely remember it was the Colorado Central application. I have the application material from the Hilltop property in my files, and the Day Mines' geologists may come here and review the application material

although I have no way to duplicate the maps. I believe it would be best for them to obtain the material through your office especially with reference to the freedom of information act. I would suggest handling this request the same as previous requests by sending the material out to be duplicated at their expense. I think we should maintain our copy of the application as it does have some good geologic data in it.

J. William Hasler

J. William Hasler,
Field Officer, Region III
Office of Minerals Exploration

Enclosure

OFFICE OF THE PRESIDENT:
ROBERT G. RISK
President
401 E. 34th Street
Indianapolis, Indiana 46205
Telephone: 317-925-4221

RECEIVED
AREA GEOLOGIST
CONSERVATION DIVISION
AUG 18 1975
GEOLOGICAL SURVEY
LAKEWOOD, COLORADO

COMPANY OFFICE:
ROBERT A. KNECHT
Vice-President; Secretary-Treasurer
1677 Wadsworth Blvd.
Denver, Colorado 80215
Telephone: 303-237-1395

AUG 20 1975
Denver, Colorado

August 14, 1975

OME Region IV
RECEIVED
AUG 20 1975
Denver, Colorado

Office of Mineral Evaluation
Denver Federal Center
West Sixth Avenue & Kipling
Denver, Colorado 80215

Dear Sir:

Day Mines, Inc., of Wallace, Idaho, is presently leasing the properties of Leadville Corporation. You have an application on file, #6615 entitled "Silver - Gold - Copper, Hilltop Mine, Park and Lake Counties, Colorado," which Day feels is important to their investigation of the properties. By this letter I hereby authorize you to release information related to this application to representatives of Day Mines, Inc., and request that they be allowed to review and copy the information.

Sincerely,

Robert G. Risk, President

RGR/ml

cc: Mr. William Calhoun
Mr. James L. Browne

THE DENVER POST
Tues., Mar. 2, 1971 45
★

Business--F

$6.25 Million Asked By Evergreen Firm

GOLDEN—Frontier Constructors, Inc., Evergreen, Colo., and two of its officers have filed suit in District Court here seeking nearly $6.25 million in damages from a Leadville, Colo., mining company, a Golden mining investment and research corporation, their officers and a law firm representing both.

Daniel McFadden, president, and Dyke Howell, secretary of the construction company, are asking for $250,000 special damages, $1 million general damages and $5 million punitive damages.

The suit contains 37 claims for relief, most of them concerning two letters which the plaintiffs claim were of a defamatory nature.

Named as defendants are Leadville Lead, Inc., also known as Leadville Corp.; Earth Sciences, Inc., Golden; Robert G. Risk and Robert A. Knecht, officers of the Leadville company; Duane N. Bloom of Earth Sciences; the law firm of Davis, Graham and Stubbs, and Robert S. Zinn, an attorney of the firm representing both companies.

Camp Bird Colorado, Inc., also known as Federal Resources Corp., is a third-party plaintiff seeking return or the value of leased equipment amounting to $4,359, plus $20,000 punitive damages.

The construction company also is suing for $37,711 in alleged unpaid bills; $281,576 for other work completed on a mine tunnel; $500,000 for depreciation, overhead and administrative costs for its personnel and equipment tied up at Leadville, and $250,000 actual and $1 million punitive damages for a contract lost with another company because of the present problem.

The construction company also is suing for $120,000 for loss of personnel and time at Leadville because of the mining company's alleged failure to supply adequate warming, storage and cleaning facilities for its workmen, many of whom quit to work for other area companies, the plaintiffs said.

The suit, assigned to Dist. Judge Ronald Hardesty, was filed by Golden attorney Ronald F. Weiszmann.

OME 6615
OME 6719
contract 2279

MME Form 7
(2/63)

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Date	Surname	Code
6/6/68	Peterson	120
6/6/68	Kirkham	120
"	Johnson	110
6/7	Lindgren	
6/7	Jewett	
	Cooper	
		110
		220

JUN 1 2 1968

AIRMAIL

Leadville Lead Corporation
1677 Wadsworth Blvd.
Denver, Colorado 80215

Re: OME-6615 (Silver, Gold, Copper)
Leadville Lead Corporation
Milltop Property
Park and Lake Counties, Colorado

Gentlemen:

A careful review has been made of all the information available to us relating to your amended application for financial assistance to explore the subject property. This review indicates that not enough geologic information has been furnished to identify with reasonable certainty the proposed exploration targets. We must conclude that the probability of disclosing significant ore reserves on the property is not sufficiently promising to justify Government participation in the proposed work. Accordingly, we regret to inform you that your application for assistance is denied.

We wish to thank you for your interest in the minerals exploration program and for bringing your property to our attention.

The numerous maps and reports submitted with the application are being returned to you as requested.

Sincerely yours,

FRANK E. JOHNSON

Frank E. Johnson
Chief, Office of
Minerals Exploration

cc: Director's Reading File
Economic Geology File
OME File
OME Reading File
Region III
Mr. Peterson

ECPeterson/bsl 6/6/68

MME Form 7
(2/63)

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Date	Surname	Code
6/6/68	[illegible]	120
		120
6/6	Johnson	110
		220

Memorandum

To: The File

From: E. C. Peterson

Subject: OME-6615 (Silver, Gold, Copper)
Leadville Lead Corporation
Hilltop Property
Park and Lake Counties, Colorado

Justification for Denial of Application

The Field Officer in his report recommends that the cited amended application for assistance be approved and a contract prepared. However, after a careful review of the report and new data submitted by the Applicant, it is recommended that the application be denied on the basis that the proposed work is prospecting rather than exploration.

It is questionable whether fault structures encountered on the Hilltop property persist for several thousand feet through the project area as surmised by the Applicant's consultant. No geologic evidence has been presented to confirm this belief. Consequently, there are no exploration targets that can be identified with certainty.

In addition, it is not likely that the proposed method of exploration could be carried on in the effective manner as suggested in the proposal.

We have discussed our findings with the Field Officer and he agrees with the recommendation.

E. C. Peterson

E. C. Peterson

cc: Director's Reading File
Economic Geology File
OME Docket
OME Reading File
~~Region III~~
Mr. Peterson

ECPeterson/bsl 6/6/68

IN REPLY REFER TO:

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
FEDERAL CENTER, DENVER, COLORADO 80225

Office of Minerals Exploration
Building 53 Room 203

April 17, 1968

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EP | 130 P

Memorandum

To: Chief, Office of Minerals Exploration

From: Field Officer, Region III

Subject: OME-6615 (Ag, Au, Cu)
Leadville Lead Corporation
Hilltop Property
Park and Lake Counties, Colorado

Transmitted herewith is an Amended Report of Examination by J. William Hasler on the subject property recommending approval to complete the exploration work herein outlined as a Stage I contract. The exploration work consists of drilling 5 diamond drill holes totalling an estimated 5,571 feet at an estimated total cost of $93,618.75. Government participation at 62-1/2 percent will total an estimated $58,511.71. Enclosed are additional data supplied by the applicant as well as maps for inclusion in a contract if prepared.

J. William Hasler

J. William Hasler,
Field Officer, Region III
Office of Minerals Exploration

Enclosures

UNITED STATES

DEPARTMENT OF THE INTERIOR

STEWART L. UDALL, SECRETARY

U. S. GEOLOGICAL SURVEY

OFFICE OF MINERALS EXPLORATION

AMENDED REPORT OF EXAMINATION

OME-6615 (Silver, gold, copper)

LEADVILLE LEAD CORPORATION

HILLTOP MINE

PARK AND LAKE COUNTIES

COLORADO

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Amended Report of Exam,

By

J. William Hasler,

Geologist

April, 1968

CONTENTS

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Introduction and summary	1
Estimate of costs	3
Developed Reserves	7
Indicated Reserves	7
Inferred Reserves	7

ILLUSTRATIONS

Exhibit A - Geologic map of the Hilltop Mining Property, Leadville Lead Corporation

Exhibit B - Claim map of subordinated ground, Leadville Lead Corporation, Park and Lake Counties, Colorado

Exhibit B-1 Geologic Section along DDH IG-1

B-2 Geologic Section along DDH IG-2

B-3 Geologic Section along DDH IG-3

B-4 Geologic Section along DDH IG-4

B-5 Geologic Section along DDH IG-5

Introduction and Summary

The Leadville Lead Corporation, 1677 Wadsworth Boulevard, Denver, Colorado, applied to the Office of Minerals Exploration for financial assistance to explore for silver, gold, and copper on the property of the Hilltop Mine, Park and Lake Counties, Colorado at an estimated cost of $425,279.85.

The application was referred to the field and an examination of the property was made on July 11 and 12, 1967 by J. W. Hasler. The report of examination submitted during October 1967 indicated that the area referred to above warrants exploration but that the operator's target areas were too generalized, and that the projections from presently known geologic data were too great to insure the probable discovery of new and undiscovered reserves of silver, gold and copper. The application was therefore denied without prejudice.

The applicant and his geologic consultant, Dr. Duane Bloom, of Earth Sciences, Inc. held a meeting November 29, 1967 in Washington, and were requested to submit an amended application stressing more realistic and definite targets, as well as to stage the work to insure a more closely supervised exploration program. The applicant has now submitted an amended application to complete the proposed exploration.

His program is as follows: It is proposed that the program be altered to provide for 5 diamond drill holes with a total length of 5,571 feet and located as shown on the enclosed map, Exhibit A. The holes will start in the "ore horizon" of the Leadville formation

and be oriented east, down the dip of the host rock (approximately -15°). The holes will be controlled to remain in the ore horizon by directional drilling techniques. The 5 holes will be spaced about 650 feet and 750 feet apart, the southernmost station being approximately 900 feet north of the Hilltop Mine workings. The holes vary from 700 to 1500 feet in length and are expected to intersect potential ore bearing structures as shown on the enclosed cross sections. The Leadville Lead corporation will bear the expense of providing access to the area, preparing the sites, constructing facilities for obtaining drill water and putting cased holes into each site to a depth of approximately 100 feet. Request is made for OME assistance to extend each of these holes to the following depths:

IG-1	1300 feet
IG-2	700 feet
IG-3	1500 feet
IG-4	1500 feet
IG-5	1200 feet

It is expected that the advance preparation for core drilling will be completed between June 1 and June 15, 1968. Drilling should be carried on around the clock on a 7-day week until completed. Past experience suggests that each rig will average approximately 60 ft./day; thus the program should be completed 31 days after moving on site (set up and teardown - 4 days, drilling - 25 days, miscellaneous down time - 2 days).

ESTIMATE OF COSTS

Assumptions

1. 100 hours cementing time/2,000 ft. of drilling.
2. The holes will have to be deflected one time for each 500 ft. drilled to remain in the "ore horizon" and the average deflection will require 4 hours rig time.

a. Independent contracts

1. Mobilization and demobilization of 5 surface drilling units @ $500/unit---------- $2500.00
2. Set up and tear down 5 units
   160 hours @ $14.25---------- $2280.00
3. Diamond core drilling
   a. 100 - 250 ft. 4 holes, 229 - 250 ft. 1 hole, 621 ft. NX wl @ $10.00---------- 6210.00
   b. 250 - 500 ft. 5 holes 1250 ft. NX wl @ $10.00---------- 12500.00
   c. 500 - 750 ft. 4 holes, 500 - 700 ft. 1 hole 1200 ft. BX wl @ $9.55 ---------- 11460.00
   d. 750 - 1000 ft. 4 holes 1000 ft. BX wl @ $9.55---------- 9550.00
   e. 1000 - 1250 ft 3 holes, 1000 - 1200 ft. 1 hole 950 ft. BX wl @ $10.50---------- 9975.00

ESTIMATE OF COSTS

(Continued)

a. Independent contracts --

3 f. 1250 - 1500 ft. 2 holes

1250 - 1300 ft. 1 hole

550 ft. BX wl @ $10.50---------- $5775.00

4. Lost casing

a. 400 ft. of NX casing

@ $28.00/10 ft.---------- 1120.00

b. 1000 ft. of BX casing

@ $18.15/10 ft. ---------- 1815.00

5. Lost rods

a. 1000 ft. BX rod

? @ $19.35/10 ft.---------- 1935.00

6. Cement and hole plugging agents

? 50¢/ft. drilled

5,571 ft x 50¢---------- 2785.50

7. Cementing and redrilling

1 hr/20 ft. drilled

? $\frac{5571 \text{ ft}}{20}$ = 279 hrs @ $17.50---------- 4882.50

8. Rig time casing

1 hr./80 ft. drilled

$\frac{5,571 \text{ ft.}}{80}$ = 70 hrs. @ $17.50---------- 1225.00

9. Card board core boxes

557 boxes @ $1.00/box---------- 557.00

ESTIMATE OF COSTS

(Continued)

a. Independent contracts

10. Hole deflections (includes engineer, tools, and bits).

what control would Gov't have for this operation? Any deflection would be a claimable item unless controls were established.

1 deflection / 500 ft.

$\frac{5571 \text{ ft.}}{500}$ = 11 deflections

@ $650/deflection---------- $7150.00

11. Rig time for hole deflections

11 deflections x 4 hrs. each

44 hrs. @ $22.50---------- 990.00

12. Standby time miscellaneous (water, road problems, etc.)

1 hr. per 50 ft. drilled

$\frac{5571 \text{ ft.}}{50}$ = 111 hrs. @ $14.25---------- 1581.75

b. Personal services

1. Senior geological engineer 35 days @ $93.40/day

(includes $75/day fee, 20 miles @ $.12/mile round trip from Leadville and $16.00 per diem) ---------- 3269.00

2. Draftsman

?

40 hours @ $5.00/hr---------- 200.00

c. Operating materials and supplies

1. Fuel for water pump

20 gal/day for 30 days

600 gals @ 35¢/gal ---------- 210.00

ESTIMATE OF COSTS

(Continued)

d. Operating equipment

1. "Eastman Single Shot" survey

instrument. 30 days @ $75/5 days +$8/day over 5 days---$ 275.00

2. Field office (rental)

30 days @ $5/day + $100 moving costs----------$ 250.00

3. Water pump rental

? Assume 5 pumps @ $4/each/day

30 days @ $20/day----------$ 600.00

4. Two 4-wheel drive vehicles

30 days/vehicle @ $10/day/vehicle----------$ 600.00

see GSA allowance?

600 miles @ 25¢/mile----------$ 150.00

e. Initial rehabilitation and repairs ---------- none

f. New buildings, fixtures, installations---------- none

g. Miscellaneous

Necessary?

1. Spectrographic analyses for five elements

5 ft. samples $\frac{5571}{5}$ + 1114 samples

$ 2.50/sample----------$2785.00

Name elements for assay

2. Assays 5 assays/target, 22 targets

110 assays for 5 elements @ $7---------- $ 770.00

Necessary?

3. Thin sections

One thin section/100 ft.

$\frac{5571}{100}$ = 56 thin sections @ $2----------$168.00

4. Reproductions and drafting supplies---------- $ 50.00

Total	$93,618.75
Total OME participation requested 62-1/2%	$58,511.71
Leadville Lead participation 37-1/2%	$35,167.04

In a letter dated February 2, 1968 to the First National Bank of Denver (included herein) the applicant states that the exploration program at the Hilltop mine has located 303,958 tons of ore (See Table attached) that includes developed reserves,indicated reserves, and inferred reserves. This ore is quoted to average 0.030 oz Au, 6.51 oz. Ag, 0.119% Cu, 2.52% Pb and 1.08% Zn. At current prices these reserves would gross an estimated $33.92 per ton. Minerals eligible for OME assistance (gold, silver and copper) would gross $23.95 per ton, or amounting to some 70 percent of the total value of the ore. Gold was calculated at $37.00 per ounce.

Ore Body	Tons	oz. Au	oz. Ag	%Cu	%Pb	%Zn
			Developed Reserves			
New Hilltop	154,381	0.034	3.68	0.144	4.04	5.53
Last Hope Vein	21,307	Drilling not yet completed.				
			Indicated Reserves			
McGillis Vein	6,138	0.05	9.95	0.13	1.01	0.18
Stewart-Fulton	7,914	Varying grade ore				
Last Hope	6,938	0.04	7.01	0.15	1.74	0.14
Dump Material	40,000	Material containing $20.00 gross metal value				
			Inferred Reserves			
West Hilltop Vein	50,400	0.01	2.76	0.133	2.92	0.71
South Ext. 1038B	8,280	0.03	4.77	0.104	2.90	1.40
Hilltop Shaft Vein	200	0.08	16.12	0.228	1.62	1.50
Vein between McGillis & Last Hope	3,000	0.034	5.09	0.190	1.06	0.11
115 Level Veins	4,200	------	1.59	------	7.40	0.14
2nd vein	1,200	------	7.64	------	------	-------

A review of the applicant's 303,958 total tonnage figure as shown in his letter dated February 2, 1968 to the First National Bank of Denver indicates that some of this tonnage includes some material in which the assays have been generalized. Excluding this dubious material, I obtained a total tonnage of some 234,737 tons of material that assayed an estimated 0.03 oz. Au, 6.51 oz. Ag, 1.17% Cu, 2.52% Pb and 1.08% Zn per ton. At current metal prices this material would total approximately $34.30 per ton with the eligible minerals gold, silver and copper totalling $24.34, or 70.09 percent of the total value of the ore.

Exploration work completed to date has consisted of building some 5,000 feet of access road along Iowa Gulch to the site of proposed rill hole, IG-2, installed a pump system which will adequately supply water for several rigs designed to complete the proposed drilling program and prepare the drill site for the completion of drill hole IG-2. Drill hole IG-2 was completed to a depth of 219 feet and had penetrated Leadville Dolomite containing two mineralized veins, 10 feet wide, and one which is 30 feet wide. The lead, zinc and some of the silver minerals have been leached from these veins because of their nearness to the surface, however, the gold and silver content of the gossan indicates that the veins should carry ore grade material at depth.

The access road intersected several faults containing reported ore-grade mineralization as shown on the applicant's latest map but no assays were submitted.

Spectrochemical analyses from drill cores obtained from drill holes IG-2 shows the following values:

Core Sample	Ag oz.	Zn%	Sludge Sample	Ag oz.	Zn%
1' - 5'	3.4	0.5	-----	-----	------
5' - 10'	0.5	------	------	-------	------
10' - 15'	0.4	-------	-------	-------	------
15' - 20'	0.6	-------	-------	--------	------
20 - 25'	2.0	-------	-------	-------	-------
55' - 60	0.5	0.4	-------	------	-------
60' - 65'	2.5	0.6	62' - 67'	2.0	0.3
65' - 70'	1.0	0.4	67' - 72'	2.0	0.4
70' - 75'	2.4	0.5	72' - 77'	2.0	0.5
75' - 82'	2.7	0.4	------	------	--------
Vein Sample					
B Vein	-------	-------	--------	-------	---------
17' - 21'	1.0	-------	---------	---------	---------
C Vein	--------	-------	---------	-------	---------
62' - 73'	2.0	0.4	---------	-------	---------
73' - 82'	2.5	0.4	--------	--------	---------
Wet	---------	----------	----------	---------	--------
73' - 82'	2.5	0.3	--------	--------	--------

Although the spectrochemical analyses shows only a few zones of mineralized material it is believed that the applicant's proposed drill holes herein outlined is better designed to explore the northward extensions of the Big Fault, Doran, Emily, Louisville, Fulton and Addie fault structures, by drilling holes IG-1, IG-2, IG-3, IG-4 and IG-5 totalling an estimated 5,571 feet as shown on the accompanying map.

The proposed holes IG-1 through IG-5 should adequately explore the Leadville formation in the intensely fractured area that lies between the Hilltop and the Continental Chief Mines. (Exhibit 1 and Cross sections Exhibits B-1, B-2, B-3, B-4 and B-5). There is a good chance of discovering new and undiscovered ore bodies of silver and copper that may be comparable in size to those ore bodies mined from the Hilltop mine, and it is recommended that a contract be prepared to complete the work herein outlined.

The claims to be included in the proposed contract are listed in pages 3 and 4 of myReport of Examination on the subject property submitted during October, 1967, and shown on the accompanying claim map. On page 4 of that report the Diamond Field, a patented claim, should show the survey number 6590 rather than 6920, and the Atlixco, another patented claim, should show the survey number 13664, rather than 7316.

The applicant's costs appear to be pretty much in line except for the item of two senior field technicians for 35 days which is being disallowed. Total cost of the exploration program is estimated to be $93,618.75. The Government's amount based on a participation of 62.5 percent will be approximately $58,511.71

Enclosed are copies of the applicant's most recent diamond drilling bids, and accompanying costs and correspondence. Enclosed also are illustrations for inclusion in a proposed contract.

Standard Form No. 65
November 1961
General Services Administration
FPMR (41 CFR) 101-11.6

U.S. Government Messenger Envelope

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		220
		120M

Memorandum

To: The File

From: Edward C. Peterson

Subject: OME-6615 (Silver, Gold, Copper)
Leadville Lead Corporation
Hilltop Property
Park and Lake Counties, Colorado

Dr. Duane Bloom called today (5/6/68) regarding the status of the subject application.

He was informed that the proposal and the Field Officer's report were being reviewed, and unless additional information was required, a decision regarding the application should be reached shortly.

I informed Mr. Bloom that if an exploration contract was prepared it could not be executed until sometime in the next quarter (after July 1), because of insufficient OME funds available at this time. Also, any work his company may perform in reference to the proposed project, prior to the signing of a contract, would be at the company's own expense.

Mr. Bloom stated that he understood the money situation, and requested that we inform him of our decision regarding the proposal as soon as possible.

Edward C. Peterson

Edward C. Peterson

cc: Director's Reading File
Division File
Economic Geology File
OME Docket
OME Reading File
Mr. Peterson

ECPeterson/bsl 5/7/68

Peterson 120
Skibenes 120
Johnson 110
EAC 220

120M

November 29, 1967

Memorandum

To: The File

From: E. C. Peterson

Subject: OME-6615 (Silver, Gold, Copper)
Leadville Lead Corporation
Hilltop Property
Park and Lake Counties, Colorado

Mr. Robert Risk, President of Leadville Lead Corporation, and Dr. Duane Bloom, his consulting Geologist, visited our office today to discuss with OME personnel Leadville's recently denied application and to propose an amended program.

The new proposal consists of two stages of diamond core drilling at an estimated cost of about $300,000.00. Other than less drilling and the work being divided into two stages, the project was similar to the denied one. OME was not impressed with the proposal although Dr. Bloom presented geologic maps and cross sections of the project area that were in much greater detail than what was previously submitted. Targets were outlined and other data shown that were lacking from the original material.

After a lengthly discussion, it was finally decided that the OME would consider a new proposal limited to the work proposed in the above Stage I, with possible additional work to be authorized later depending upon the results of the initial program.

Both Risk and Bloom seemed satisfied with this, and Bloom will submit such a proposal shortly. Total estimated cost to be about $90,000.00.

E. C. Peterson

E. C. Peterson

cc: Director's Reading File
Division File
Economic Geology File
OME File
OME Reading File
Mr. Peterson

Peterson/bsl 1/29/68

EARTH SCIENCES, INC.

GEOLOGY GEOCHEMISTRY GEOPHYSICS Golden, Colorado 80401

303-279-7733

November 27, 1967

Mr. J. William Hasler
Field Officer Region III
Office of Mineral Exploration
U.S. Geological Survey
Denver Federal Center
Building 25, Room 2284
Denver, Colorado 80225

OME Region III
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Denver, Colorado

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SUBJECT: ADDENDUM TO LEADVILLE LEAD PROPOSAL OF 2/67 (Docket No. OME-6615)

Dear Bill:

The following is offered as a revised program for the Leadville Lead application for OME assistance. The revised program provides for an initial drilling stage to begin approximately June 1, 1968, consisting of five 750 ft. holes. These holes will be located in the "ore horizon" and oriented to cut faults known to be mineralized at some positions along their lengths. The holes should yield at least 16 target intersections.

The second drilling stage would extend each of the five holes to 2500 ft. This drilling should yield at least 20 additional target interesections on known mineralized faults.

An accurate estimate of the costs of this program cannot be made without contractor bids for work in the summer of 1968. However, an approximation can be made on the basis of bids submitted and costs for the 1967 field season.

1. Construction of access road 1700 ft. @ $1/ft.	$1700.00
2. Preparation of drill sites 4 sites @ $2260/site?	$9040.00
3. Stage 1 drilling 4 holes drilled to 750 ft., extend 1 hole from 220 ft. to 750 ft. 3530 ft. @ $23.30/ft.	$82,249.00
Sub Total	$92,989.00

4. Stage 2 drilling
   5 holes extended from 750 ft. to 2500 ft.
   8750 ft. @ $23.30/ft. $203,875.00

Total Program $296,864.00

I feel this program would substantially reduce the exploration risk on the project. The majority of the known faults in the area of interest are within 2500 ft. of the outcrop of the ore horizon on the west slope of the Mosquito Range.

