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UNITED STATES  
DEPARTMENT OF THE INTERIOR  
BUREAU OF LAND MANAGEMENT

State Nevada

MINERAL REPORT

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NEVADA STATE OFFICE  
RENO, NEVADA

Mineral Patent Application  
of  
Placer Amex Inc. and Sterling Mineral Venture  
for the  
McDermitt No. 9, McDermitt No. 10, McDermitt  
No. 11, McDermitt 12, McDermitt #20, McDermitt  
No. 21, Opalite #1, Opalite #2, Fred 1, Fred 3,  
Fred 13 and Fred 15 lode mining claims

(Title)

LANDS INVOLVED  
Mount Diablo Meridian, Nevada

T. 47 N., R. 37 E.  
secs. 27, 28, 33 and 34 (within)  
Mineral Survey 4922  
aggregating 243.865 acres

Sept. 6, 1979  
(Date)

By

Reb E. Bennett  
Geologist

Technical Review

Darryl L. Steward  
9/20/79

Management Review

Vaden B. Stickley  
10/5/79  
GPO 850-410

This report is the result of a mineral patent application examination and should not be used for purposes other than that for which the report was prepared.

#### ABSTRACT

Placer Amex Inc. and Sterling Mineral Venture have applied for mineral patent on 12 lode claims at their McDermitt mercury mine. Examination of the claims indicates that a sufficient quantity and quality of mercury is within the claims to constitute a valid discovery. It is recommended that patent be issued for the 12 lode claims.

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## INTRODUCTION

-On March 31, 1977, Placer Amex Inc. and Sterling Mineral Venture, a joint venture consisting of Mineral Exploration Company, Ltd. and Sterling Mineral Venture, Ltd., filed a mineral patent application for 12 lode mining claims at their McDermitt mercury mine. The mine, operated by Placer Amex Inc., is the largest mercury-producing facility in the Western Hemisphere. Annual production is 20,000 flasks of mercury per year, or about half the total U.S. requirements. A field examination of the mining claims was made on August 9 and 10, 1978 and July 10, 1979. Fred Boyd Jr., Nevada State Office Mining Engineer, accompanied the writer on the August 1978 dates.

This report covers the examination of the mining claims and summarizes the pertinent facts and considerations used to formulate an opinion as to the validity of the locations and if all field requirements for patent pursuant to the Federal Mining Laws had been met.

## RECORD DATA

The McDermitt No. 9, McDermitt No. 10, McDermitt No. 11 and McDermitt 12 lode mining claims were located on May 3, 1941. The McDermitt 12 was relocated on May 10, 1974. The McDermitt #20 lode mining claim was located on June 6, 1941 and amended on June 25, 1974. The McDermitt No. 21 lode mining claim was located on July 1, 1941. The Opalite #1 and Opalite #2 lode mining claims were located on July 15,

1956. The Fred 1, Fred 3, Fred 13 and Fred 15 lode mining claims were located on November 28, 1970. A summary of the location data is in the Appendix.

In May of 1973, Mineral Exploration Company, Ltd. acquired title to the original locations. On October 15, 1973, Mineral Exploration Company, Ltd., conveyed an undivided fifty-one percent (51%) interest in the claims to Placer Amex Inc. By deed dated July 1, 1976, Mineral Exploration Company, Ltd., conveyed an undivided forty-nine percent (49%) interest in the lode claims to Sterling Mineral Venture.

The Notice of Application for Patent and plat of mineral survey 4922 were conspicuously posted at the location monument of the McDermitt No. 21 lode claim, which is along the center line, 755 feet southwest of the northeast end line (see Photo 1).

Land status records indicate that except for a pipeline R/W (N-11700, McDermitt Mine), Communication line R/W (N-2594, Nevada Bell) and three geothermal leases (N-8552, U.S. Geothermal Corp.; N-10141, Thermal Resources, Inc.; and N-10142, Earth Power Corp.), the subject lands are vacant and unappropriated public domain.

#### LOCATION, ACCESS AND PHYSICAL FEATURES

The McDermitt Mine is at an elevation of about 6460 feet above sea level and located along the southern edge of McDermitt Creek basin, about 6 airline miles southwest of the small town of McDermitt, Humboldt

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Photo 1. Posted Notice of Application for Patent and plat of Mineral Survey No. 4922.

County, Nevada (see Figure 1). Access to the mine is via Cordero Mine Road, a secondary road which joins Highway 95 at McDermitt. The mining claims are within sections 27, 28, 33 and 34, Township 47 North, Range 37 East, Mount Diablo Meridian, Nevada. Photo 2 is a panoramic view of the mine.

There is a regional population of about 1,000, most of whom are employed in some aspect of ranching or farming. The McDermitt Mine itself employs about 40 people, on a four days a week, 10 hours a day schedule.

The mining claims were identified on-the-ground by Mineral Survey 4922 (see Figure 2 and Photo 3) and by inspection of cultural and topographic features as depicted on the USGS Jordan Meadows 15-min. quadrangle map (1959). All mineral survey corners were located except the following which were under dumps or had been removed by mining or construction activities: McDermitt No. 21, corners 2, 3; McDermitt No. 11, corners 3, 4; Fred 3, corner 4; Opalite #2, corner 3 and McDermitt No. 10, corner 2. The mineral survey monument common to McDermitt No. 11, Fred 13, McDermitt 12 and Quinn River No. 8 (not in this patent application) is incorrectly scribed. Corner 4 of Fred 13 is scribed FR 13-3 rather than FR 13-4 and corner 3 of Quinn River No. 8 is scribed QR 8-4 rather than QR 8-3.

At the Orovanda Climatological Station (about 30 miles south of the mine), annual precipitation is about 11 inches, occurring mostly in the winter

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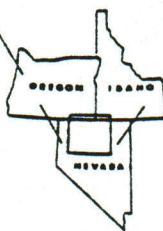
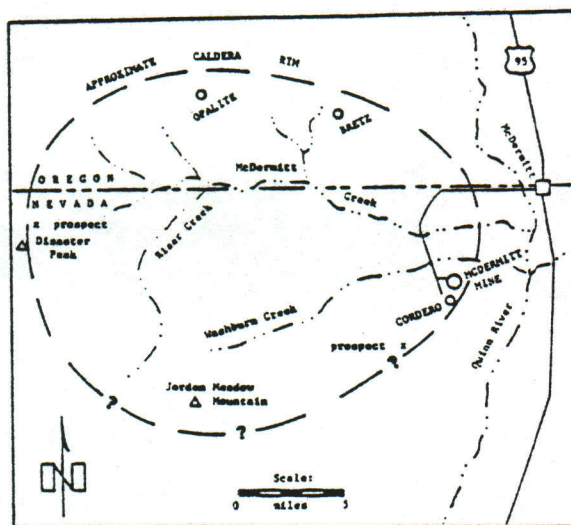


Figure 1. Location Map.

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