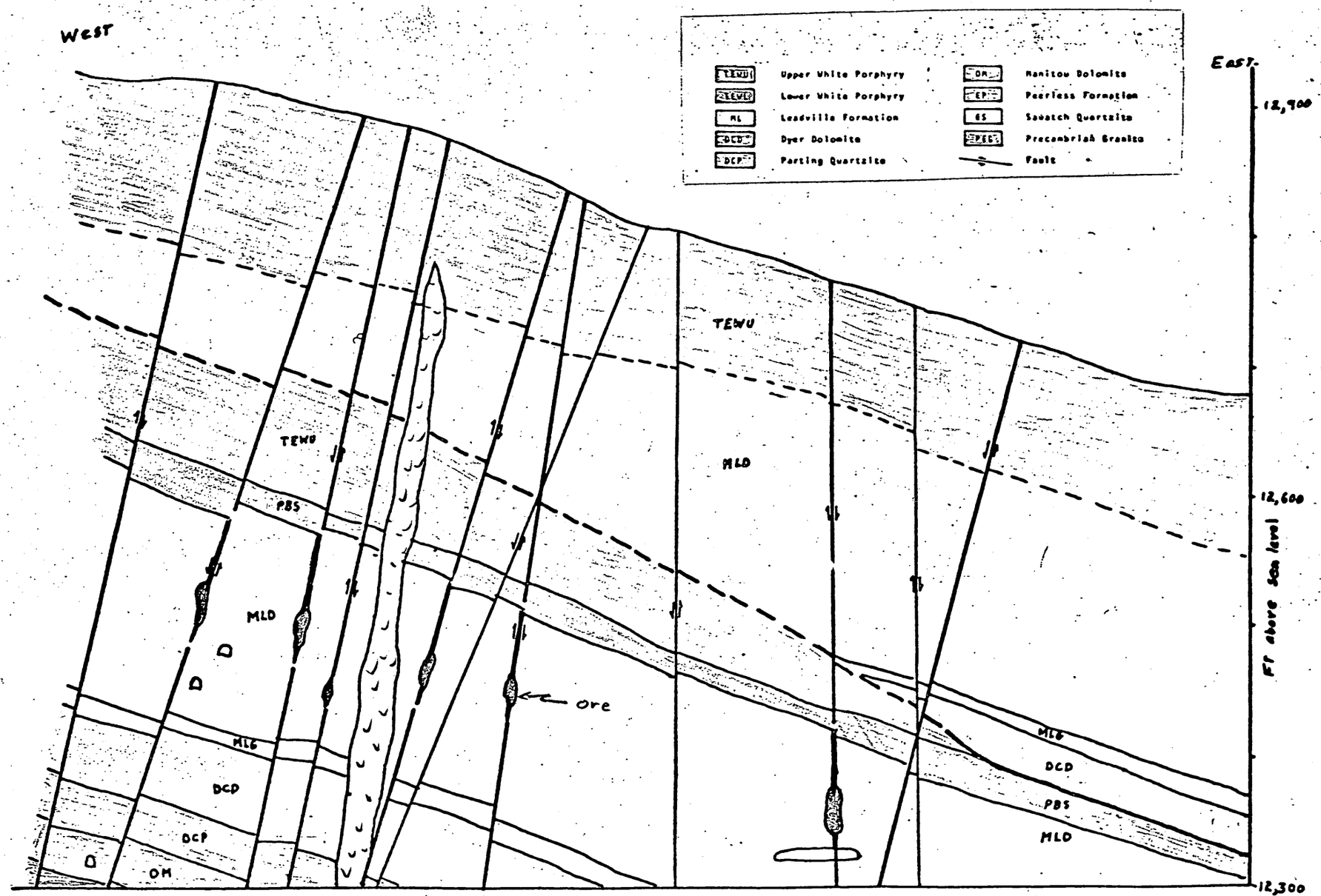
This past September we (1) put in the first 5000 ft. of access road, (2) installed a pump system (which will adequately supply the rigs with water), (3) put in a site for drill hole IG-2 and (4) drilled IG-2 to a depth of 219 ft. The road-cut exposed several faults carrying ore grade mineralization and drill hole IG-2 intersected two mineralized veins 10 ft. wide and one which is 30 ft. wide. The lead, zinc and some of the silver minerals have been leached from these veins (because of their proximity to surface). However, the gold and silver content of the gossan indicates that the veins should carry ore grade mineralization in areas where they are deeper.

We are hoping to obtain OME assistance to carry out this program during the 1968 field season.

Sincerely,

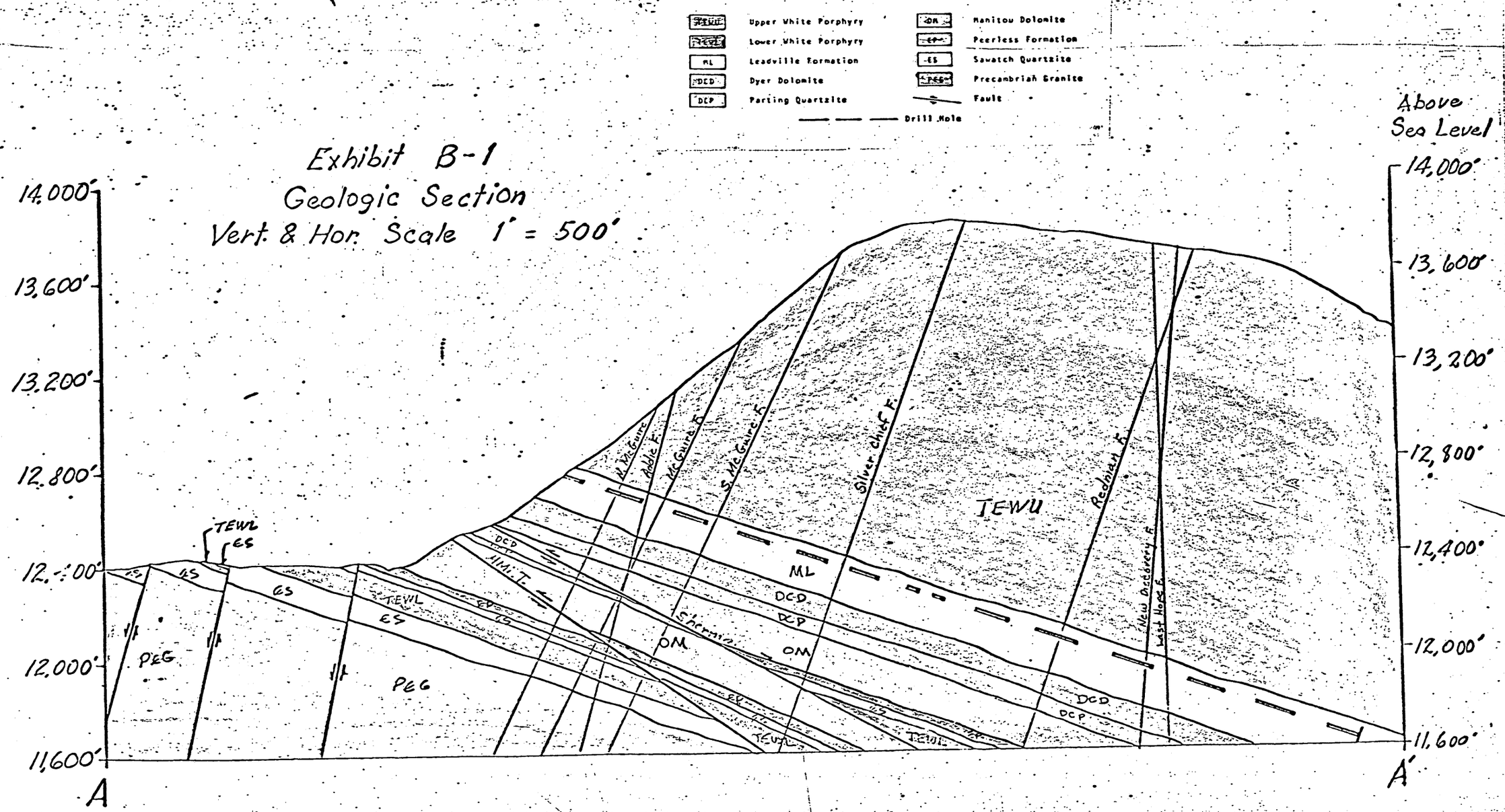
Duane N. Bloom

Duane N. Bloom



East - West cross section along grid line 33,500N
Hilltop Mine, Park County Colorado.

Scale 1 in = 100 ft.


Upper White Porphyry
Lower White Porphyry
ML Leadville Formation
DCD Dyer Dolomite
DCP Parting Quartzite
OM Manitou Dolomite
Peerless Formation
ES Sawatch Quartzite
Precambrian Granite
Fault
Drill Hole
Exhibit B-1
Geologic Section
Vert. & Hor. Scale 1" = 500'
Above Sea Level
14,000'
13,600'
13,200'
12,800'
12,400'
12,000'
11,600'
A
A'
N. McGuire
Addie F.
McGuire F.
S. McGuire F.
Silver Chief F.
Redman F.
New Occidental F.
Last Hope F.
Sherman
TEWU
TEWL
ES
ML
DCD
DCP
OM
PEG
A

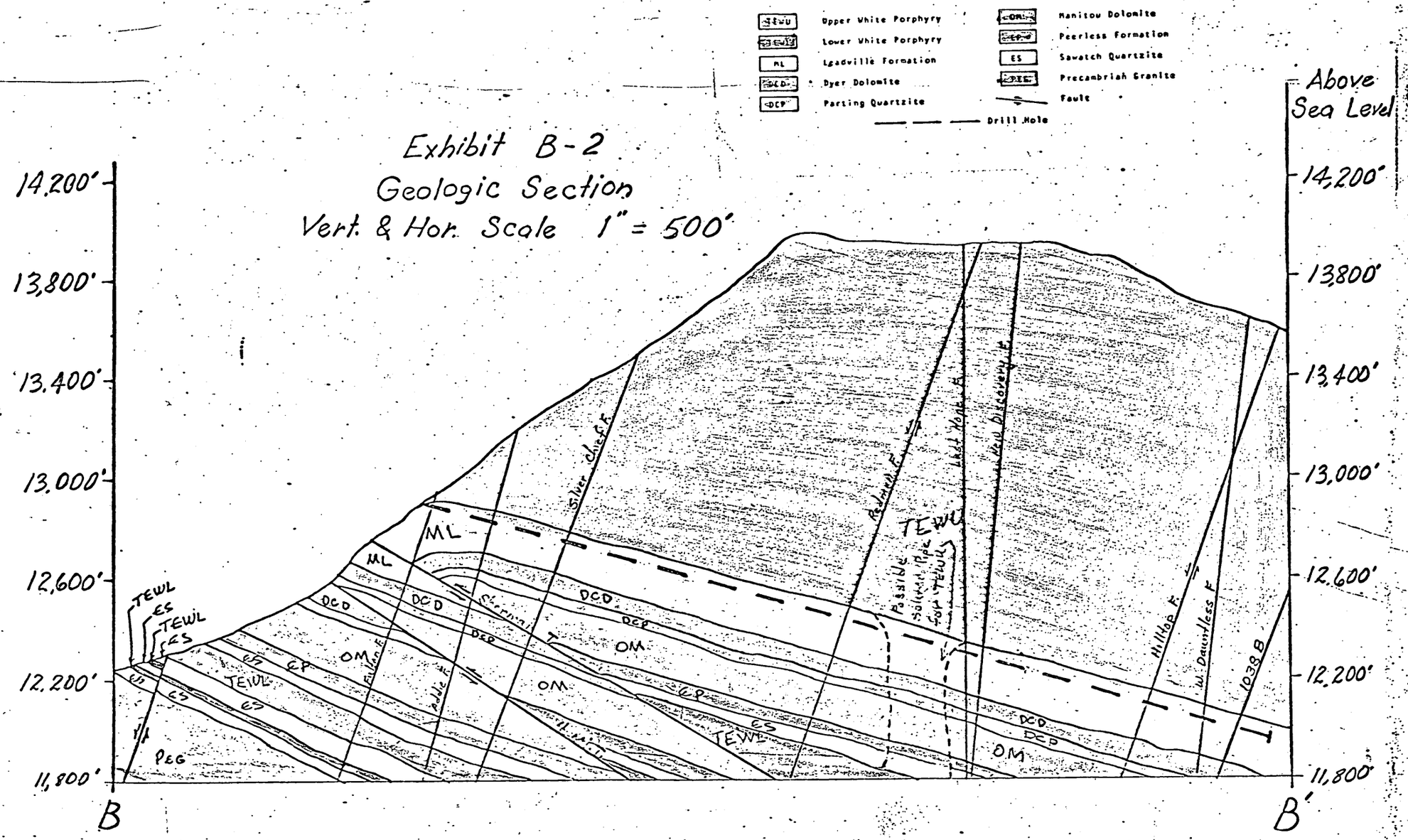
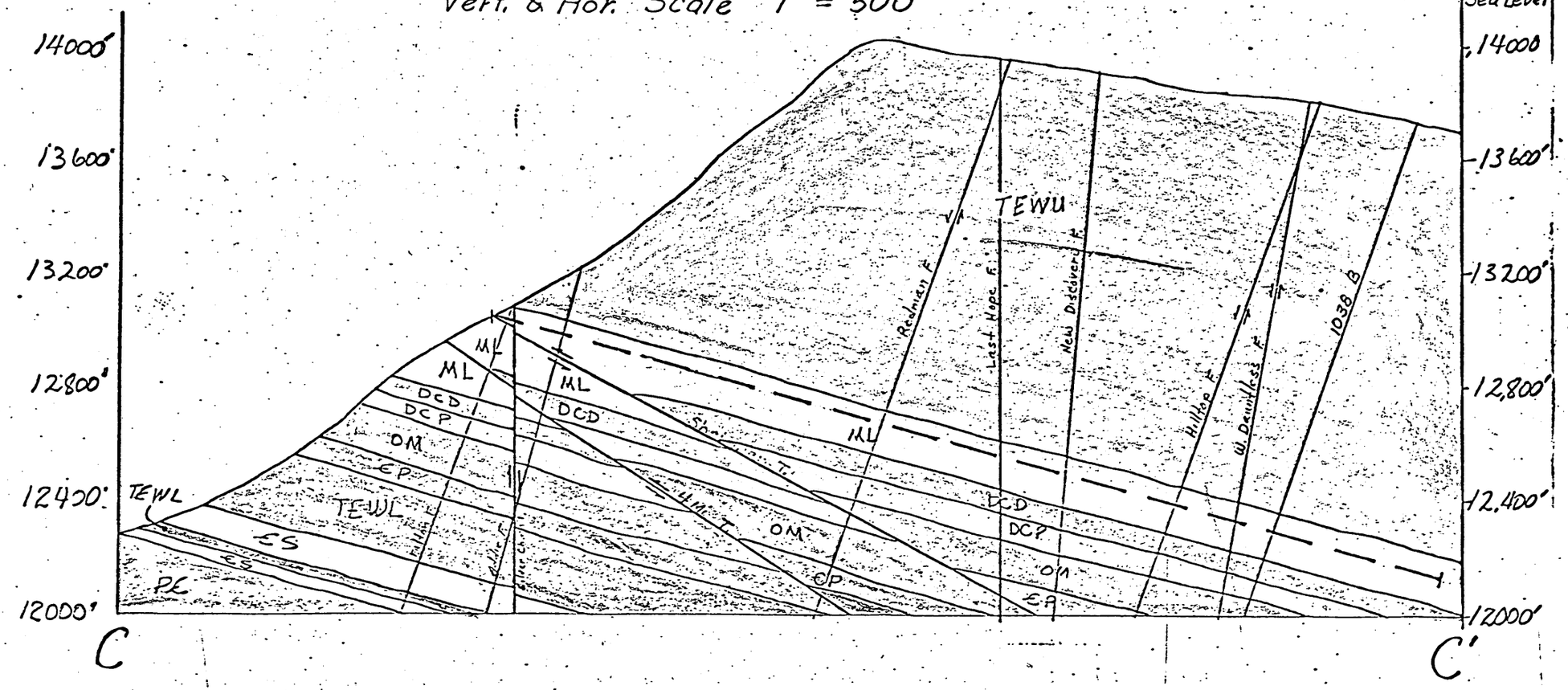


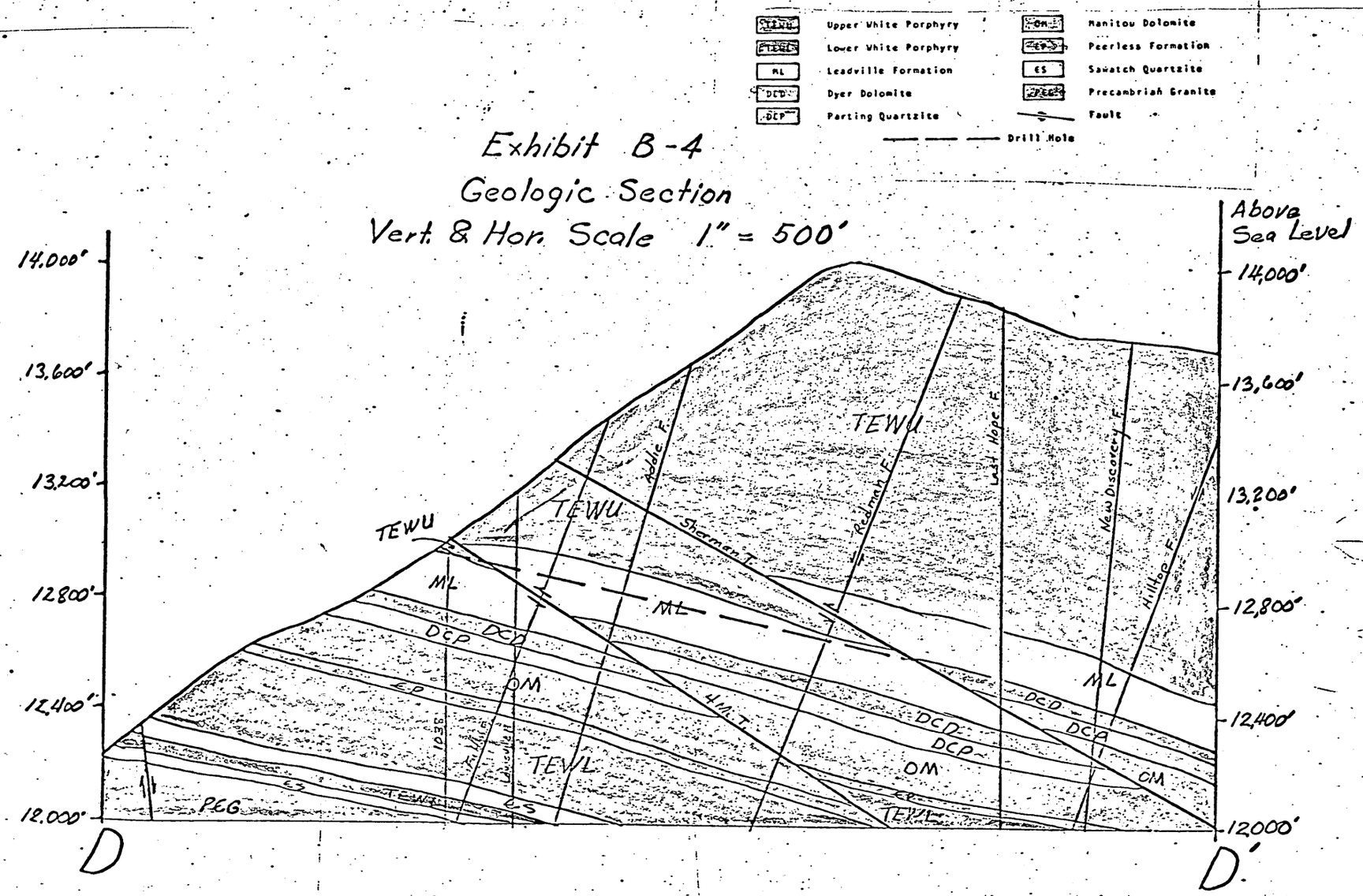
Exhibit B-2
Geologic Section
Vert. & Hor. Scale 1" = 500'

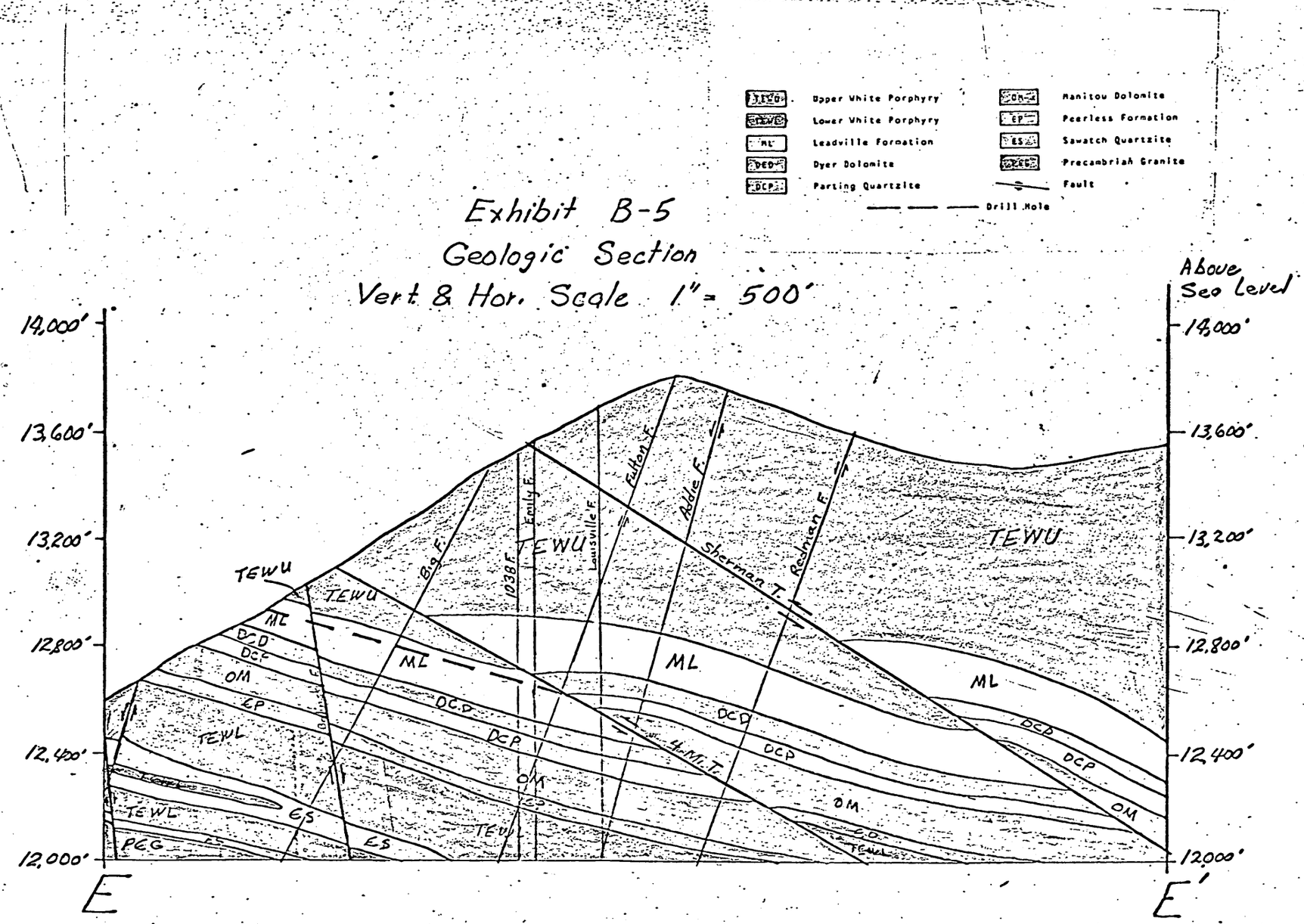
Exhibit B-3

Geologic Section

Vert. & Hor. Scale 1" = 500'




Upper White Porphyry
Lower White Porphyry
Leadville Formation
Dyer Dolomite
Parting Quartzite
Manitou Dolomite
Peerless Formation
Sawatch Quartzite
Precambrian Granite
Fault
Drill Hole
Exhibit B-4
Geologic Section
Vert. & Hor. Scale 1" = 500'
Above Sea Level
14,000'
13,600'
13,200'
12,800'
12,400'
12,000'
TEWU
ML
DCP
DCD
OM
EP
ES
TEWL
PEG
Adolc F.
Sherman F.
Redman F.
Last Hope F.
New Discovery F.
Hilltop F.
D
D'


Upper White Porphyry
Lower White Porphyry
Leadville Formation
Dyer Dolomite
Parting Quartzite
Manitou Dolomite
Peerless Formation
Sawatch Quartzite
Precambrian Granite
Fault
Drill Hole
Exhibit B-5
Geologic Section
Vert. & Hor. Scale 1" = 500'
Above Sea Level
14,000'
13,600'
13,200'
12,800'
12,400'
12,000'
E
E'
TEWU
ML
DCD
DCP
OM
EP
TEWL
ES
PCG
Big F.
1038 F.
Emily F.
Louisville F.
Fulton F.
Addie F.
Sherman F.
Redman F.
4-M.T.

MME Form 7
(2/63)

OFFICIAL FILE COPY

Date	Surname	Code
11/14/67	Peterson	120
11/14/67	Kirkham	120
		110
11/14	CAC	220
		120P

AIRMAIL

Dr. Duane N. Bloom
Earth Sciences, Inc.
Golden, Colorado 80401

NOV 14 1967

Re: OME-6615 (Silver, Gold, Copper)
Leadville Lead Corporation
Hilltop Property
Park and Lake Counties, Colorado

Dear Dr. Bloom:

Thank you for your letter of November 9, 1967, in reference to a meeting in our office to discuss the subject application. In accordance with your request, we are pleased to change the date of your visit to Wednesday, November 29, 1967, at 10:30 a.m., in Room 4460, Department of the Interior Building.

Sincerely yours,

FRANK E. JOHNSON

Frank E. Johnson
Chief, Office of
Minerals Exploration

cc: Director's Reading File
Division File
Economic Geology File
OME Docket
OME Reading File
OME Region III w/cy incoming letter
Mr. Peterson

GLAult/a 11-14-67

232.63

EARTH SCIENCES, INC.

GEOLOGY GEOCHEMISTRY GEOPHYSICS Golden, Colorado 80401

303-279-7733

November 9, 1967

Frank E. Johnson
Office of Minerals Exploration
U.S. Department of the Interior
Geological Survey
Washington, D.C. 20242

Dear Mr. Johnson:

Thank you for your offer to meet with me and discuss the OME-6615 application.

Unfortunately, since I talked to Mr. Smith, an extremely important matter has arisen which will keep me occupied for approximately two weeks. If it is possible, I would like to move the appointment up to the week beginning Monday, November 27. If your calendar is open that Wednesday, November 29, at 10:30 a.m., I would sincerely appreciate meeting with you at that time. Rm 4460 Interior Bldg.

Sincerely yours,

Duane N. Bloom

DNB/bw

c.c. Dr. R.G. Risk

Copy to R-III

MME Form 7
(2/63)

OFFICIAL FILE COPY

Date	Surname	Code
11/6/67	Peterson	120
11/6/67	Kirkbride	120
		110
		220
		120M

NOV 6 1967

AIRMAIL

Dr. Duane N. Bloom
Earth Sciences, Inc.
Golden, Colorado 80401

Re: OME-6615 (Silver, Gold, Copper)
Leadville Lead Corporation
Milltop Property
Park and Lake Counties, Colorado

Dear Dr. Bloom:

In reference to your telephone conversation with Mr. Roscoe Smith on November 3, 1967, we shall be pleased to meet with you in our office to discuss the subject application further.

If convenient, we shall expect you between 9:00 - 10:00 A.M., in Room 4460, Interior Building, on Monday, November 13. However, our office is open daily Monday thru Friday from 7:45 A.M., to 4:15 P.M., and a different time or date can be arranged which may be more suitable to you.

Sincerely yours,

FRANK E. JOHNSON

Frank E. Johnson
Chief, Office of
Minerals Exploration

cc: Director's Reading File
Division File
Economic Geology File
OME Docket
OME Reading File
Mr. Peterson
Region III

ECPeterson/bsl 11/6/67

23263

OME-6615
Leadville Lead

Duane
Bloom — Earth Sciences, Inc. Golden
Since Application Colo. 80401
New facts

1. What are weak points - specifically

2. New data from drill holes - 3 veins

He wants to come to Washington
Set up appointment

after Wed. 8 Nov

Ed - write to Mr. Bloom
giving him an early
appointment to discuss
1 and 2

I told him over the phone (11-3-61) about
geological evidence of specific targets
and costs commensurate with
ore that might be discovered

MME Form 7
(2/63)

OFFICIAL FILE COPY

Date	Surname	Code
10/26/67	Peterson	120
10/27	Kerkhemer	120
10/30	Kulogeard	110
10/31	[illegible]	
		220
		120M

OCT 31 1967

AIRMAIL

Leadville Lead Corporation
1677 Wadsworth Blvd.
Denver, Colorado 80215

Re: OME-6615 (Silver, Gold, Copper)
Leadville Lead Corporation
Hilltop Property
Park and Lake Counties, Colorado

Gentlemen:

Careful study of your application for financial assistance in exploring the subject property and of other information available to us indicates that the probability of disclosing significant ore reserves on the property is not sufficiently promising to justify Government participation therein. Accordingly, we must inform you that your application for exploration assistance is denied.

We regret the necessity for this action, which, however, is taken without prejudice to the property. Should you perform additional work on the property which discloses evidence that could materially change this opinion, we shall be pleased to consider a new application at that time.

We wish to thank you for your interest in the minerals exploration program and for bringing your property to our attention.

The gray metal filing case containing numerous maps and report is being returned to you as requested.

Sincerely yours,

FRANK E. JOHNSON

Frank E. Johnson
Chief, Office of
Minerals Exploration

cc: Director's Reading File
Division File
Economic Geology File
OME File
OME Reading File
Mr. Peterson
Region III
130

ECPeterson/bsl 10/26/67

23263

MME Form 7
(2/63)

OFFICIAL FILE COPY

Date	Surname	Code
10/26/67	Peterson	120
2/21/67	Kirberg	120
"	Johnson	110
		220
		120M

October 26, 1967

To: The File

From: Edward C. Peterson

Subject: OME-6615 (Silver, Gold, Copper)
Leadville Lead Corporation
Hilltop Property
Park and Lake Counties, Colorado

Justification for Denial of Application

The Applicant proposes to explore for silver, gold, and copper-bearing ore bodies on the subject property by drilling five 3,500-foot diamond drill holes down-dip in the Upper Leadville formation at a total estimated cost of $425,279.85.

The report of the field examination of the property indicates that the program as planned is prospecting and as such is not eligible for OME assistance. The proposed work is based chiefly on questionable geological theories and projections extending for several thousands of feet, and areas designated as exploration targets by the Applicant are too generalized and indefinite to be considered as such at this time.

In addition, available information indicates that the total estimated cost of the program is excessive in proportion to any tonnages and grades of material that may be discovered in the area.

The Hilltop mine just south of the current project area was ; the subject of two previous DMEA projects (DMEA Dockets 1463 and 4572). The work failed to establish any significant ore reserves on the property. It is noted, however, that current exploration being conducted by the Applicant in the Hilltop area has proven an ore body in excess of 100,000 tons with an approximate grade of .04 oz. Au/T, 8 oz. Ag/T, 0.5% Cu, 3% Pb and 2% Zn. It appears that the Applicant will continue this exploration.

I concur with the Field Officer's recommendation to deny the application for assistance without prejudice to the property. If the Applicant performs additional work in the area and sufficient evidence is obtained to indicate a more definite and encouraging exploration target, the OME could consider a new application at that time.

Edward C. Peterson

Edward C. Peterson

cc: Director's Reading File
Division File Economic Geology File, OME Docket, OME Reading File
Mr. Peterson

ECPeterson/bsl 10/26/67

23263

IN REPLY REFER TO:

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
FEDERAL CENTER, DENVER, COLORADO 80225
Office of Minerals Exploration

OFFICIAL COPY
O. M. E.
RECEIVED
OCT 20 1967
INITIALS | CODE
JL 130
120 M
JJ 110
130 P

October 18, 1967

Memorandum

To: Chief, Office of Minerals Exploration

From: Field Officer, Region III

Subject: OME-6615 (Silver)
Leadville Lead Corporation
Hilltop Property
Park and Lake Counties, Colorado

Transmitted herewith is a report of examination on the subject property, with accompanying illustrations and related material. It is concluded that the applicant's proposed program lies more in the realm of prospecting than exploration, and it is therefore recommended that the application be denied without prejudice.

J. William Hasler

J. William Hasler,
Field Officer, Region III
Office of Minerals Exploration

Enclosures

UNITED STATES

DEPARTMENT OF THE INTERIOR

STEWART L. UDALL, SECRETARY

U. S. GEOLOGICAL SURVEY

OFFICE OF MINERALS EXPLORATION

REPORT OF EXAMINATION

REGION III

On-Site Report

OME-6615 (Silver, gold, copper)

LEADVILLE LEAD CORPORATION

HILLTOP MINING COMPANY

PARK AND LAKE COUNTIES, COLO.

By

J. William Hasler

October 1967

Contents

Introduction and summary---------- 1

Location---------- 2

Unpatented claims---------- 3

Areal geology---------- 4

Local geology---------- 6

Ore Reserves---------- 10

Production---------- 11

Prior DMEA Contract Work---------- 12

Applicant's proposed exploration---------- 15

Recommendations and conclusions---------- 20

Table

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Illustrations

Exhibit B. Map of subordinated ground (included)

Exhibit B1 through B5. Geologic sections along proposed diamond drill holes (included)

Exhibit C. Property map, Leadville Lead Corporation (included)

Exhibit D. Composite map of the Hilltop Mine, Park County, Colorado (see application)

Exhibit H. Geologic map of the Hilltop Mining property, Leadville Lead Corpoation (see application)

Exhibit J. Geologic sections through the Hilltop Mining property (see application).

Exhibit L. Major faults in vicinity of the Leadville Lead property (included).

Exhibit M. Mg:Pb ratios in altered White Porphyry in vicinity of Hilltop Mine (included)

Attached: Revised exploration program with estimated costs as of August 3, 1967 (included)

Bulldozing bids (Included)

Diamond drill bids including costs for whipstocking and directional drilling (included).

OME-6615 (Silver, gold, copper)

LEADVILLE LEAD CORPORATION

HILLTOP MINING COMPANY

PARK AND LAKE COUNTIES, COLORADO

Introduction and Summary

Leadville Lead Corporation, 1677 Wadsworth Boulevard, Denver, Colorado, applied to the Office of Minerals Exploration for financial assistance to explore for silver, gold and copper on the property of the Hilltop Mining Company, Park and Lake Counties, Colorado, at an estimated cost of $425,279.85. The application was referred to the field and an examination was made by Mr. J. William Hasler on July 11 and 12, 1967. The examining geologist was accompanied by Mr. Duane Bloom and Mr. William Walker, Earth Sciences, Inc., who represented the applicant.

The Hilltop Mining property lies in Sec. 36, T. 9 S., R. 79 W., in the Horseshoe Mining district, Park and Lake Counties, Colorado. The patented ground subordinated in this proposal is owned by the Leadville Lead Corporation and is free of liens and mortgages. The mining locations were filed by or for the Leadville Lead Corporation and are believed to be valid.

The applicant proposes to explore for new and undiscovered deposits of silver, gold and copper by drilling five 3500-foot diamond drill holes down-dip in the Upper Leadville formation at 700-foot intervals in an area approximately 3,600 feet by 3,600 feet. The area lies between the Hilltop mine on the south and the Continental Chief Mine on the north, Exhibit "H", applicant's map.

The applicant's consulting geologist proposes a favorable area near the supposed vent of the Mosquito Range stock, that produced the Early White porphyry which overlies the Leadville formation. Petrofabric, and other geologic studies indicate increased mineralization in this area, thus the proposed exploration. It is the opinion of the examining geologist that although the area referred to above warrants exploration, the applicant's target areas are too generalized and indefinite. Geological projections extend for several thousands of feet materially reduces the probability of finding ore bodies of comparable size and grade of those mined from the Hilltop mine. It is therefore recommended that the application be denied without prejudice. The application could be considered at a later date if a more definite and encouraging target area or areas are developed. The proposed exploration program is in the realm of prospecting at the present stage and consequently is not eligible for OME assistance.

Location

The Hilltop Mining property lies in the crestal area of the Mosquito range in the western part of Park County and the eastern part of Lake County. Access to the present workings (Dauntless Portal) is by 13 miles of maintained county road which departs west from U. S. Highway 285 one mile south of Fairplay, Colorado.

Access to the drill sites for the proposed program is by way of 7 miles of county road up Iowa Gulch (east) from Leadville, Colorado.

Future development of the property is planned from the west side of the Mosquito Range to provide the railroad access, personnel, service and supply facilities of Leadville, Colorado, an established mining community with a population in excess of 10,000.

The proposed exploration program is to be conducted on a block of ground consisting of 33 patented claims and 9 unpatented mining locations, Exhibit C, as listed in the application. Property taxes have been kept up to date on the patented ground and assessment work has been accomplished and filed on the unpatented locations. This block of ground is a portion of the Hilltop Mining property of the Leadville Lead Corporation which consists of approximately 3700 acres of patented and unpatented claims.

Unpatented Claims

Date Filed	Name of Claim	Park Book	County Page	Lake Book	County Page
9/18/48	Arthur No. 2	42	162	273	176
9/18/48	Van Statts	42	162	273	177
9/20/48	Cowell	48	246		
9/20/48	Col. Chivington			273	179
9/20/48	Davis			273	180
9/20/48	Mc Tas			273	181
9/20/48	Boggess			273	181
9/24/48	Crutcher	48	246		
12/15/66	LL-39	77	291		

Patented Claims

Survey Number	Name	Acreage
5356	Hill	10.330
5357	Silver Chief	8.071
5972	Wyoming	10.12
6188	Taylor	
6188	Reynolds	17.127
6454	Equator	9.500
6455	Slide	2.81
6508	Silver Cliff	10.133
6590	Summit	
6590	Summit No. 2	20.156
6877	Astor	10.18
6877	Vanderbilt	10.259
6920	Diamond Field	4.408
6921	Old Judge	10.331
6921	Perique	10.331
6921	Durham	10.331
7316	Minnie	10.331
7316	Glass	10.331
7316	Phoebe	10.331
7316	Atlixco	10.331
7316	Wright	10.331
7316	Continental Divide	10.235
7933	Monument	
7933	Lehigh	27.408
7933	Mauch Chunk	
12096	Humboldt	8.38
13664	Laguna	10.331
13717	Gloucester	
13717	Joe Horner	
13717	Oregon	
13717	Stromboli	51,428
13717	Maud S	
13717	Confidence	
	Total Patented Acreage	303.524

Areal Geology

Numerous silver-lead deposits, particularly bedded replacement bodies in the upper part of the Leadville dolomite, have been mined out along the outcrops of pre-Pennsylvanian dolomites on Mount Bross and Mount Lincoln. Some of these deposits have been followed into the

mountain for distances of several hundred feet. Beneath parts of the areas capped by Pennsylvanian strata and porphyries on both mountains, the Leadville dolomite remains unprospected, though it may contain ore bodies worth as much as a million dollars in gross value. A deposit typical of these areas has been described, but the bulk of the mine workings are inaccessible.

The Hilltop mine, described by Behre, supplied 1 to 1-1/2 million dollars' worth of silver-lead ore, but all other mines in that mineralized area were very much smaller. Unprospected ground within the upper part of the Leadville dolomite, where it is concealed beneath younger rocks, between the Hilltop and Continental Chief mines and east of the Peerless Maud mine may contain additional deposits valued at a million dollars or less.

Small silver-lead deposits may be found in dolomites, particularly the upper part of the Leadville dolomite, concealed by Pennsylvanian strata and porphyries (1) east of the Loveland area, (2) east of the Sacramento area, and (3) adjacent to the hanging wall of the London fault with the Sacramento area.

Prospecting either for individual deposits or for a new area of principal mineralization outside areas mentioned above is more likely to result in financial loss than gain. The most promising localities probably would be (1) between the London fault and the Mosquito Range crest, within the transverse belt of profuse minor faults northeast of Mount Evans, and (2) along the footwall zone of the London fault, opposite the Sacramento area; in both the favorable

pre-Pennsylvanian rocks lie unprospected beneath a thick cover of unfavorable Pennsylvanian strata. Though deposits are likely to occur in each locality, the apparent impossibility of closely restricting prospecting at depths of 500 to 2,500 feet below the surface would make their discovery excessively costly. There is also a possibility, though decidely no assurance of finding deposits in concealed pre-Pennsylvania rocks somewhere along either (1) the Sherman fault, or (2) a zone of reverse dips that extends from Mosquito Creek north-northeastward on the west side of the South Platte River, but there are no clues for prospecting. Within the traverse belt between the London fault and North Star Mountain, however, all the favorable horizons are so well exposed, except under local areas of slide rock, that chances for noteworthy discoveries must be regarded as slight.

No major discovery of lead and zinc, copper, molybdenum, iron, manganese, or fluorite is reasonably to be anticipated, though small commercial deposits of one or more may yet be found.

Local Geology

The following description is based primarily on observations as recorded in a Colorado School of Mines thesis 1019, 1965, by Dr. Duane Bloom.

Bedrock in the Hilltop Mining Area, Horseshoe district is made up of Precambrian metamorphic and granitic rocks, Paleozoic sediments and Paleocene (?) intrusives. Pre-Pennsylvanian sediments

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VanderWilt, John W., State of Colorado Mineral Resources Board, Mineral Resources of Colorado, p. 340-341, 1947.

consist of 570 feet of dolomite, sandstone, and quartzite, typical of the shelf deposits of the Cordilleran Foreland. The upper surface of the Leadville Dolomite (Mississippian) has a karst topography upon which the Belden Formation (Pennsylvanian), 460 feet of shale, sandstone, and limestone, was deposited. The Belden, in turn, is overlain by at least 1000 feet of alluvial fan and deltaic sediments comprising the Coffman Formation (Pennsylvanian). Exhibit J.

Paleocene(?) granodiorite and quartz monzonite porphyries occur as sills and dikes in all of the sedimentary rocks of the district. The principal intrusives is a sill of granodiorite porphyry which lies immediately above the Leadville Dolomite in the vicinity of known ore deposits of the Hilltop Mine, and had a premonzonite porphyry with a thickness excess of 1000 feet overlies the granodiorite porphyry on the northeastern part of the property, Exhibit J.

Structurally the district lies in an intensely faulted area between the Front Range and Sawatch uplifts. Exhibit L. Deformation appears to have been a result of compression along a nearly horizontal stress axis oriented approximately N. 60° E. Stress was relieved by folding, followed by reverse faulting, both accompanied by strike-slip faulting. Post-compression collapse can be observed on many of the high angle faults. Intrusives were emplaced throughout the period of deformation.

The fracture pattern in post-Precambrian rocks is very similar to the Precambrian fracture pattern, suggesting that the Precambrian fabric had a strong influence on later deformation. The north-south regional tension zone is of great economic significance and appears

to be present in the Precambrian rocks as a contact between predominantly metasediments (east) and granitic rocks (west). Several intrusives were injected into this zone in the Tertiary.

The known ore deposits of the district consist of northwest to northeast-trending elongate pods, consisting principally of galena, quartz, pyrite, anglesite, cerrusite and smithsonite, Exhibit D. The pods appear to lie in a north south trending tension zone mentioned above. This mineralized zone has a width of at least 1-1/2 miles and a length of at least 4 miles. Single ore pods vary from 10,000 tons to more than 300,000 tons. The silver content of the ore is chiefly in the form of freibergite, argentite, and cerargyrite, with small amounts in solid solution within the galena. Silver content of the galena, ore and gangue mineralogy and the form of the ore bodies suggest that the ores were deposited under hydrothermal conditions at approximately 200° C.

The wall-rock is highly fractured and has a leached iron-stained appearance. Wall-rock bleaching, silicification, and recrystallization are minor or absent. Muscovite (1M), present in minor amounts within the host rock, was unaffected by the process of mineralization. Primary dispersion aureoles are restricted to fractures. Silica as quartz veinlets forms the largest primary aureoles. Secondary dispersion of the ore elements is marked, the size of the supergene aureoles varying directly with the aqueous solubility of the supergene minerals. Calcium, magnesium, strontium, and barium were released by the dissolution of dolomite in sulfuric-acid-rich solutions and exhibit mobilities

proportional to the aqueous solubilities of their respective sulfates.

The ore bodies occur in breccia zones and "bc" (longitudinal) fractures along left lateral strike-slip faults in the Upper Leadville Dolomite. The main ore horizon consists of a zone extending from 30 feet to 90 feet below the top of the Leadville formation. Mineralization is enhanced where fractures intersect and where the controlling fracture changes strike or dip.

The localization of mineralization in the Upper Leadville Dolomite appears to be chiefly due to the close proximity between that horizon and the main Early White Porphyry sill. A study of thin sections of the Early White Porphyry in combination with a study of the trace element content of the samples strongly suggested that the least altered samples have the highest ore metal content and that the amount of magnesium varies in a perfect inverse fashion with the degree of alteration. Scatter diagrams prepared by plotting the magnesium: heavy metal ratios, Exhibit M, in Early White Porphyry samples strongly support the concept that the porphyry was depleted in the ore metals in the vicinity of the ore deposits. This data in addition to data from fluid inclusion studies has led to the postulation that dilute H_2S-HCl solutions, within the solidified and cooling porphyry, sercitized the silicate minerals and became enriched with silica, iron, sodium, calcium, magnesium and the ore elements. These solutions, carrying the heavy metals as chloride complexes, descended through the porphyry and were funneled into intensely fractured zones in the underlying Leadville Formation. Reaction with the dolomite neutralized the solutions causing sulfide deposition.

Ore Reserves

The current Hilltop exploration program began in June 1966.

The method being used to explore for and prove up the remaining deposits in the vicinity of the Hilltop workings is rotary-percussion drilling. The sample cuttings are collected as a sludge on plastic sheets, each sample representing 4 feet. As of February 1, 1967, one ore body has been drilled giving proven reserves estimated to be in excess of 100,000 tons with an approximate grade of .04 oz. Au/T, 8 oz. Ag/T, 0.5% Cu, 3% Pb and 2% Zn. In addition approximately 30,000 tons of material having an estimated 7 oz. Ag/T and 5.7% Pb are present on the main Hilltop shaft dump (U. S. Bureau of Mines War Materials Report No. 194), and approximately 6000 tons of dump material remain on the Last Chance and Hilltop Endline dumps. According to company records these dumps were sampled by Ellis Webster in 1945 with the following results (Last Chance and Hilltop Endline dumps. According to company records these dumps were sampled by Ellis Webster in 1945 with the following results (Last Chance and Hilltop dumps respectively: 0.01, .02 oz. Au/T; 6.9, 5.3 oz Ag/T; ? 0.5% Cu; 5.8, 15.9% Pb, 3.0, 8.5% Zn. The dumps were likely bulk sampled with hand shovels.

Copies of assay certificates showing the grade of ore encountered in the present drilling program are enclosed as Exhibit F. Assay maps and accurate tonnage-grade calculations are presently being prepared.

Ore Reserves -- Continued. Table 1

Tons	Au oz.	Ag oz.	C %	Pb %	Zn %	Value per ton
100,000	0.04	8.00	0.5	3.00	2.00	$32.52
Last chance dump	0.01	6.90	?	5.80	3.00	
6,00 Hilltop Endline Dump	0.02	5.30	0.5	15.90	8.50	
154,000 North Stope	0.03	6.70	(50% of ore)			34.00
30,000 Hilltop shaft		7.00		5.7		41.59
290,000						$36.80

A rough estimate of ore reserves in the Hilltop mine and from associated dump material totals some 290,000 tons of material that will gross approximately $36.80 per ton at current prices. The applicant informed the examining geologist that they plan to block out a million and a half tons of ore at the Hilltop Mine, and if these plans materialize they plan to drive a haulage-tunnel from the Hilltop mine to Iowa Gulch, and then ship ore to Leadville, thus saving the excessive haul of ore around the mountains via Buena Vista and up the Arkansas River Valley to Leadville, Colorado.

Production

There are many intervals during the 100 years of mining activity in the Horseshoe District for which no records are available. Large dumps of unknown origin can be seen in areas where the Leadville Dolomite crops out along the south slope of White Ridge, in the eastern portion of the Horseshoe Cirque, and in the vicinity of Peerless Mountain. Most of these workings have caved and many of the portals

and shafts have been covered by slide rock. The lack of records makes it difficult to estimate the production of the district. Incomplete records suggest that the original nine-claim Hilltop group produced in excess of $2,700,000 worth of ore prior to 1923. During much of this time, lead was valued at 4 cents per pound and silver at 56 cents per ounce, thus at today's prices this ore would probably have a gross value in excess of $6,000,000.

Records on the production from the Hilda, Last Chance, Badger Boy, Dauntless, Peerless and Peerless Maude mines are even more sketchy. Taking the size of the dumps into account, a total production of $4,000,000 at today's prices seems reasonable; thus putting the production of the entire district at approximately $10,000,000. The average grade of ore produced in early operations appears to have been about .04 oz Au/T, 15.7 oz Ag/T, 0.5% Pb and 5.2% Zn. Much of this ore was hand sorted (culling out the lighter material) which resulted in an increase in grade and an upgrading of the lead-zinc content relative to silver. The most recent production from the 1038 zone (1963-1966) had a weighted average grade of .032 oz Au/T, 11.42 oz Ag/T, 0.49% Cu, 9.7% Pb and 2.9% Zn at current prices this ore would gross $59.12 per ton, which is considerably higher than the average ore shipped. Copies of available settlement sheets and other data giving an indication of the past production are shown in Exhibit E.

Prior DMEA Contract Work

The Leadville Lead Corporation, under DMEA Docket 4572, applied to the Defense Minerals Exploration Administration for

financial assistance to explore for lead, zinc and copper at the Hilltop mine, Park County, Colorado. A modified two-stage program was recommended and an exploraton program under Contract Idm E-1124 was completed April 26, 1958. Only a portion of the proposed work was completed and the contract was terminated May 1, 1958. The results of the DMEA work proved unfavorable.

The object of Project 1 under Docket No. 4572 was to explore an electromagnetic anomaly in the Leadville formation. Project 1, Stage 1 consisted of drilling from two stations for a total of 3,000 feet of diamond core drilling to test anomaly B. Stage II was to be completed pending favorable results of Stage I. Project 2 was designed to explore the Fulton and Doran fissures in the Leadville formation northwest of the Hilltop ore body. Project 2, Stage I consisted of raising 150 feet from the Dauntless level to the Doran level and crosscutting 125 feet from the raise to the Doran fissure. If the fissure was intersected the Doran fissure was to be explored for 600 feet along its strike. The contract was estimated to cost $99,418.00, and the Government's share at 50 percent participation should not exceed $49,709.00.

Work completed under the contract began August 27, 1957 and was suspended April 26, 1958. Principally because the increasingly unfavorable results of the exploration work performed both under the contract and solely at company expense, the contract was terminated, effective May 1, 1958 without all the work outlined having been completed.

Acceptable work completed under Project 1, Stage 1 included excavating drill station B-1, core drilling 288 feet in one hole, and other incidental work units. Under Project 2, Stage I, the principal acceptable units of work consisted of drifting for 99 feet on the Dauntless level, raising (3 compartments) for 150 feet, raising (connecting raise) for 20 feet, and drifting and crosscutting for 363 feet on the Doran level. No Stage II work was undertaken under either of the contract projects. A total cost of $28,609.50 was approved of which the government's share was 50 percent or $14,304.75. The project was performed in an efficient and workmanlike manner.

The exploratory work under contract Idm E-1124 at the two areas in the Hilltop mine resulted in substantially reducing the probability of finding new ore deposits in these areas. The core hole B-1-0 penetrated anomaly "B" and the Leadville and Belden formations were found to be essentially barren. The company further explored the anomalous ore by raising drifting and long hole drilling. Results were essentially negative, substantially proving that no further work in the area was warranted.

In the Project 2 or Fulton-Doran area the results of contract work to explore extensions of the old workings were equally unrewarding. The original plan of entering the old workings of the Doran and Fulton stopes had to be changed as the old workings were found to be inaccessible. The Doran extension proved to be barren and appeared to be occupied by a porphyry dike at the place intersected. Further work therefore appeared to be unwarranted. The company again extended exploration workings and the results were essentially negative.

During the period of the contract ore-grade material was found by the company in the vicinity of the target areas. Along the Dauntless lateral that extends to the Anomaly "B" drill site a mineralized quartz vein was intersected at Station 1038. The company drifted southward on this vein and found several small ore bodies.

Applicant's proposed exploration

The applicant proposes to explore by diamond driling down the dip of the upper Leadville formation from an area in Iowa Gulch, to test an area approximately 3600 feet by 3600. Exhibit H, applicant's map, Exhibit B and Exhibit B1 - B5. The Iowa Gulch area was selected because of accessibility, insofar as access road and preparation of drilling sites are concerned. The excessively rough topography precludes the drilling of vertical holes from the surface, to test the area near the proposed location of the major source vent of the Early White porphyry that is proposed to lie in the vicinity of Mt. Sherman, according to the applicant's geologic consultant.

Applicant's Justification for Discovering New Ore Bodies

1. The stratigraphic horizon which contains all of the known ore deposits of the district is present in the area to be explored.

Significant exploration has been carried out on the 3700 acre Hilltop Mining property only in or immediately adjacent to areas where glaciation has exposed the ore horizon (Exhibits H and N) i.e.

Peerless Mining Area (Horseshoe Amphitheater)

Hilltop Mining Area (Four-Mile Amphitheater)

Continental Chief Mining Area (Iowa Amphitheater)

Upper Sacramento Mining Area (Sacramento Amphitheater)

White Ridge Mining Area (south slope of White Ridge)

2. The known ore bodies of the property lie in a north-south zone of intense fracturing. The best defined unexplored portion of this zone (between the Hilltop and Continental Chief Mines)is to be explored by this program.

Geologic mapping shows a north-south zone of intense fracturing at least 1 1/2 miles wide traversing the Leadville Lead property, a distance of 3 miles (Exhibit L). Northwest striking thrust faults (and associated, ore-bearing northeast striking tear faults) have been identified chiefly in the southern and western parts of the property where Paleozoic sediments outcrop. However, a thrust fault has also been recognized in the Pennsylvanian conglomerates in the extreme northeast part of the property (Exhibit H) and a series of tear faults offset the London Fault (high angle reverse) in this same

locality (Exhibit L). Taking into account the difficulty of recognizing structure in the igneous rocks and coarse clastic sediments of post-Mississippian age, it appears likely that just as dense a fracture pattern exists in areas where these rocks outcrop as in the area where the ore horizon has been exposed, the shear zone recognized, and mineralization found.

3. The Area to be explored is capped by highly altered Early White Porphyry (most probably source of the components of the ore-bodies) which had a pre-erosion thickness in excess of 1500 feet--at least as thick as anywhere in the district.

The theory of ore genesis delineated in section 3e, states that the ore elements were (1) derived from the solidified and cooling porphyry, (2) carried by aqueous solutions which were funneled into intensely fractured zones and (3) precipitated as sulfides by neutralization in the underlying dolomite. It would logically follow that the magnitude of the mineralization would vary with amount of porphyry, the degree of alteration and the frequency of dilatent fractures of appropriate age.

4. The area to be explored includes the most probable locations of the source vent for the Early White Porphyry.

Regional geologic mapping (Emmons, 1886, p. 155) and more recent petrofabric studies (Bloom, 1965, p. 115) suggest that the major source vent for the Early White Porphyry in the Mosquito Range region lies in the vicinity of Mount Sherman. If a major vent is found by the drill program, it would increase the probability that ore will be found in several horizons (Leadville, Dyer, Manitou and Peerless Formations) as occurred in the vicinity of the Breece Hill Plug of the Leadville District.

5. The potential yield of the area to be explored is in excess of $36 million and the total potential of the Leadville Lead property is in excess of $488 million.

Production from the main stopes of the Hilltop mine (Last Chance, Hilltop, Lind, Stewart, McGillis, Last Hope, Fulton and 1038) has exceeded $7 million at todays prices. These workings lie on approximately 53 acres (Exhibit D). If the potential yield per acre on the ground to be explored (approximately 272 acres) is assumed to be equivalent, a yield of $36 million is indicated. If analogous reasoning is applied to the entire Hilltop Property (3700 acres) a potential yield of $488 million is indicated. Obviously if additional ore horizons are found (as occurred at Leadville) the potential yield would be increased.

6. The identification of the shear zone, the ore horizon and the probable source of the mineralization provides very favorable odds for finding ore in the proposed program.

Exhibit N shows a north-south longitudinal section along the Mosquito range within the zone of fracturing. Ore bodies within 3500 feet of the outcrop of the ore horizon on the west slope of the range are projected to the section. If glaciation had not exposed mineralization in the areas noted, a drill program such as that proposed would have successfully located all of the ore bodies that have thus far been found in the zone.

Recommendations and Conclusions

The applicant's geologic consultant has arrived at the reasons for the probability of discovering new ore bodies as a result of several year's study of the area while completing field work in preparation for a Doctorate in Geology at the Colorado School of Mines. The general conclusions that have been drawn from the study do not appear illogical. The area of interest lies between the Hilltop mine on the south and the Continental Chief on the north. (Exhibit H, applicant's map) is a rather large target area, and I believe it is an extremely long shot, to expect to find ore bodies in the area without ascertaining pretty much the exact location of the main source channel that fed from the Mosquito Range Stock into and overlying the Leadville formation thus creating the Early White Porphyry sills. It might be advisable to test the area with perhaps two holes nearest the Hilltop Mine area as proposed and shown on the applicant's exhibit "H", the geologic map of the applicant's Hilltop Mining property. This could be a Stage I program, and if results were unfavorable, the exploration program would then be terminated.

The applicant's consultant has obtained bids (herein included) from reputable diamond drilling companies and includes a bid from Mr. James E. Sharp, the only specialist in the area that has done considerable whipstocking and directional deep drilling, which would be required if the drill holes were to be directed to stay within the Leadville formation. It is questionable, in my opinion, that a study

that a study by trace element analyses of the drill sludge would be a definitive enough method to insure that the drill hole was within the Leadville-Belden formational contact as he plans. I should think frequent in-hole surveying with a Tro Pari surveying instrument or equivalent would be an imperative requirement. Experience elsewhere in the region (Aspen) where both the Belden and Leadville formations have been drilled, core and sludges have been extremely difficult to obtain. These areas however have been in highly altered rock, and this may well be the case when the drilling in this area reached the critical area of alteration near a magmatic vent or channel. Even the limited amount of drilling in the Anomaly "B" area under the previous DMEA contract proved discouraging.

It would be my recommendations that the applicant should first discover a more limited target showing known, strong mineralization, and or/ore within the general target area, then the OME could assist in further exploration, even if two or more holes penetrated this kind of material. The applicant is presently building the access road in Iowa Gulch to proceed with the diamond drilling as outlined in this report of examination. I recommended that if this was their plan, they should not await the decision of the OME, as this would materially delay their overall exploration program and eventual production.

The applicant's 2-stage program consists of 5 diamond drill holes spaced 700 feet apart, the southernmost station being 700 feet north of the Hilltop Mine workings. Each hole will be drilled down the dip of the Leadville formation for 2000 feet into the area near where, it is predicted, the vent for the Early White Porphyry may be located.

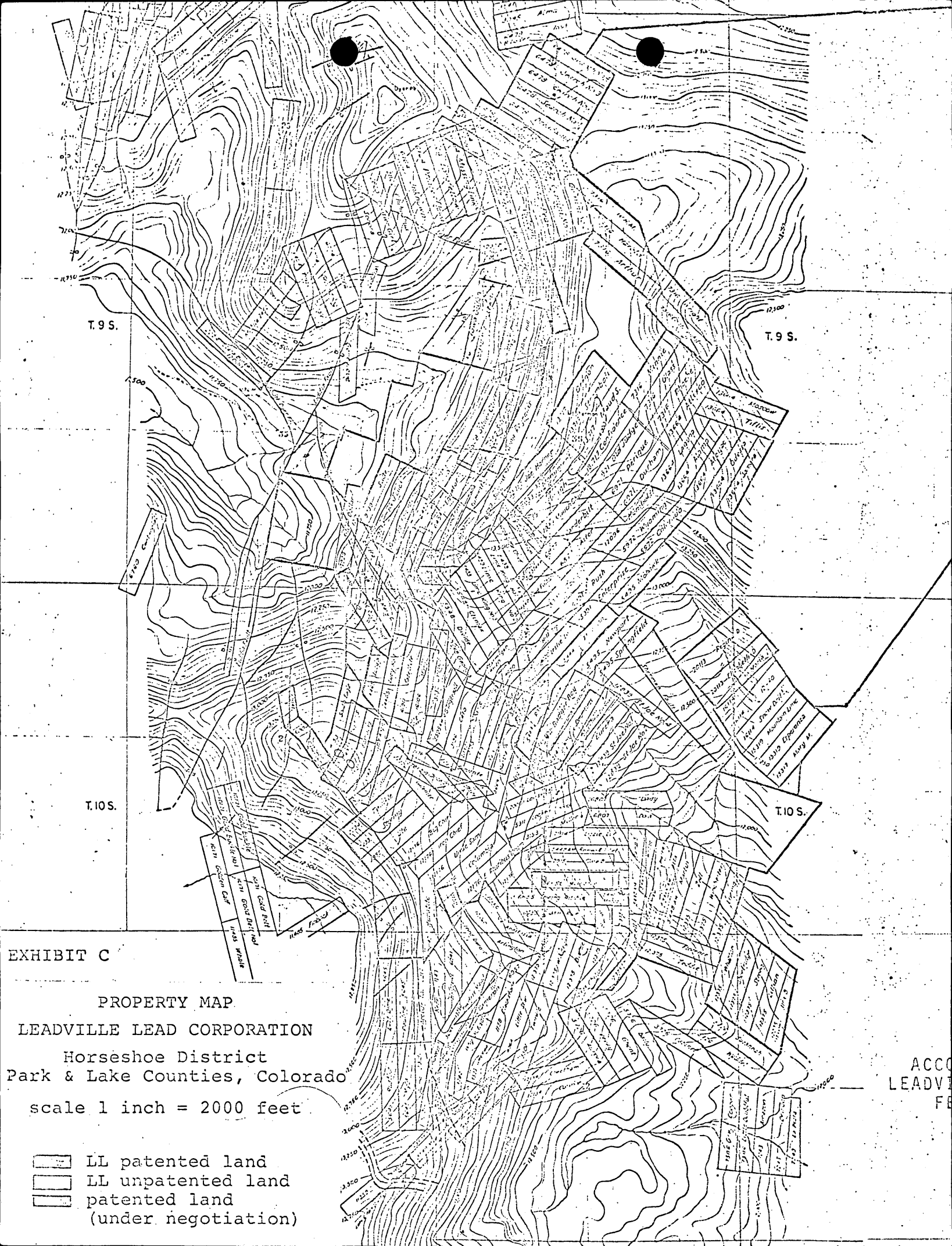
Some 7000 feet of access road will be required, leading from the Continental Chief road along the outcrop of the Leadville formation (Exhibits C and H, applicant's maps).

The estimated costs for the Stage I program will total $425,279.85 according to the applicant. The total estimated cost of the program appears to be much too high in proportion to the tonnage and grade of material that may be discovered, if the discovery ratio to date is no greater than it has been in the past. It may be more advantageous for the applicant to test the area first from an underground hole located at the most northerly end of the drift on the Last Hope vein. A 3000 foot drill hole at a +5° angle trending N. 5° E. would intersect the Leadville formation in the projected area along the drill hole shown in section D-D'; Exhibit B and B-4 attached. The applicant, in his letter of August 3, 1965 accompanying this report indicates that many problems may occur due to faulting, plus the fact that the geologic projections extend over several thousand feet, especially on the east side, where the main target area lies.

It is concluded that the applicant's proposal is not likely to result in the discovery of significant reserves of silver, due largely to the fact that the target area is quite indefinite in nature. The geologic studies indicate that the area between the Hilltop Mine and the Continental Chief is generally a promising area structurally, but a more specific target area, or areas, are required to qualify for OME assistance. The proposed program lies very much within the realm of prospecting rather than exploration. It is also noted that

the major production from the Hilltop Mine area has come from replacement ore bodies in a zone some 2,000 feet long, 200 feet high and may average 25 feet in width. Large extensive blanket type deposits have not been found in the Hilltop, or Continental Chief Mines, and it is not feasible to assume a potential of that reported by the consulting geologist, under the assumption that because $7,000,000 worth of ore was mined from 53 acres, it is reasonable to assume that $36,000,000 will be produced from 272 acres, etc. etc.

It is therefore recommended that the application be denied without prejudice and that the application will receive further consideration provided the applicant can locate a more definite and promising target area.


T. 9 S.
T. 9 S.
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T. 10 S.
EXHIBIT C
PROPERTY MAP
LEADVILLE LEAD CORPORATION
Horseshoe District
Park & Lake Counties, Colorado
scale 1 inch = 2000 feet
LL patented land
LL unpatented land
patented land
(under negotiation)

EXHIBIT L

Major Faults in the Vicinity of the Leadville Lead Property

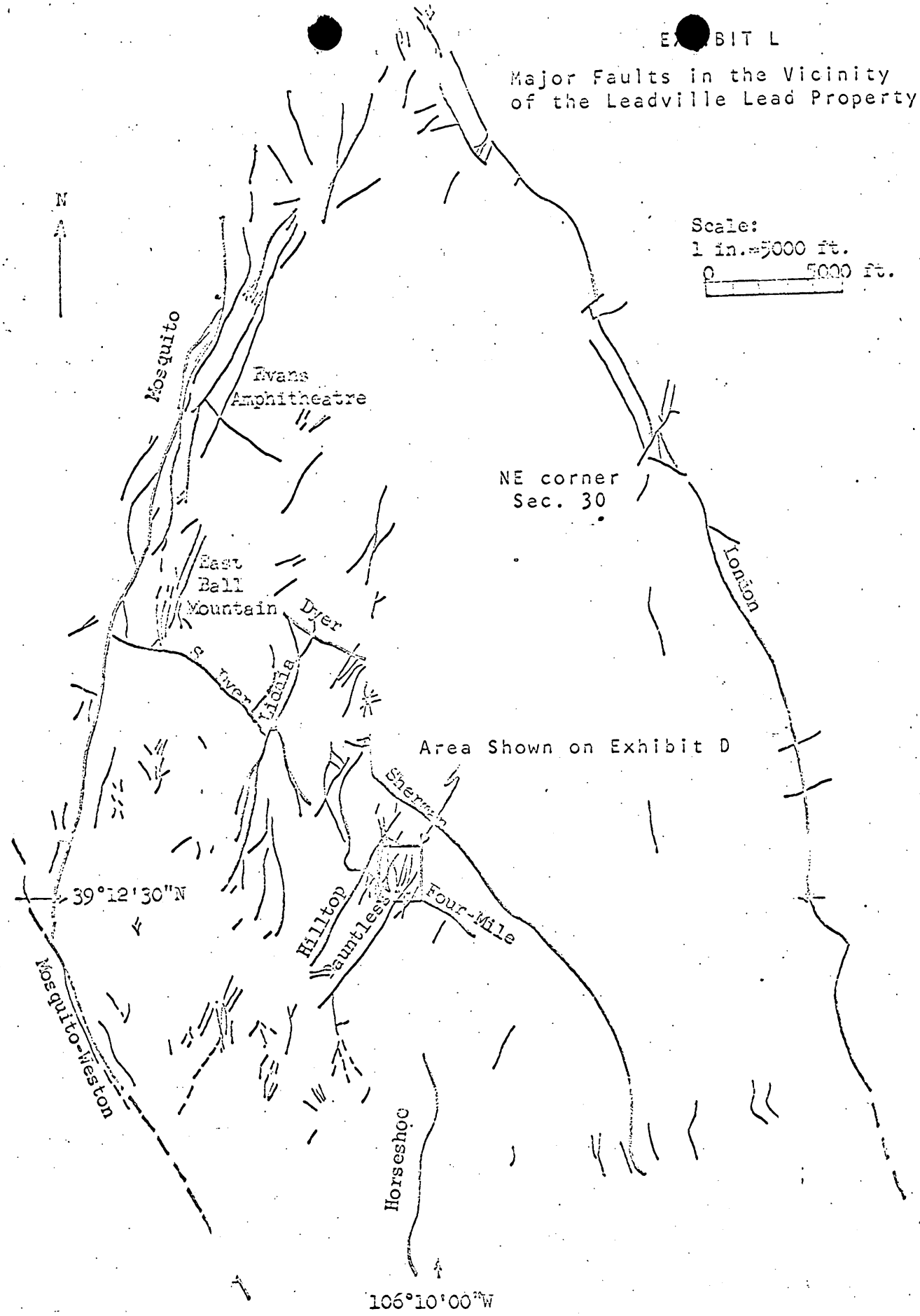
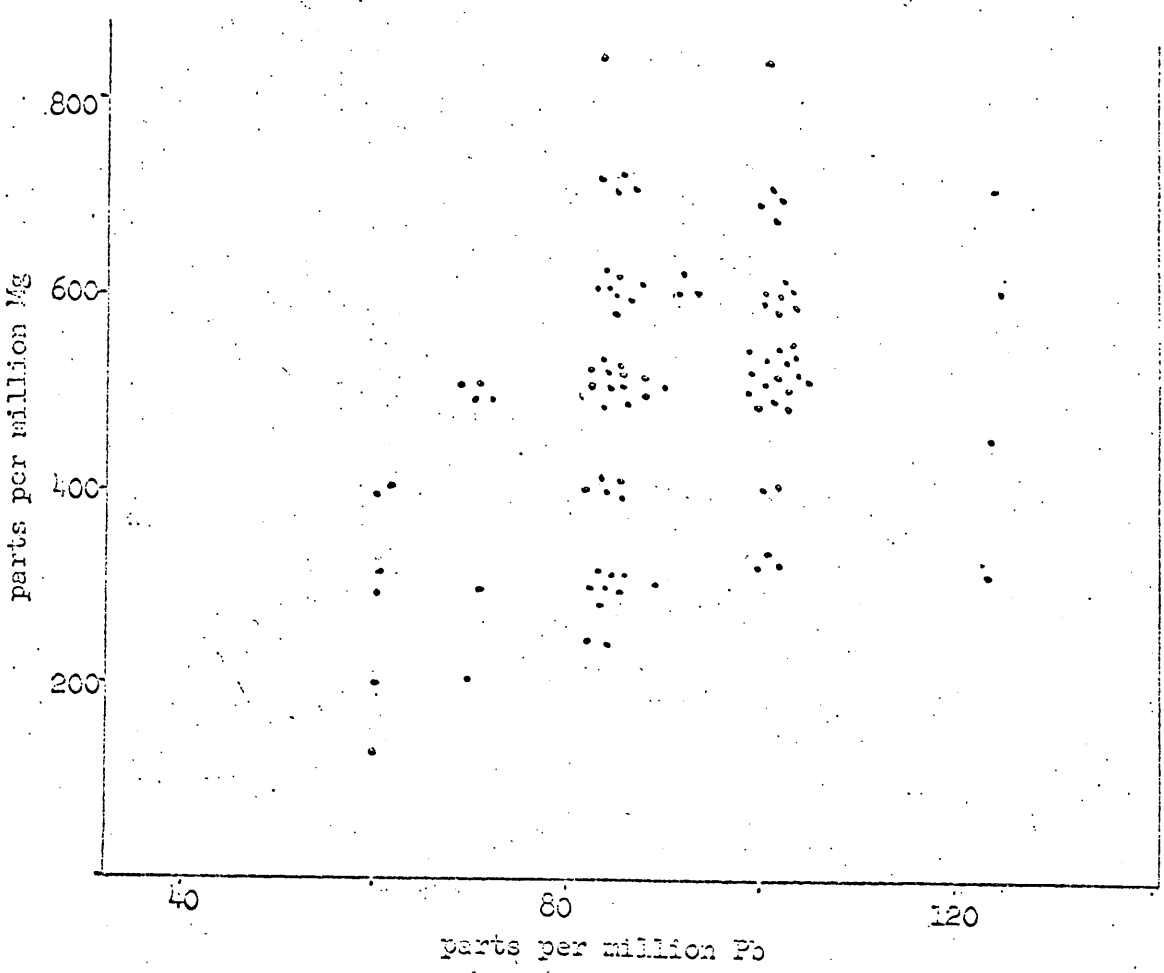


EXHIBIT M

Trace-Element Content of White Porphyry Samples with Various Degrees of Alteration

Early White Porphyry Sample	Parts Per Million											
	Mg	Pb	Zn	Cu	Ba	Mn	Ti	Ag	Sr	Ca	Fe	Cr
750	8500	60	<15	30	3000	40	250	0.5	175	4,000	5000	10
2	7000	85	30	40	3000	60	15	<.2	250	>10,000	5000	5
353	3000	40	15	30	1200	150	70	<.2	85	>10,000	2500	5
427	1500	25	<15	20	600	35	<10	<.2	250	4,000	3500	<5
276	500	30	<15	20	1500	500	175	<.2	175	>10,000	5000	<5

Increasing Alteration



Mg:Pb ratios in altered White Porphyry in vicinity of Hilltop Mine.

Office of Minerals Exploration

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O. M. E.
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JUN 16 1967
INITIALS | CODE

June 14, 1967

Leadville Lead Corporation
1677 Wadsworth Blvd.
Denver, Colorado 80215

Subject: OME-6615 (Silver, Gold, Copper)
Leadville Lead Corporation
Hilltop Property
Park and Lake Counties, Colorado

Gentlemen:

During a telephone conversation this morning with Dr. Duane Bloom, consultant for the applicant company, a tentative date of July 11 and possibly July 12, was set for a field examination on the above-stated property.

Sincerely yours,

J. William Hasler

J. William Hasler
Field Officer, Region III
Office of Minerals Exploration

cc: Chief, OME
Hasler chron
OME chron
Leadville Lead Application

MME Form 7
(2/63)

OFFICIAL FILE COPY

Date	Surname	Code
4/4	Peterson	
4/14/67	Kirkemo	

APR 27 1967

AIRMAIL

Memorandum

To: Field Officer, Region III

From: Chief, Office of Minerals Exploration

Subject: OME-6615 (Silver, Gold, Copper)
Leadville Lead Corporation
Hilltop Property
Park and Lake Counties, Colorado

The subject application is being referred to you for further consideration, a field examination if warranted, and recommendations.

We are not favorably impressed with the proposed exploration program developed by Earth Sciences, Inc. The proposal is based chiefly on questionable theories and geological assumptions with little or no real supporting evidence. In addition to these uncertainties, we doubt that the proposed method of exploration could be carried on in the effective manner as suggested in the proposal. Consequently, justification of this costly project must be considered remote.

Two previous DMEA projects (DMEA 1463 and 4572) failed to establish any significant ore reserves in the Hilltop mine vicinity, which is just south of the proposed project area.

We note that the Applicant is currently conducting an exploration project on the Hilltop property. Assays obtained from this work appear promising; however, no additional information concerning the project was included in the application.

FRANK E. JOHNSON

Frank E. Johnson

cc: Director's Reading File
Division File
Econ. Geol. File
OME Docket
OME Reading File
130
Peterson

EMPeterson/mm (4/14/67)

23263

MME Form 7
(2/63)

OFFICIAL FILE COPY

Date	Surname	Code
4/14	Peterson	

AIRMAIL

APR 17 1967

Leadville Lead Corporation
1677 Wadsworth Blvd.
Denver, Colorado 80215

Re: OME-6615 (Silver, Gold, Copper)
Leadville Lead Corporation
Hilltop Property
Park and Lake Counties, Colorado

Gentlemen:

Your application for exploration assistance has been reviewed by the Washington office and referred to Mr. J. William Hasler, Field Officer, Region III, Office of Minerals Exploration, U. S. Geological Survey, Building 25, Federal Center, Denver, Colorado 80225. Mr. Hasler will notify you if additional information concerning the application is needed, and possibly to make arrangements for a field examination.

As Mr. Hasler is responsible for making OME field examinations in eleven states, a visit to your property necessarily will have to be scheduled well in advance.

Sincerely yours,

FRANK E. JOHNSON

Frank E. Johnson
Chief, Office of
Minerals Exploration

cc: Director's Reading File
Division File
Econ. Geol. File
OME Docket
OME Reading File
Region III
Peterson

ECPeterson/mm (4/14/67)

23263

April 3, 1967

Leadville Lead Corporation
1677 Wadsworth Boulevard
Denver, Colorado 80215

Subject: OME-6615

Gentlemen:

Your application for exploration assistance, dated February 24, 1967, submitted to our office at Denver, Colorado, has been assigned Docket No. OME-6615.

Please identify all future correspondence relating to your application by this docket number.

Sincerely yours,

Frank E. Johnson
Chief, Office of
Minerals Exploration

Copy to Region III

EXHIBIT B1 THROUGH B5
GEOLOGIC SECTIONS

VERTICAL AND HORIZONTAL SCALE 1" = 400'

(For Location of Sections see Exhibit B)

TEWU	Upper White Porphyry	OM	Manitou Dolomite
TEWL	Lower White Porphyry	EP	Peerless Formation
ML	Leadville Formation	ES	Sawatch Quartzite
DCD	Dyer Dolomite	PEG	Precambrian Granite
DCP	Parting Quartzite		Fault

Drill Hole

TO ACCOMPANY OME PROPOSAL
LEADVILLE LEAD CORPORATION 2/67

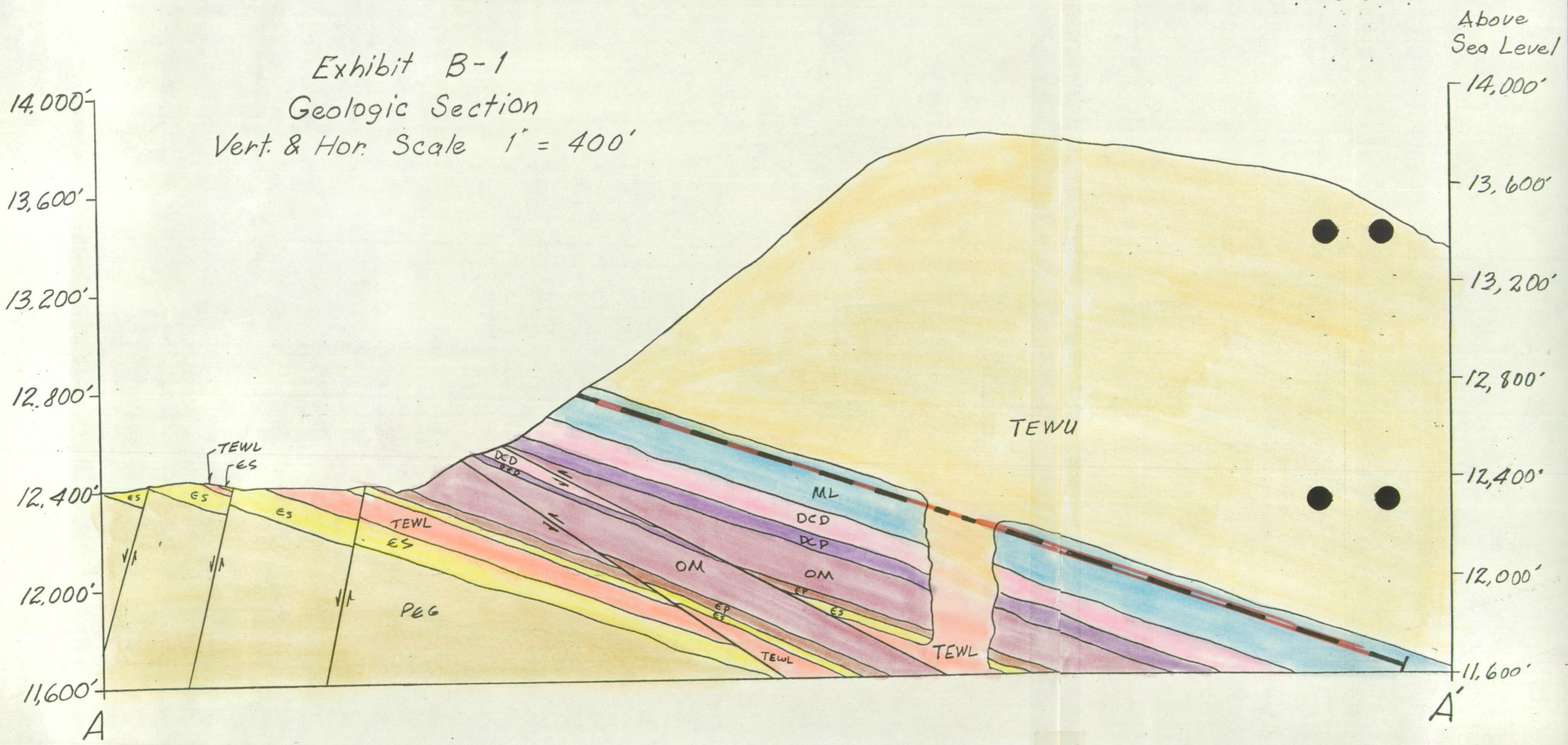
Exhibit B-1
Geologic Section
Vert. & Hor. Scale 1" = 400'
Above Sea Level
14,000'
13,600'
13,200'
12,800'
12,400'
12,000'
11,600'
A
A'
TEWU
ML
DCD
DCP
OM
TEWL
ES
PEG

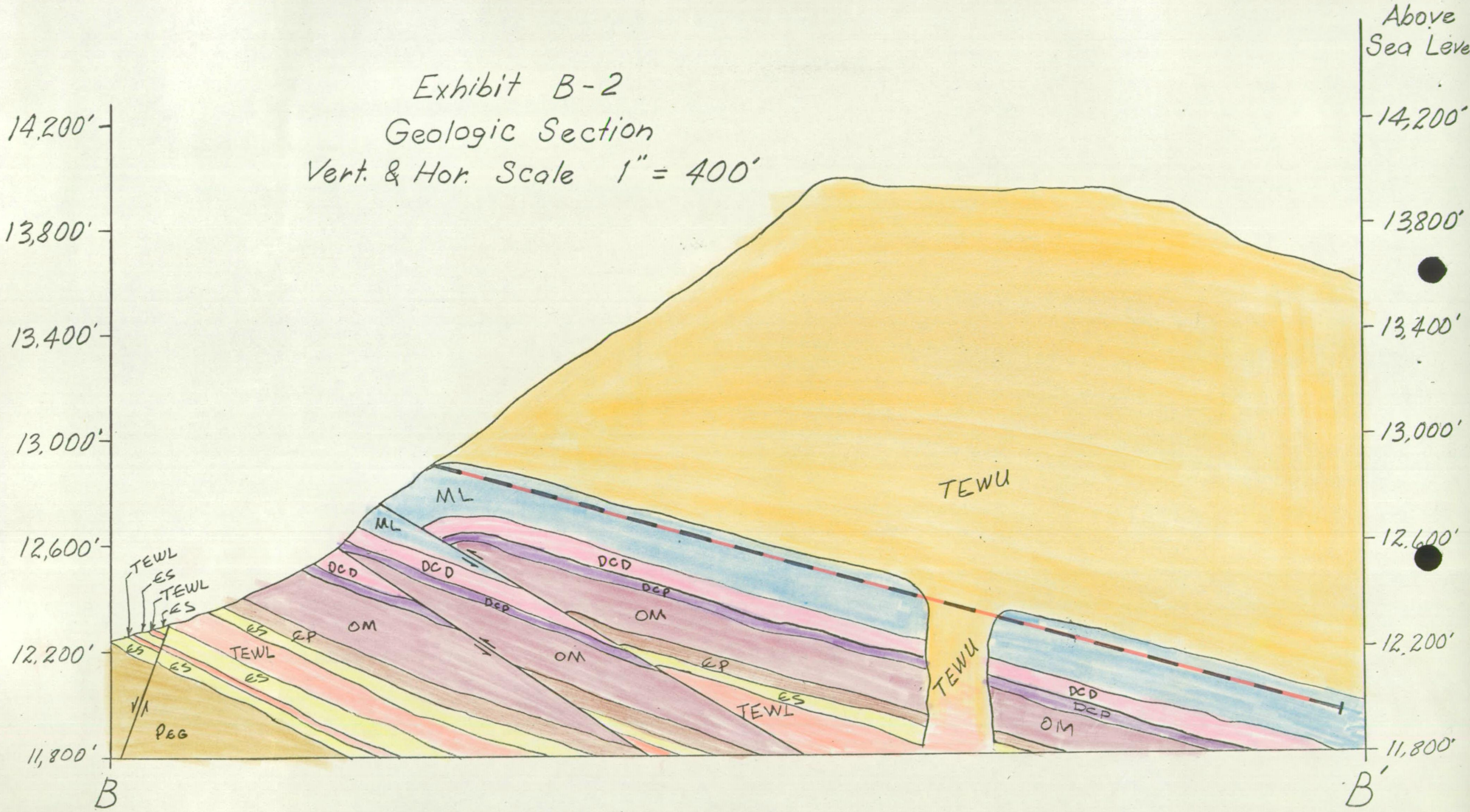
Exhibit B-2
Geologic Section
Vert. & Hor. Scale 1" = 400'
Above Sea Level
14,200'
13,800'
13,400'
13,000'
12,600'
12,200'
11,800'
B
B'
TEWU
ML
DCD
DCP
OM
TEWL
ES
EP
PEG

Exhibit B-3

Geologic Section

Vert. & Hor. Scale 1" = 400'

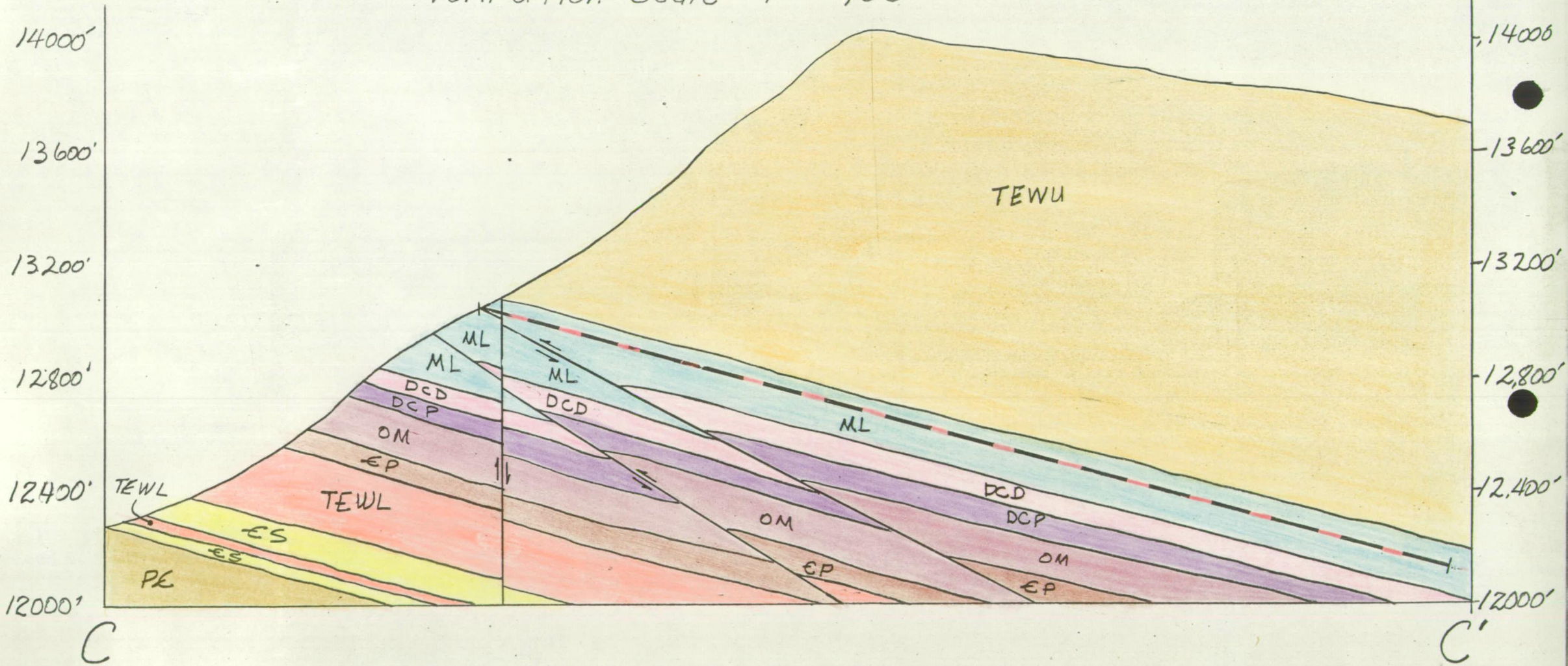

Exhibit B-4

Geologic Section

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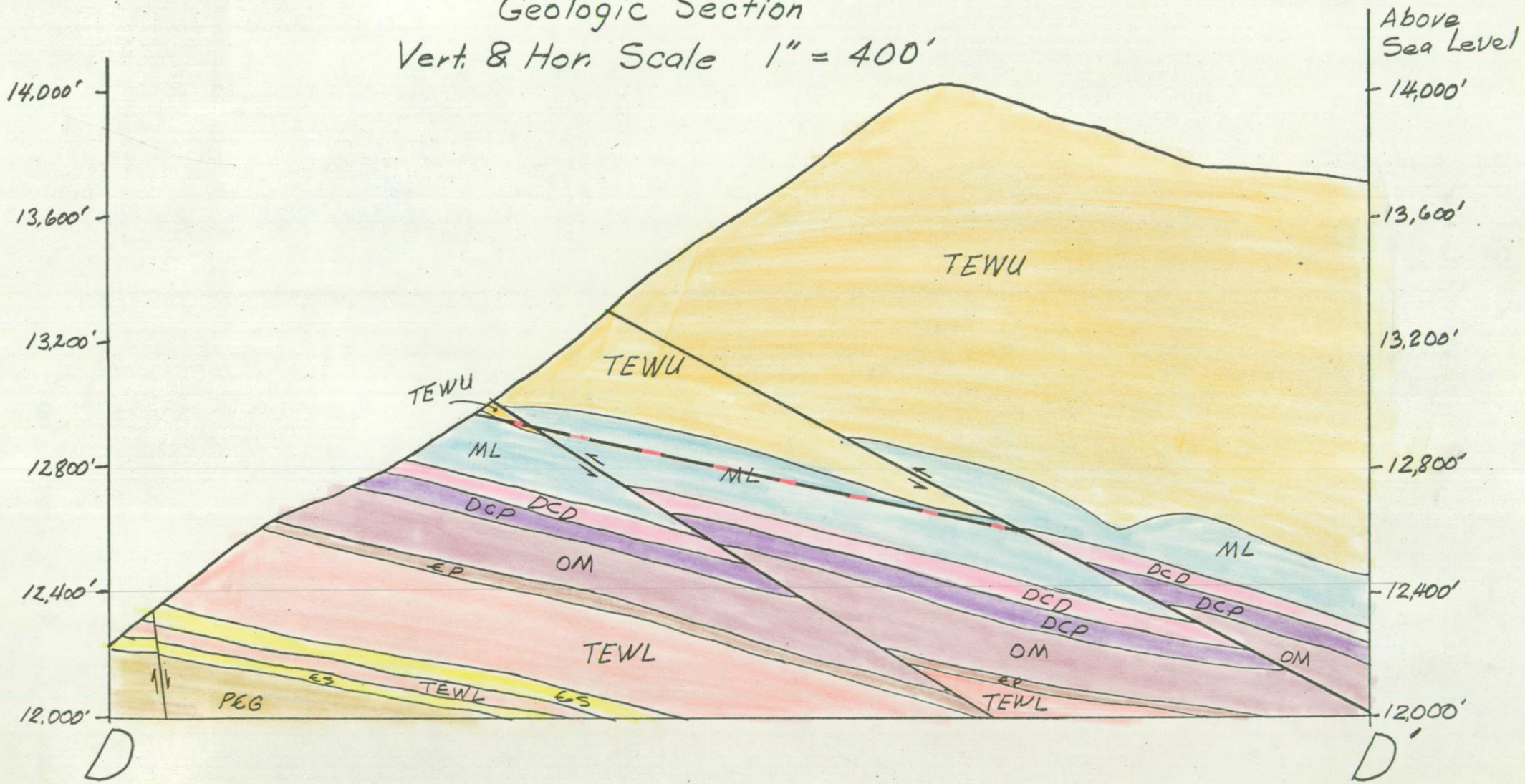
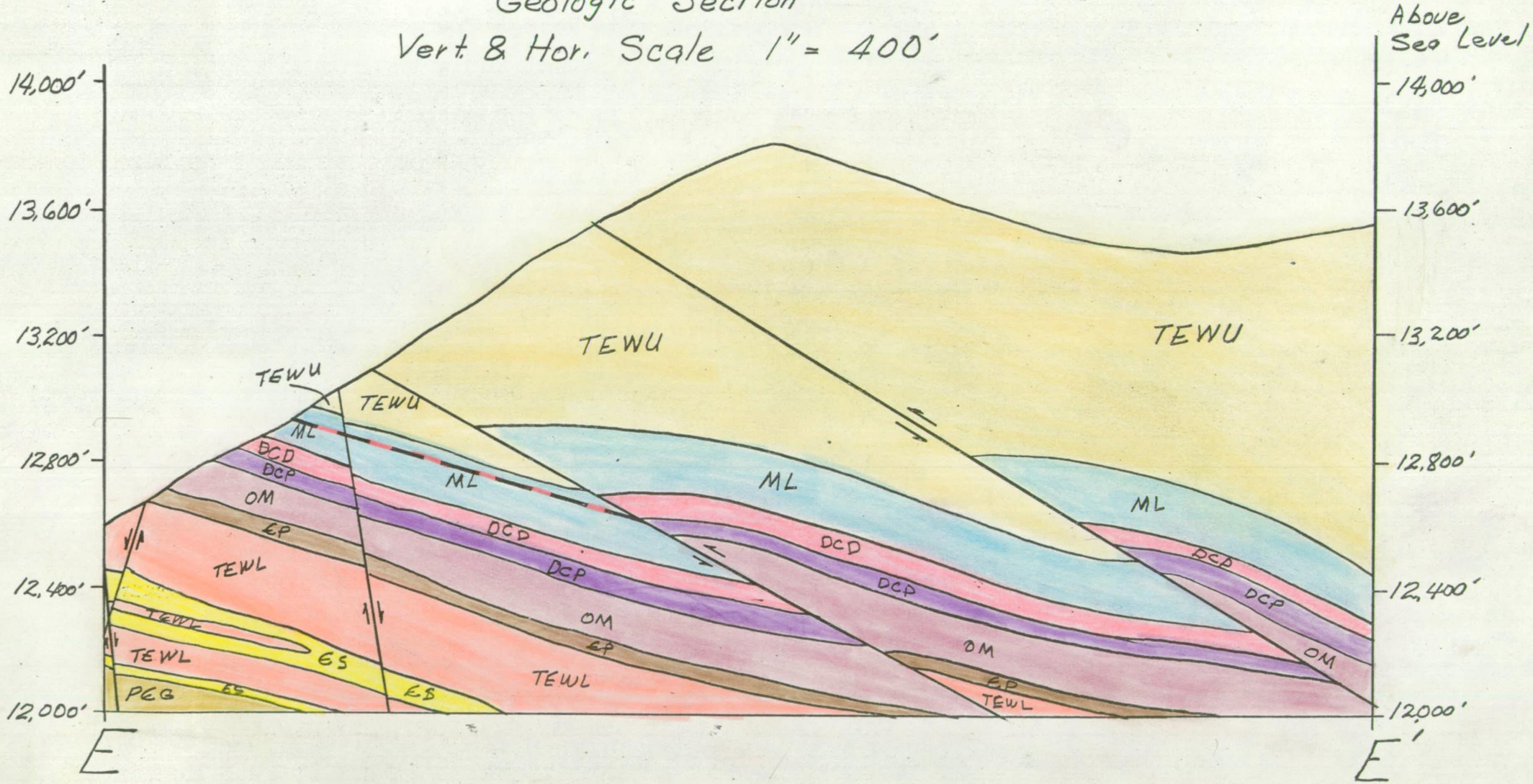


Exhibit B-5

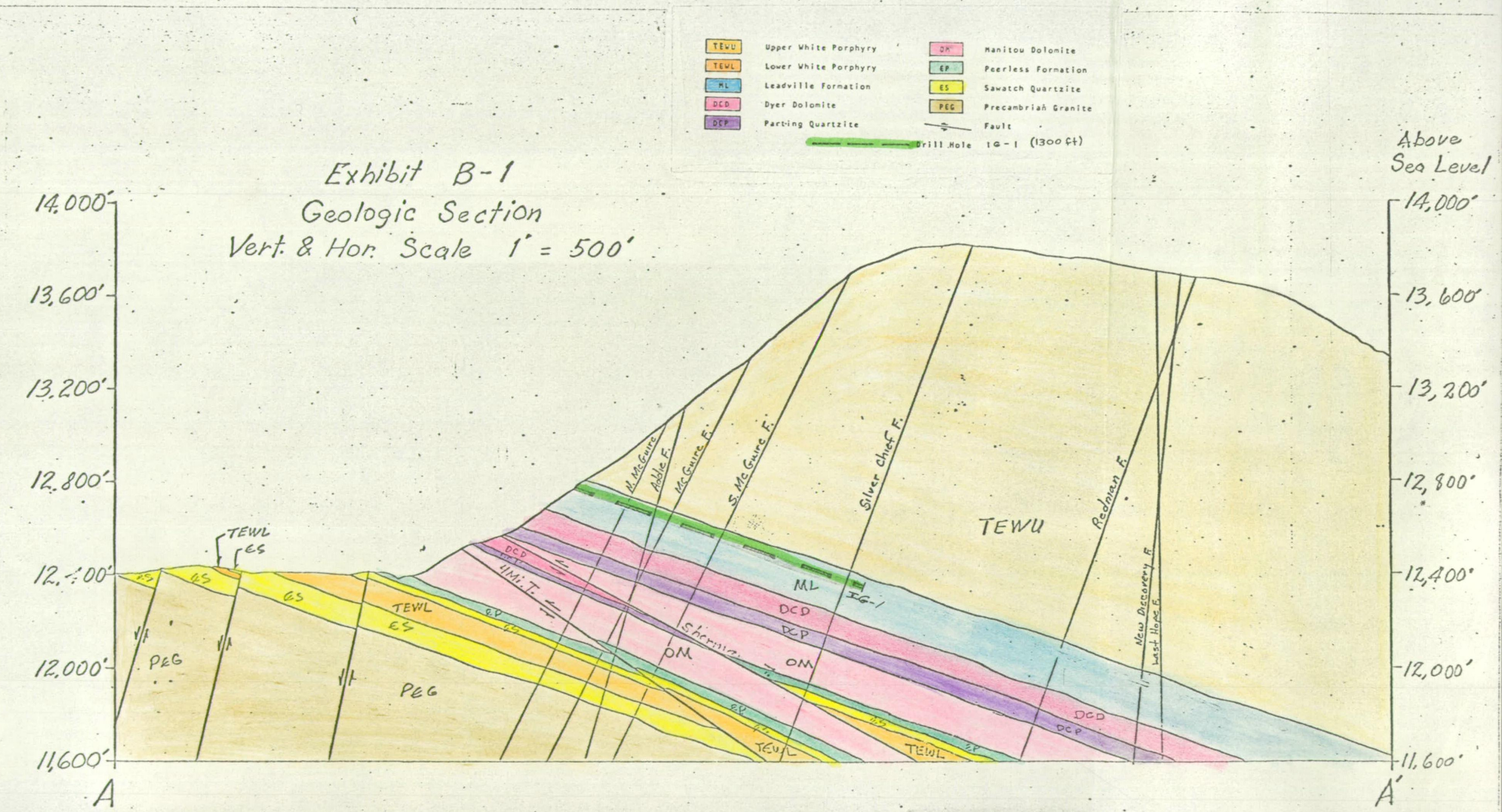
Geologic Section

Vert. & Hor. Scale 1" = 400'



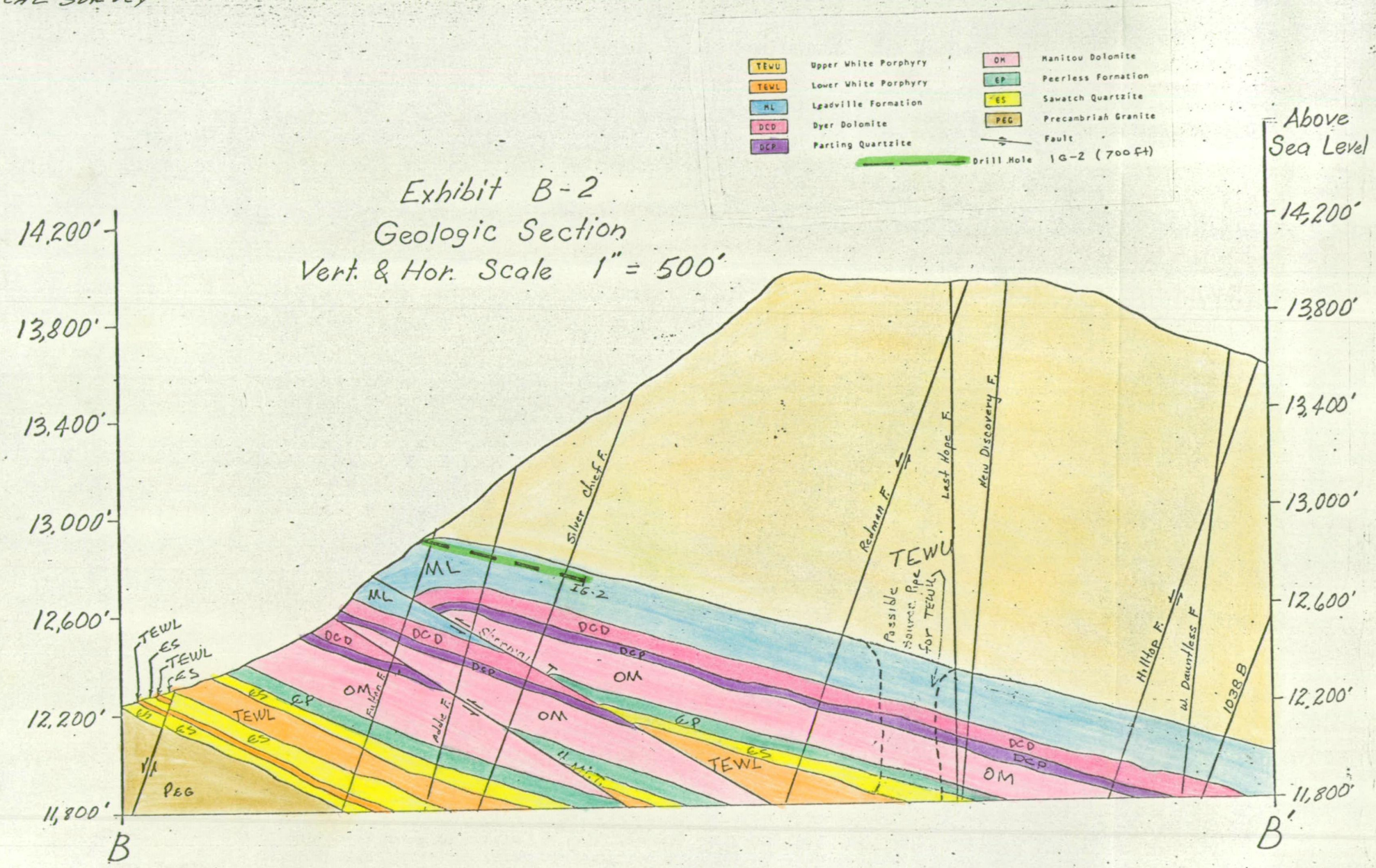
DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

OFFICE OF MINERALS EXPLORATION
DOCKET 6615



DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

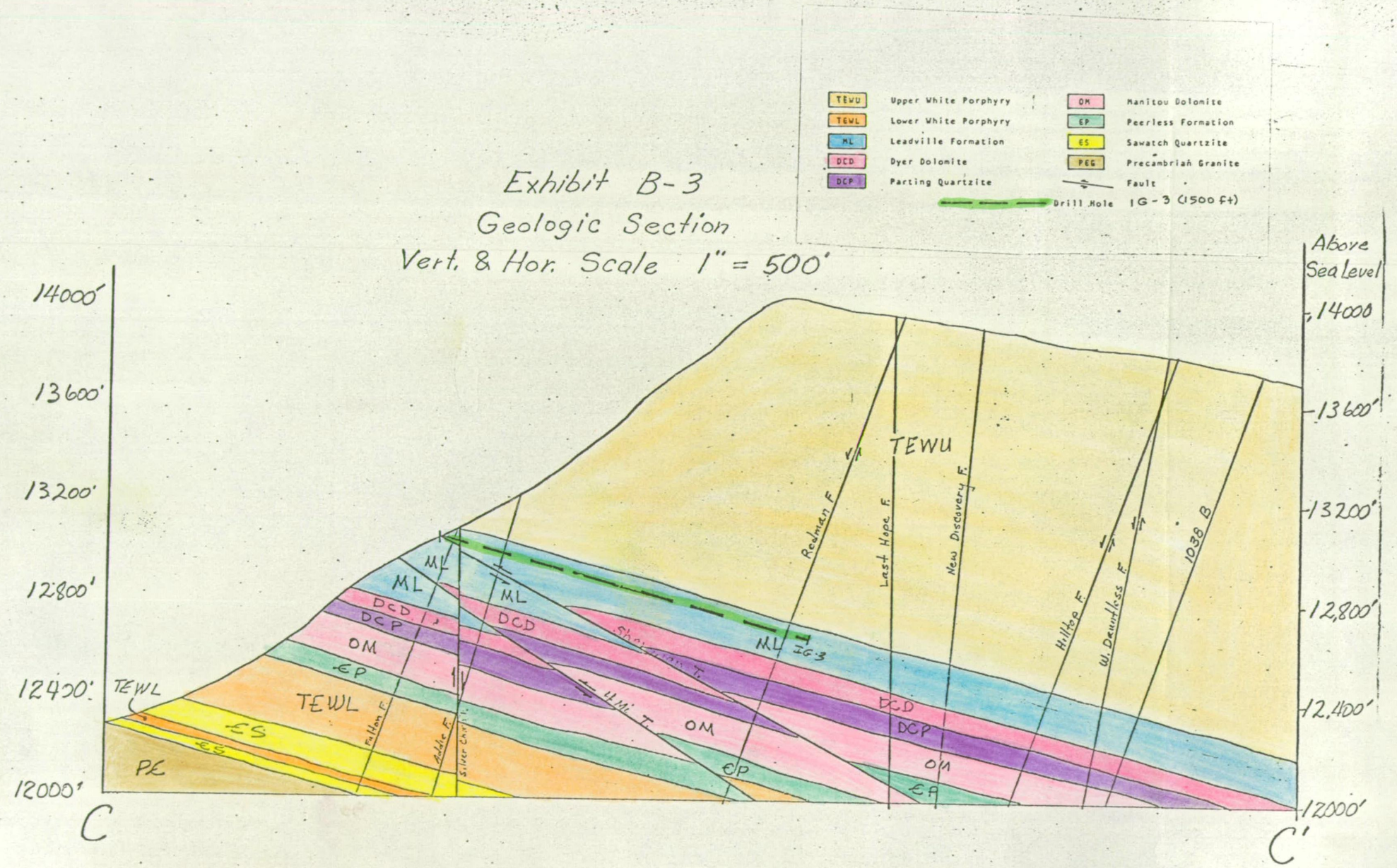
OFFICE OF MINERALS EXPLORATION
DOCKET 66/5



DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

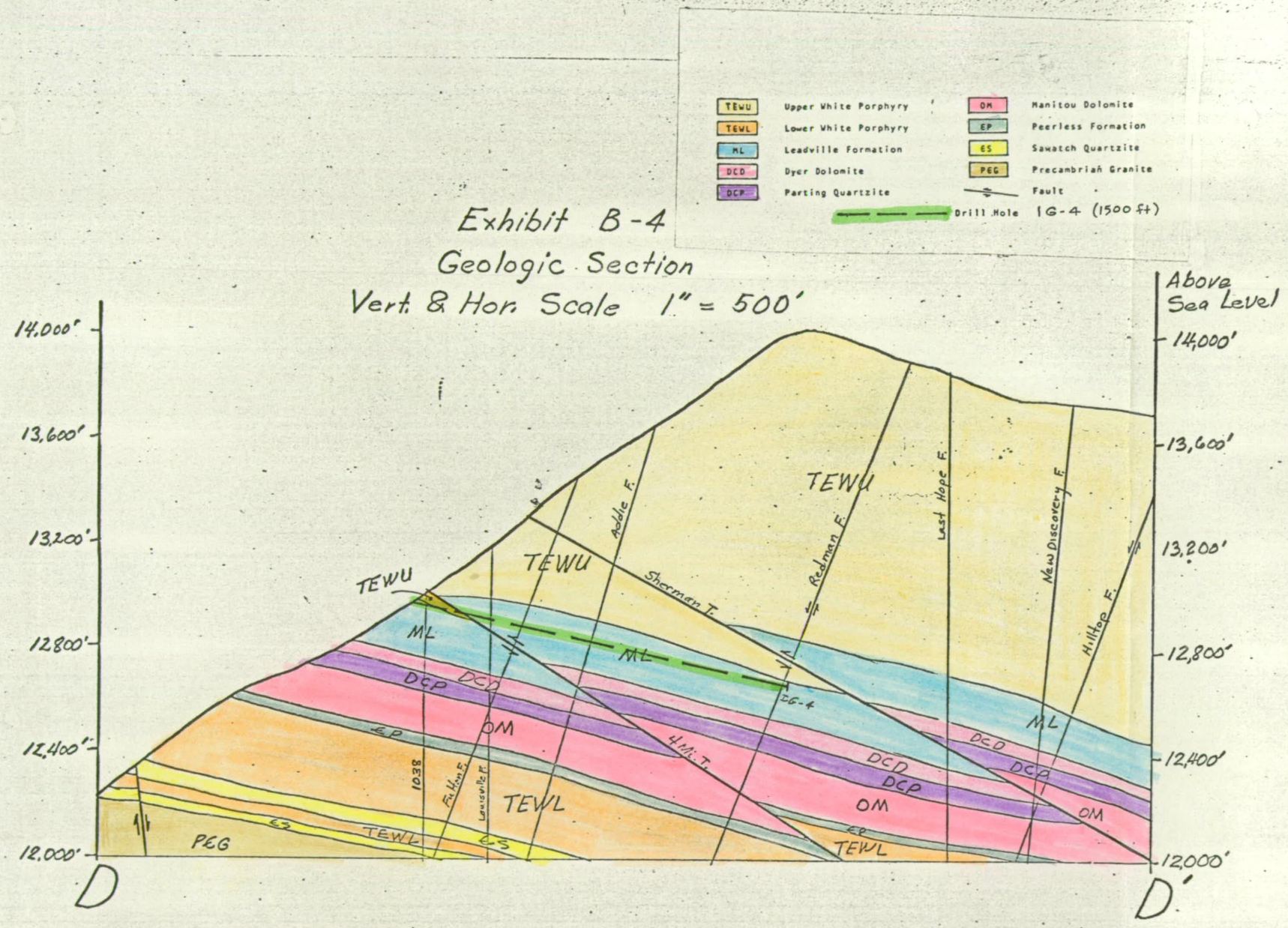
OFFICE OF MINERALS EXPLORATION
DOCKET 6615

Exhibit B-3
Geologic Section
Vert. & Hor. Scale 1" = 500'



DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

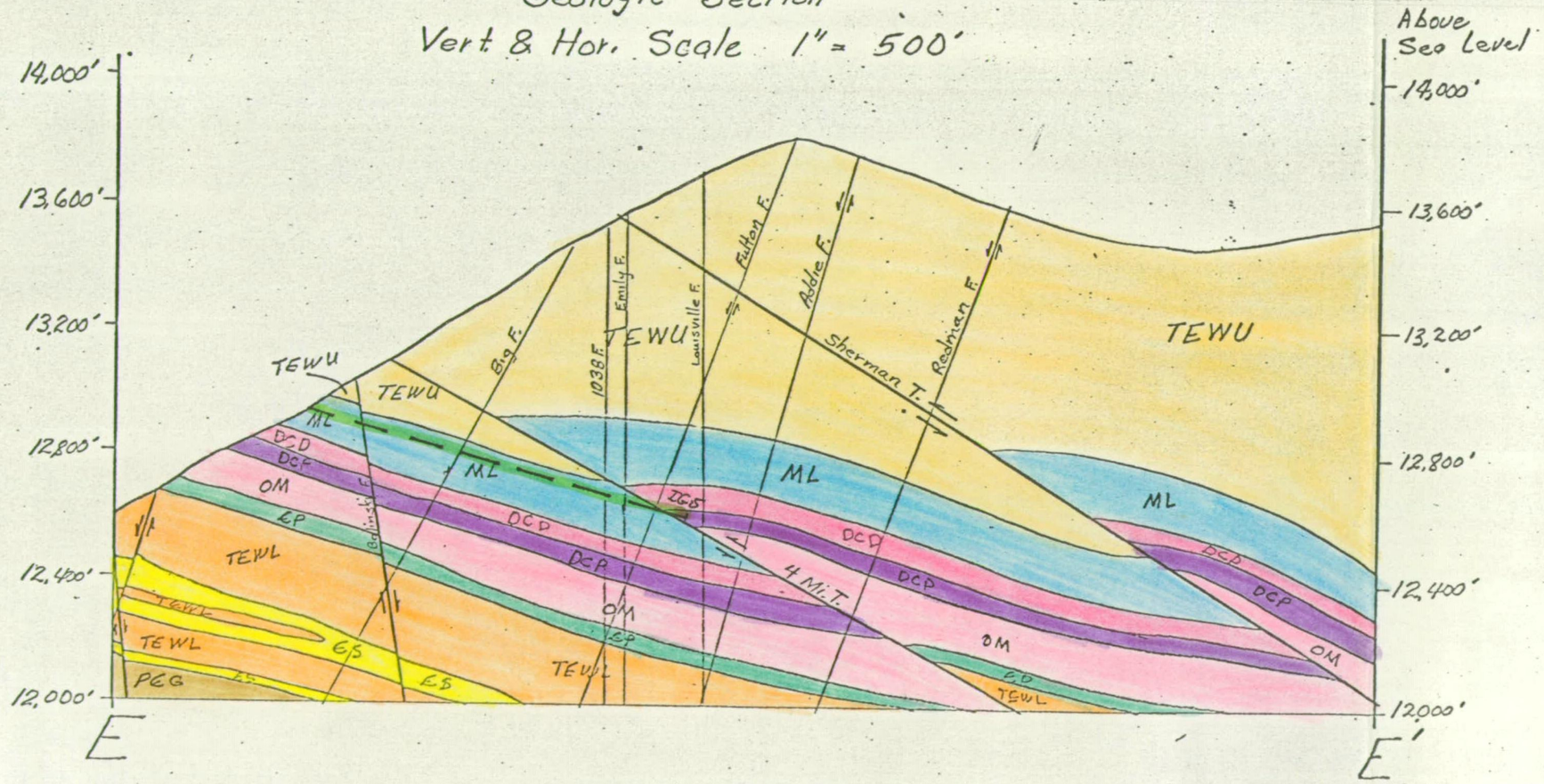
OFFICE OF MINERALS EXPLORATION
DOCKET 6615



DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

OFFICE OF MINERALS EXPLORATION
DOCKET 6615

Exhibit B-5
Geologic Section
Vert. & Hor. Scale 1" = 500'



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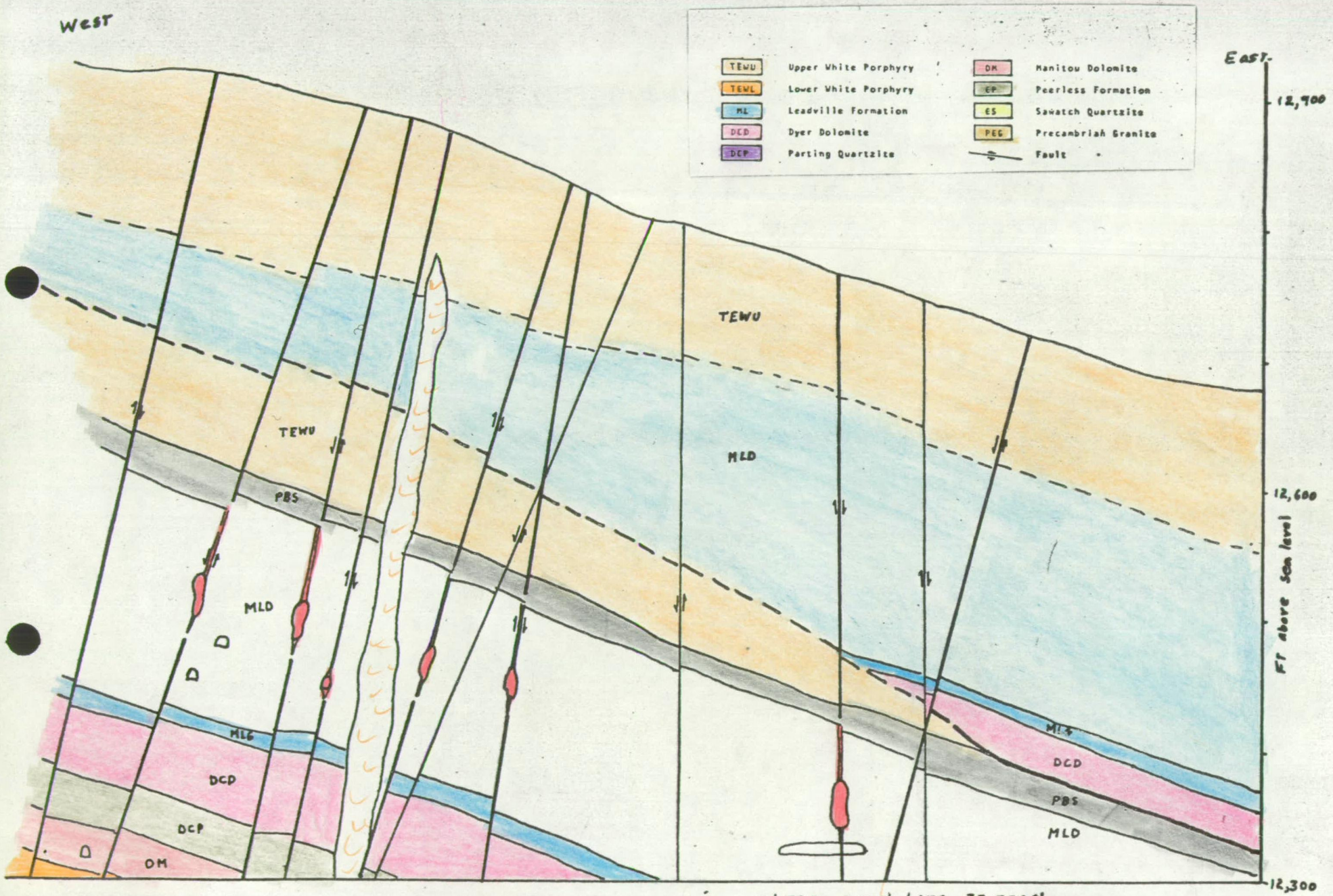


East - West Cross section along Grid Line 33,500N
Hilltop Mine, Park County Colorado.

Scale 1 in = 100 ft.

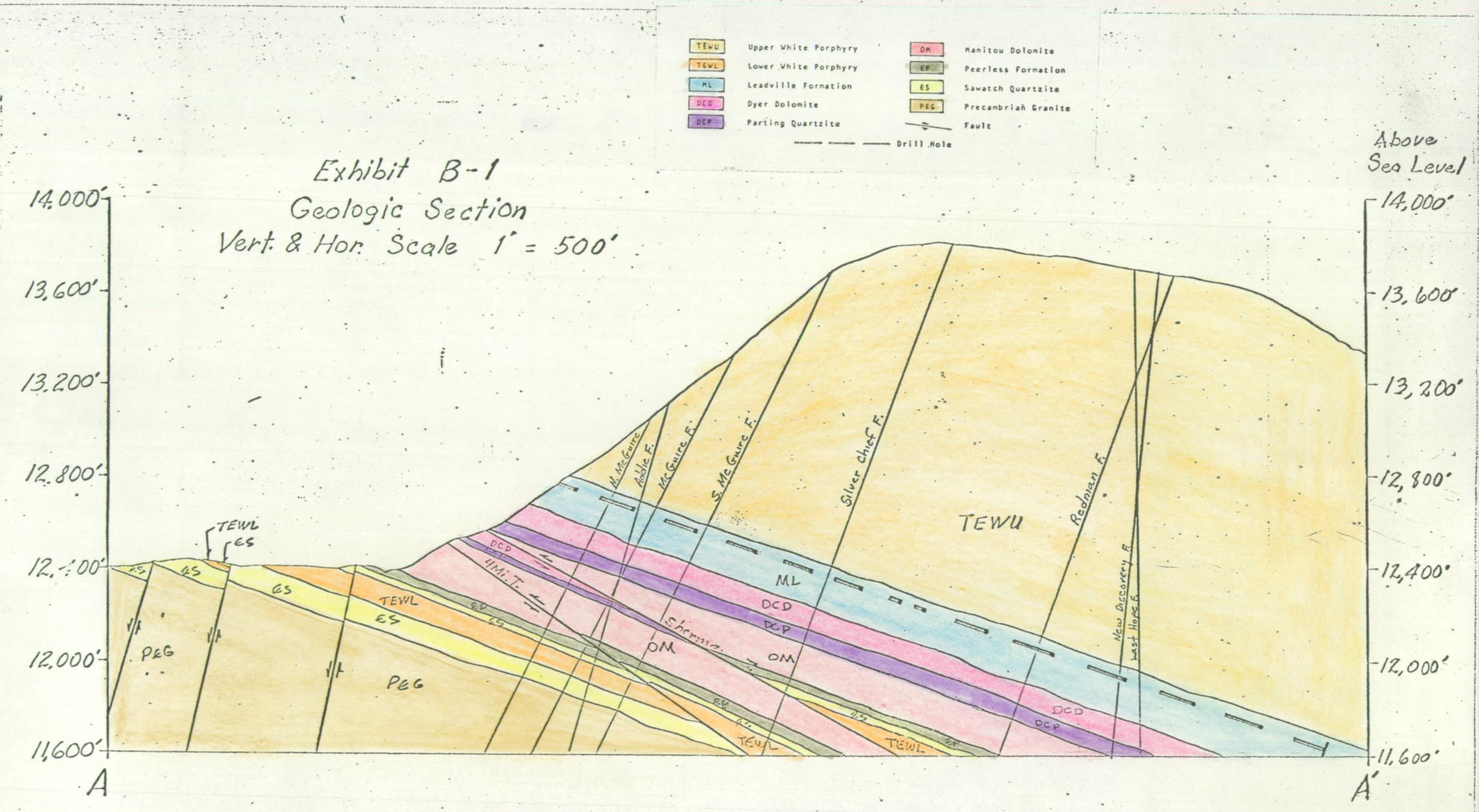


Exhibit B-1
Geologic Section
Vert. & Hor. Scale 1" = 500'
TEWU Upper White Porphyry
TEWL Lower White Porphyry
ML Leadville Formation
DCD Dyer Dolomite
DCP Parting Quartzite
OM Manitou Dolomite
EP Peerless Formation
ES Sawatch Quartzite
PEG Precambrian Granite
Fault
Drill Hole
Above Sea Level
14,000'
13,600'
13,200'
12,800'
12,400'
12,000'
11,600'
A
A'
N. McGuire F.
Noble F.
McGuire F.
S. McGuire F.
Silver Chief F.
Redman F.
New Discovery F.
Last Hope F.
Shamrock F.
TEWU
TEWL
ES
PEG
ML
DCD
DCP
OM
EP

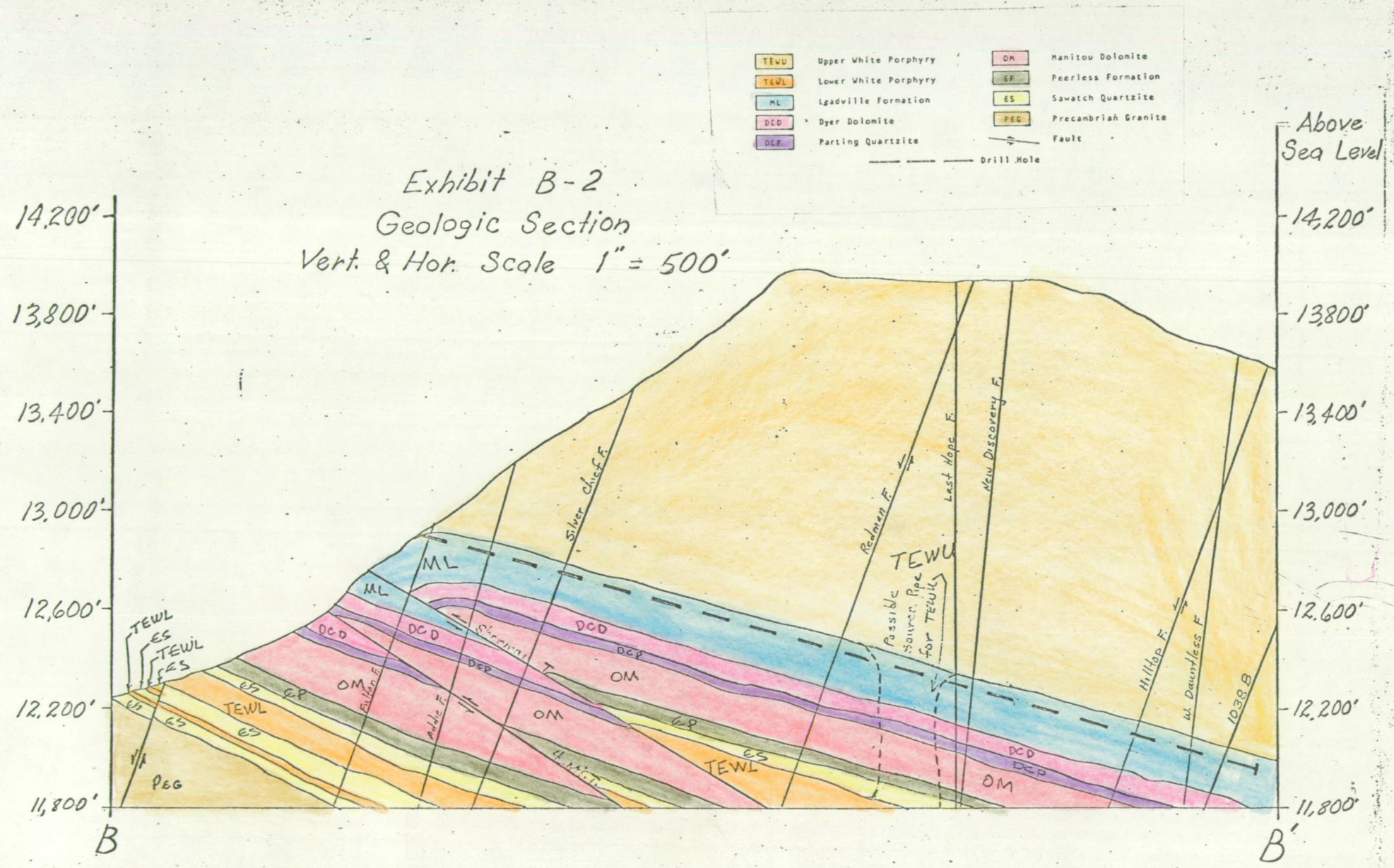
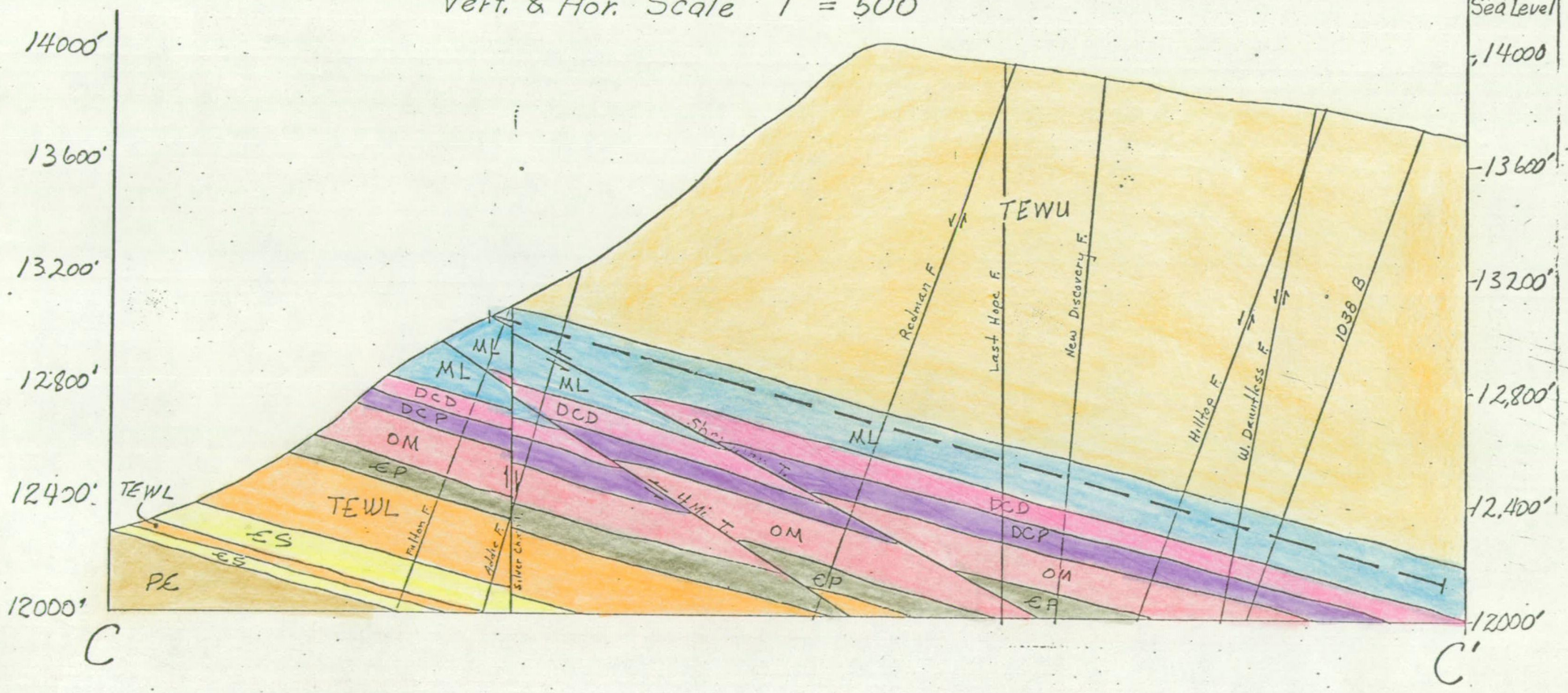


Exhibit B-2
Geologic Section
Vert. & Hor. Scale 1" = 500'
TEWU Upper White Porphyry
TEWL Lower White Porphyry
ML Leadville Formation
DCD Dyer Dolomite
DCP Parting Quartzite
OM Manitou Dolomite
EP Peerless Formation
ES Sawatch Quartzite
PEG Precambrian Granite
Fault
Drill Hole
Above Sea Level
14,200'
13,800'
13,400'
13,000'
12,600'
12,200'
11,800'
B
B'
Silver Chief F.
Redman F.
Last Hope F.
New Discovery F.
Hilltop F.
W. Dauntless F.
1038 B
Stevens F.
Adele F.
Elkhorn F.
Passible Southern Pod for TEWL
TEWU
TEWL
ML
DCD
DCP
OM
ES
PEG

Exhibit B-3

Geologic Section

Vert. & Hor. Scale 1" = 500'

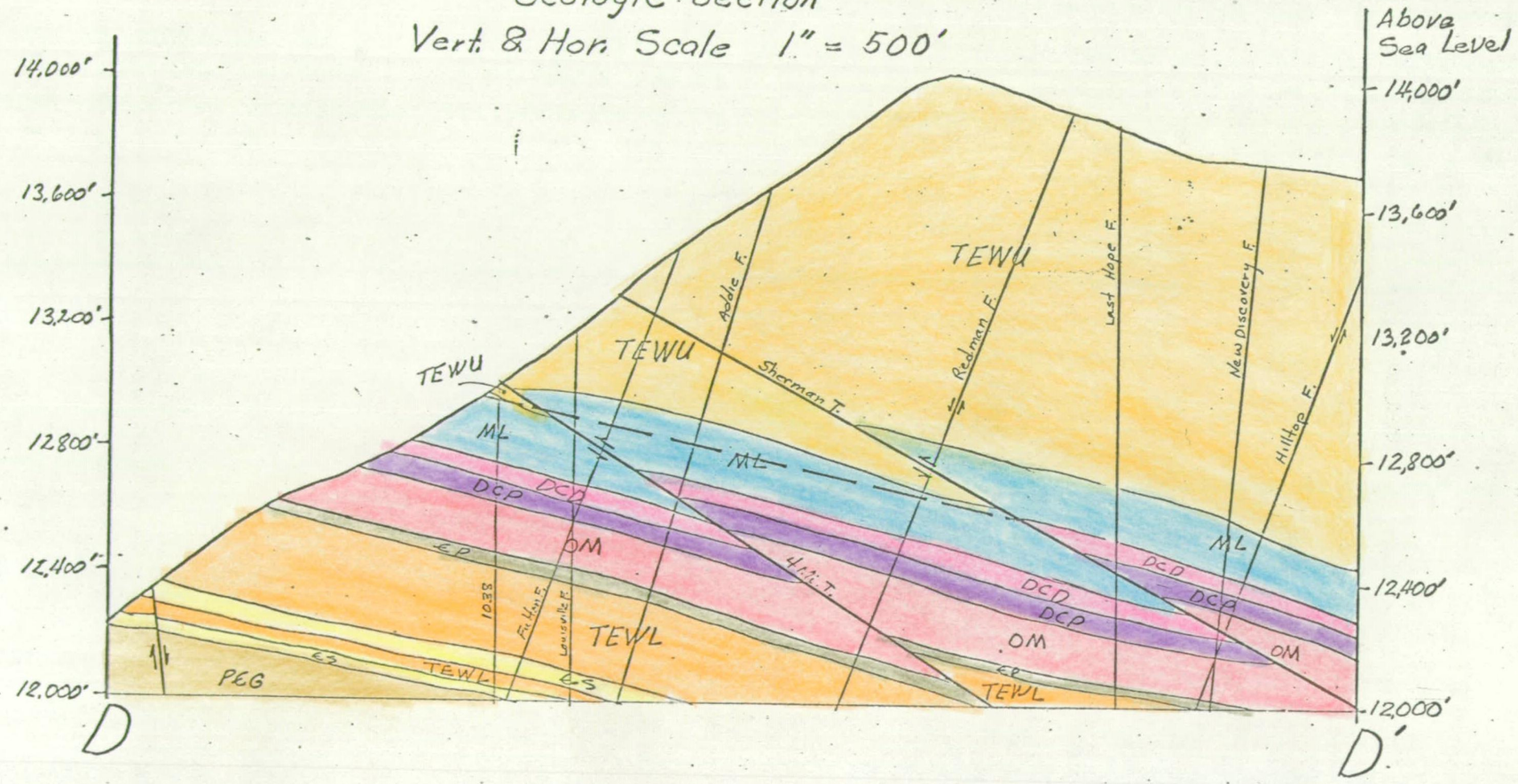


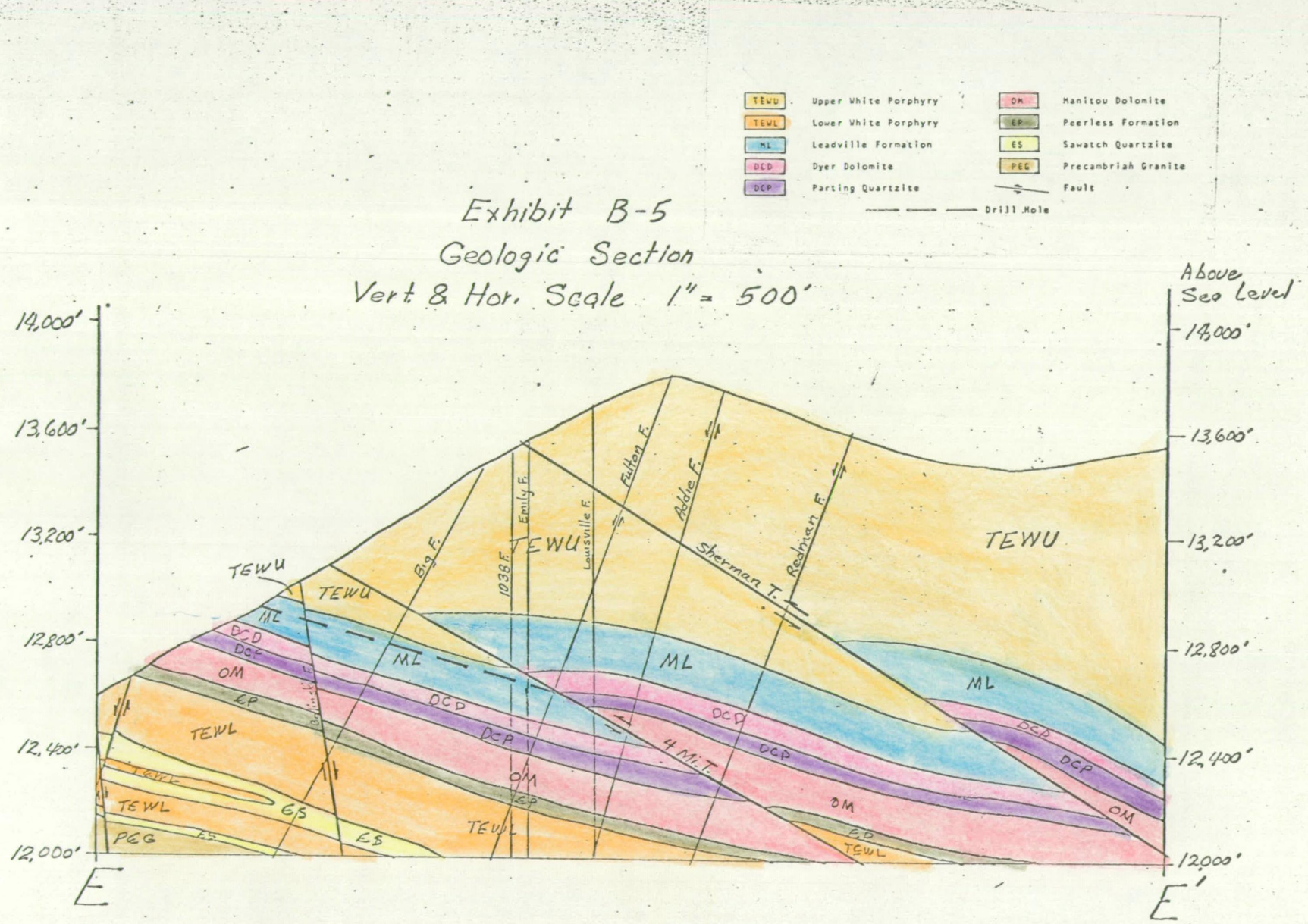
TEWU	Upper White Porphyry	OM	Manitou Dolomite
TEWL	Lower White Porphyry	EP	Peerless Formation
ML	Leadville Formation	ES	Sawatch Quartzite
DCD	Dyer Dolomite	PEG	Precambrian Granite
DCP	Parting Quartzite		Fault
			Drill Hole

Exhibit B-4

Geologic Section

Vert. & Hor. Scale 1" = 500'




TEWU Upper White Porphyry
TEWL Lower White Porphyry
ML Leadville Formation
DCD Dyer Dolomite
DCP Parting Quartzite
OM Manitou Dolomite
EP Peerless Formation
ES Sawatch Quartzite
PEG Precambrian Granite
Fault
Drill Hole
Exhibit B-5
Geologic Section
Vert. & Hor. Scale 1" = 500'
Above Sea Level
14,000'
13,600'
13,200'
12,800'
12,400'
12,000'
Big F.
1038 F.
Emily F.
Louisville F.
Fulton F.
Addie F.
Sherman T.
Redman F.
4 Mi. T.
TEWU
ML
DCD
DCP
OM
EP
TEWL
ES
PEG
E
E'

GEOLOGIC MAP OF THE

HILLTOP MINING PROPERTY

LEADVILLE LEAD CORPORATION

PARK AND LAKE COUNTIES
COLORADO

EXPLANATION

Lithologic Units

- Late White Porphyry (Tertiary)
- Sacramento Porphyry (Tertiary)
- Early White Porphyry overlying Leadville formation (Tertiary)
- Early White Porphyry intruded into pre-Mississippian units (Tertiary)
- Belden & Coffman Formations undivided
- Belden Formation (Pennsylvanian)
- Leadville Formation (Mississippian)
- Devonian, Ordovician, Cambrian sediments undivided
- Granite (Precambrian)

Symbols

- Fold
- Fault dashed where inferred
- Contact dashed where inferred
- Attitude of sediments
- Proposed drill holes
- Proposed drill road

AREA SHOWN ON EXHIBIT D

Land Status

- LL patented land
- LL unpatented land
- patented land under negotiation

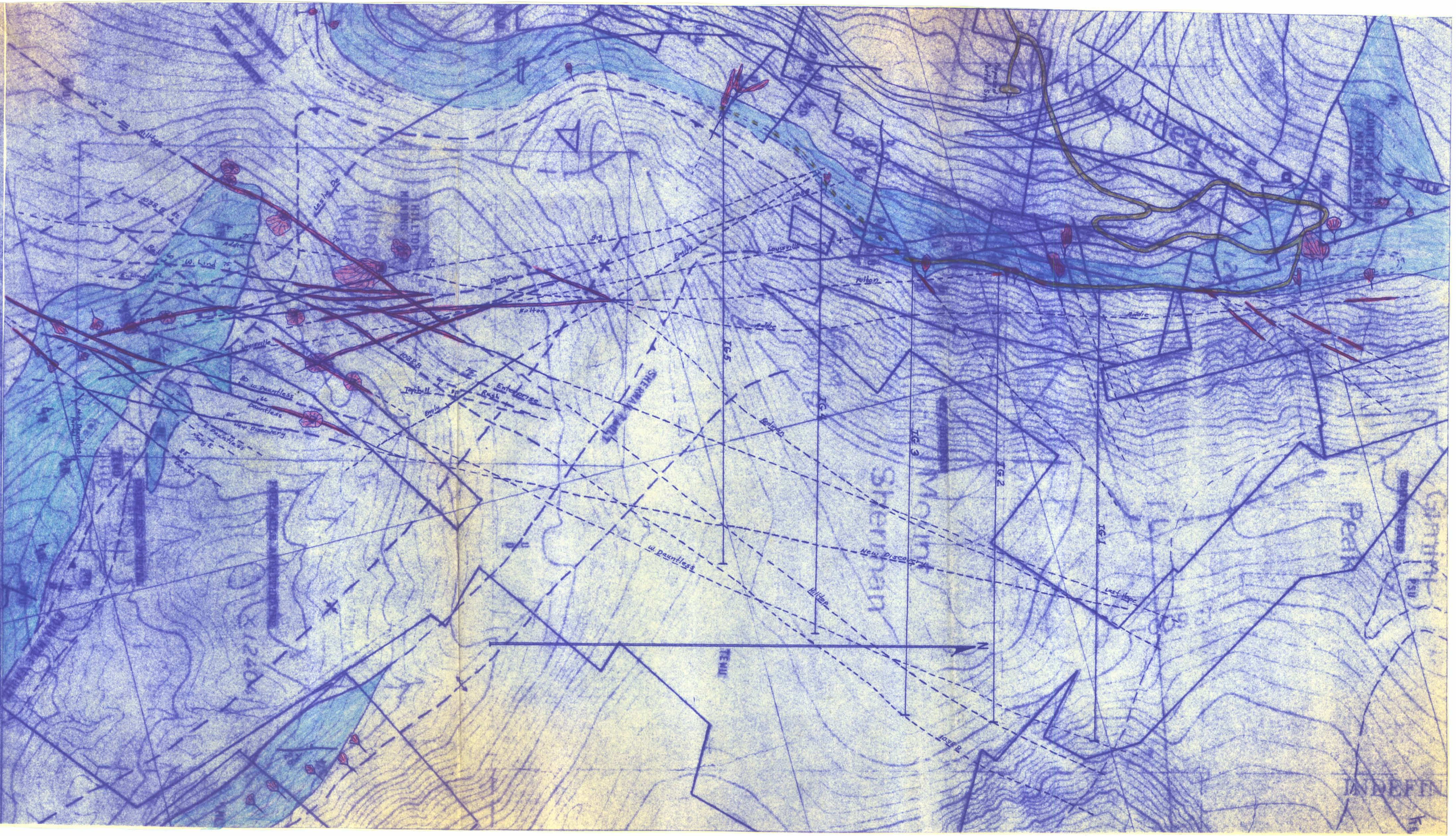
SCALE 1 INCH = 500 FEET

COUNTER INTERVAL 40 FEET

BASE MAP : USGS TOPOGRAPHIC

COMPILED BY
EARTH SCIENCES, INC.
FEBRUARY 15, 1967

TO ACCOMPANY OME PROPOSAL
LEADVILLE LEAD CORPORATION
FEBRUARY 15, 1967



DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

OFFICE OF MINERALS EXPLORATION
DOCKET 6615

GEOLOGIC MAP OF THE HILLTOP MINING PROPERTY LEADVILLE LEAD CORPORATION

PARK AND LAKE COUNTIES
COLORADO

EXPLANATION

Lithologic Units

- TLW — Late White Porphyry (Tertiary)
- TS — Sacramento Porphyry (Tertiary)
- TEWU — Early White Porphyry overlying Leadville formation (Tertiary)
- TEWL — Early White Porphyry intruded into pre-pennsylvanianits (Tertiary)
- PSU — Belden & Coffman Formations undivided
- PB — Belden Formation (Pennsylvanian)
- ML — Leadville Formation (Mississippian)
- DE — Devonian, Ordovician, Cambrian sediments undivided
- PEG — Granite (Precambrian)

Symbols

- Fold
- Fault dashed where inferred
- Contact dashed where inferred
- Attitude of sediments
- Proposed drill holes
- Proposed drill road
- Boundary of subordinated ground
- Mineralized veins and dumps

SCALE 1 INCH = 500 FEET

CONTOUR INTERVAL 40 FEET

N

BASE MAP: USGS TOPOGRAPHIC

COMPILED BY
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LEADVILLE LEAD CORPORATION
FEBRUARY 15, 1967

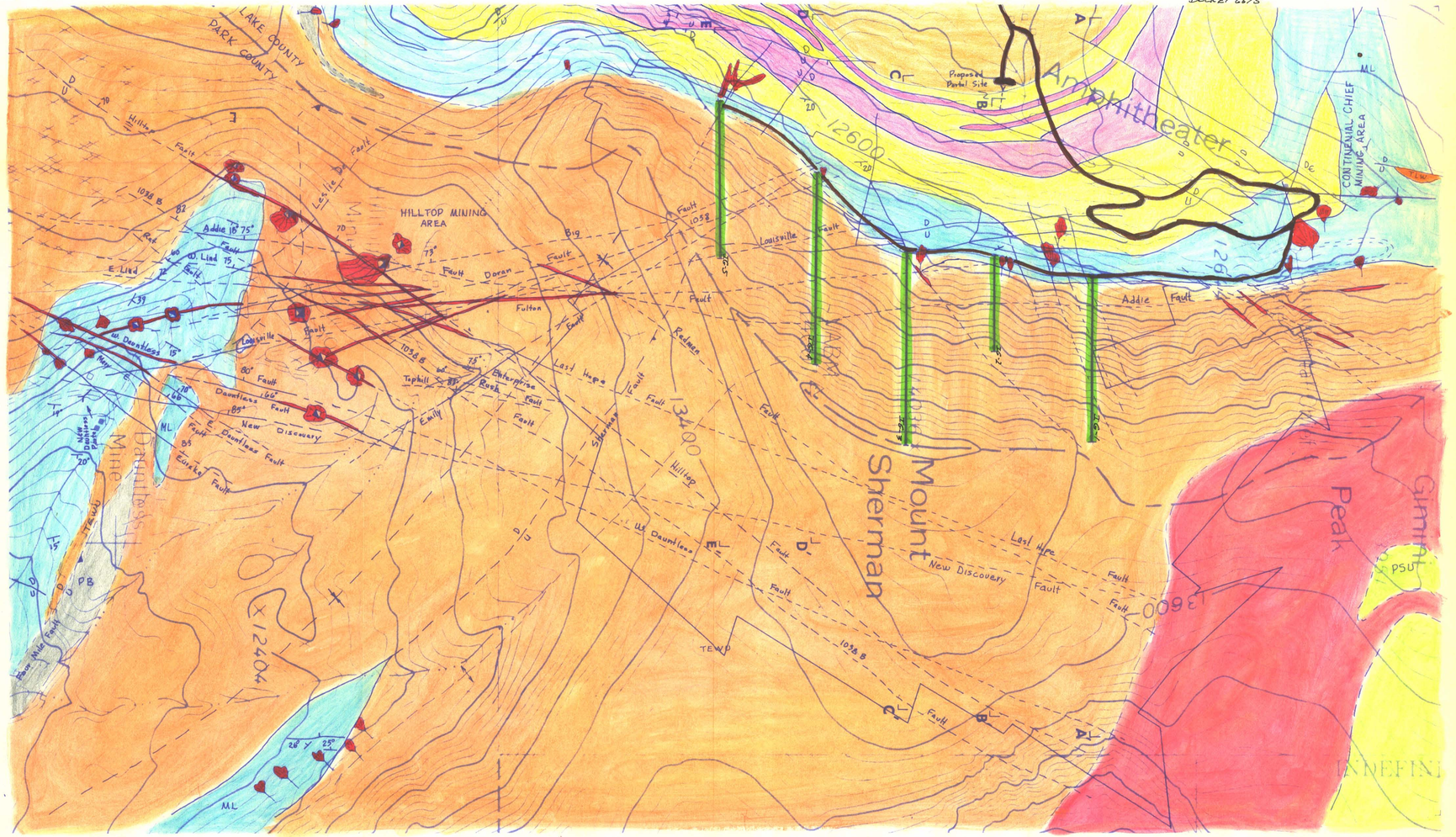

Exhibit A

GEOLOGIC MAP OF THE

HILLTOP MINING PROPERTY

LEADVILLE LEAD CORPORATION

PARK AND LAKE COUNTIES
COLORADO

EXPLANATION

Lithologic Units

- Late White Porphyry (Tertiary)
- Sacramento Porphyry (Tertiary)
- Early White Porphyry overlying Leadville formation (Tertiary)
- Early White Porphyry intruded into pre-Mississippian units (Tertiary)
- Belden & Coffman Formations undivided
- Belden Formation (Pennsylvanian)
- Leadville Formation (Mississippian)
- Devonian, Ordovician, Cambrian sediments undivided
- Granite (Precambrian)

Symbols

- Fold
- Fault dashed where inferred
- Contact dashed where inferred
- 15 Attitude of sediments
- Proposed drill holes
- Proposed drill road
- AREA SHOWN ON EXHIBIT D

Land Status

- LL patented land
- LL unpatented land
- patented land under negotiation

SCALE 1 INCH = 500 FEET

INTERVAL 40 FEET

BASE MAP : USGS TOPOGRAPHIC

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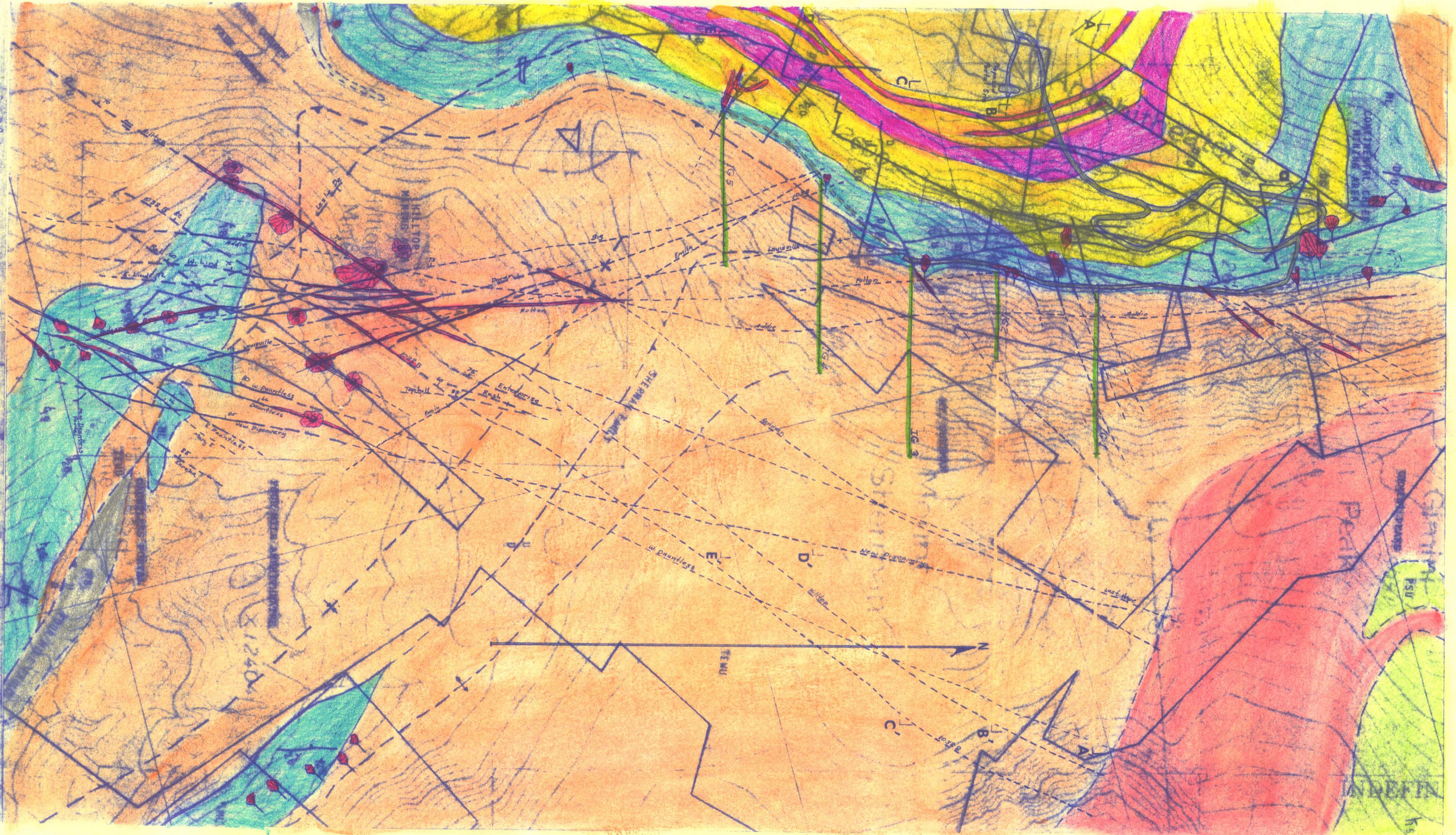
EARTH SCIENCES, INC.
FEBRUARY 15, 1967

TO ACCOMPANY OME PROPOSAL
LEADVILLE LEAD CORPORATION
FEBRUARY 15, 1967



DEPARTMENT OF THE INTERIOR
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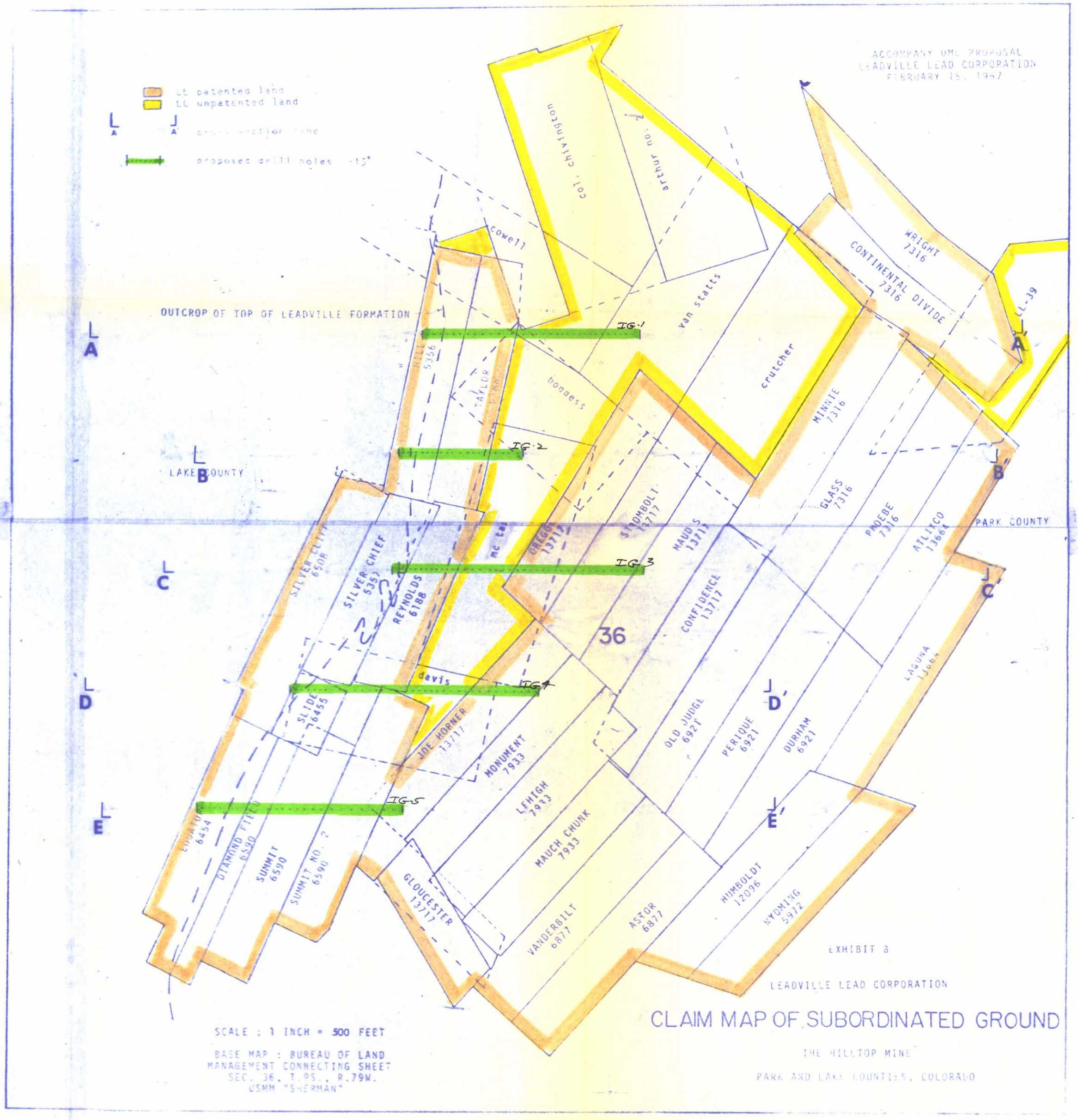
OFFICE OF MINERALS EXPLORATION
DOCKET 66/5



DEPARTMENT OF THE INTERIOR
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OFFICE OF MINERALS EXPLORATION
DOCKET 6615

GEOLOGIC MAP OF THE HILLTOP MINING PROPERTY LEADVILLE LEAD CORPORATION

PARK AND LAKE COUNTIES
COLORADO

EXPLANATION

Lithologic Units

- TEW — Late White Porphyry (Tertiary)
- TS — Sacramento Porphyry (Tertiary)
- TEWU — Early White Porphyry overlying Leadville formation (Tertiary)
- TEWL — Early White Porphyry intruded into pre-pennsylvanianits (Tertiary)
- PSU — Belden & Coffman Formations undivided
- PB — Belden Formation (Pennsylvanian)
- ML — Leadville Formation (Mississippian)
- DE — Devonian, Ordovician, Cambrian sediments undivided
- PEG — Granite (Precambrian)

Symbols

- Fold
- Fault dashed where inferred
- Contact dashed where inferred
- 15° Attitude of sediments
- Proposed drill holes
- Proposed drill road
- Boundary of subordinated ground
- Mineralized veins and dumps

SCALE 1 INCH = 500 FEET

CONTOUR INTERVAL 40 FEET

N

BASE MAP: USGS TOPOGRAPHIC

COMPILED BY
EARTH SCIENCES, INC.
FEBRUARY 15, 1967

TO ACCOMPANY OME PROPOSAL
LEADVILLE LEAD CORPORATION
FEBRUARY 15, 1967

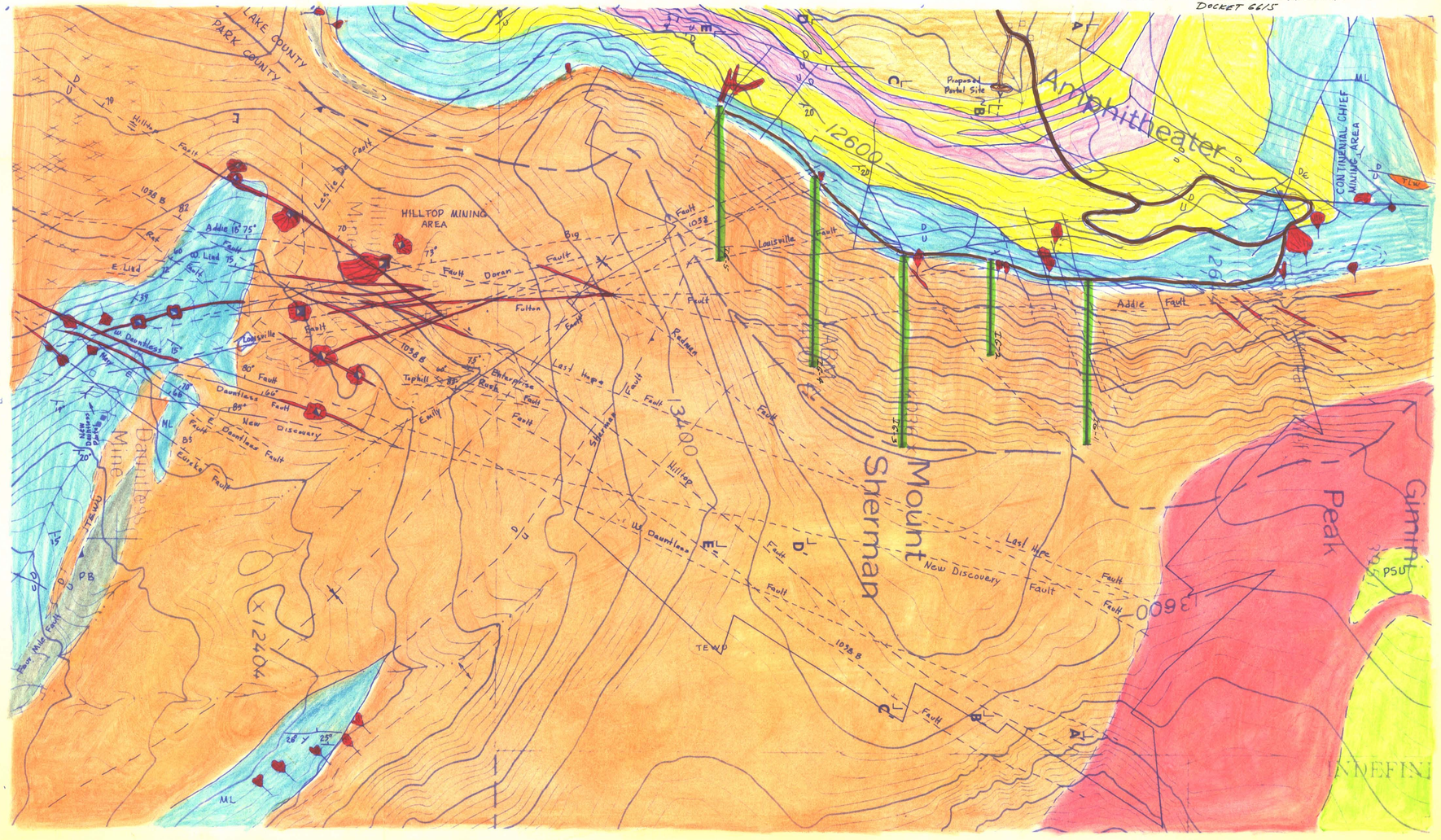
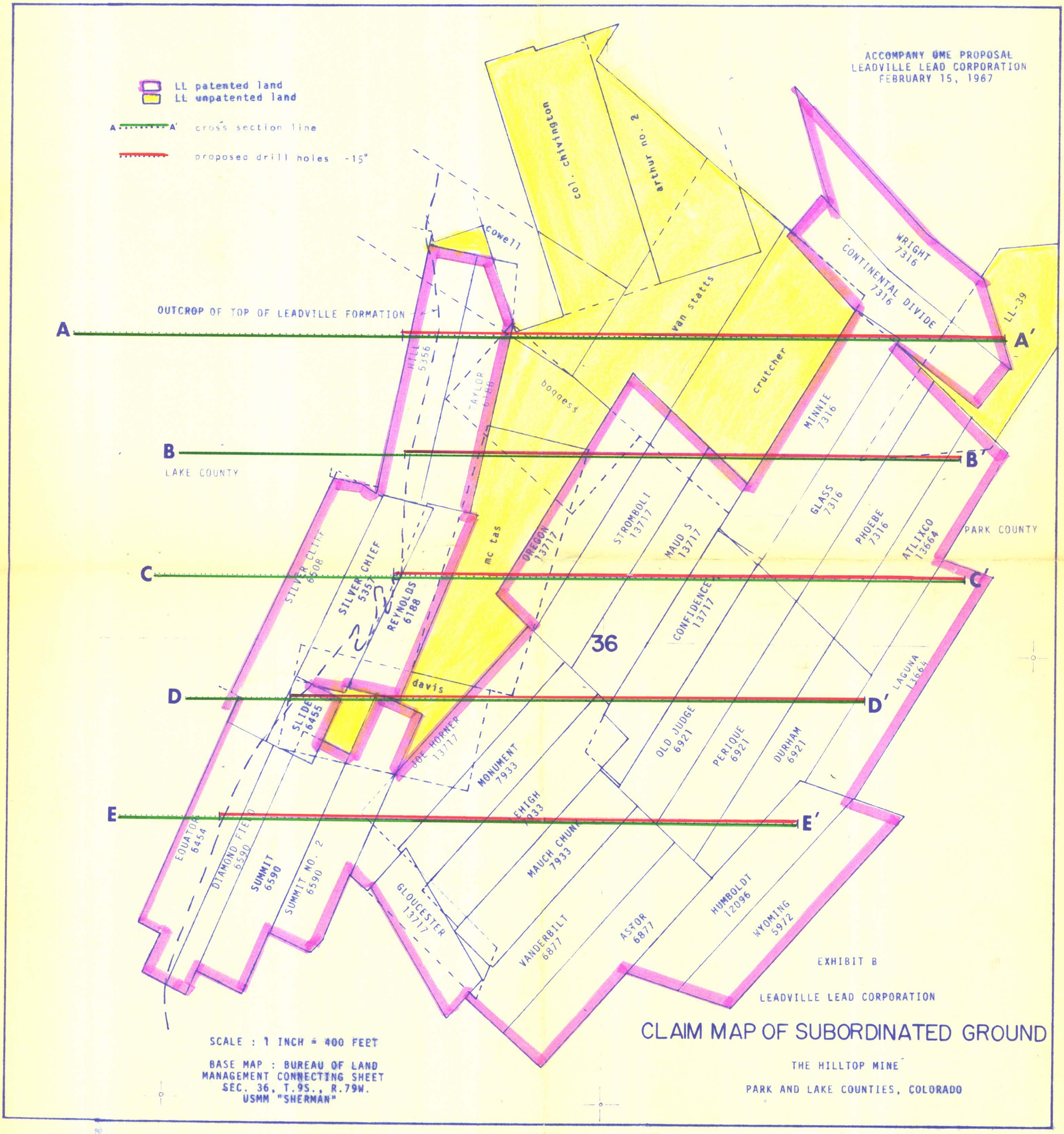


EXHIBIT A


ACCOMPANY OME PROPOSAL
LEADVILLE LEAD CORPORATION
FEBRUARY 15, 1967
LL patented land
LL unpatented land
A A' cross section line
proposed drill holes -15°
OUTCROP OF TOP OF LEADVILLE FORMATION
LAKE COUNTY
PARK COUNTY
36
A
A'
B
B'
C
C'
D
D'
E
E'
Col. Chlvington
arthur no. 2
cowell
van statts
crutcher
boggess
WRIGHT 7316
CONTINENTAL DIVIDE 7316
LL-39
MINNIE 7316
HILL 5356
TAYLOR 6188
mc tas
OREGON 13717
STROMBOLI 13717
MAUD S 13717
GLASS 7316
PHOEBE 7316
ATLIXCO 13664
SILVER CLIFF 6508
SILVER CHIEF 5357
REYNOLDS 6188
CONFIDENCE 13717
LAGUNA 13664
davis
SLIDE 76455
JOE HORNER 13717
MONUMENT 7933
OLD JUDGE 6921
PERIQUE 6921
DURHAM 6921
LEHIGH 7933
MAUCH CHUNK 7933
EQUATOR 6454
DIAMOND FIELD 6590
SUMMIT 6590
SUMMIT NO. 2 6590
GLOUCESTER 13717
VANDERBILT 6877
ASTOR 6877
HUMBOLDT 12096
WYOMING 5972
EXHIBIT B
LEADVILLE LEAD CORPORATION
CLAIM MAP OF SUBORDINATED GROUND
THE HILLTOP MINE
PARK AND LAKE COUNTIES, COLORADO
SCALE : 1 INCH = 400 FEET
BASE MAP : BUREAU OF LAND MANAGEMENT CONNECTING SHEET
SEC. 36, T.9S., R.79W.
USMM "SHERMAN"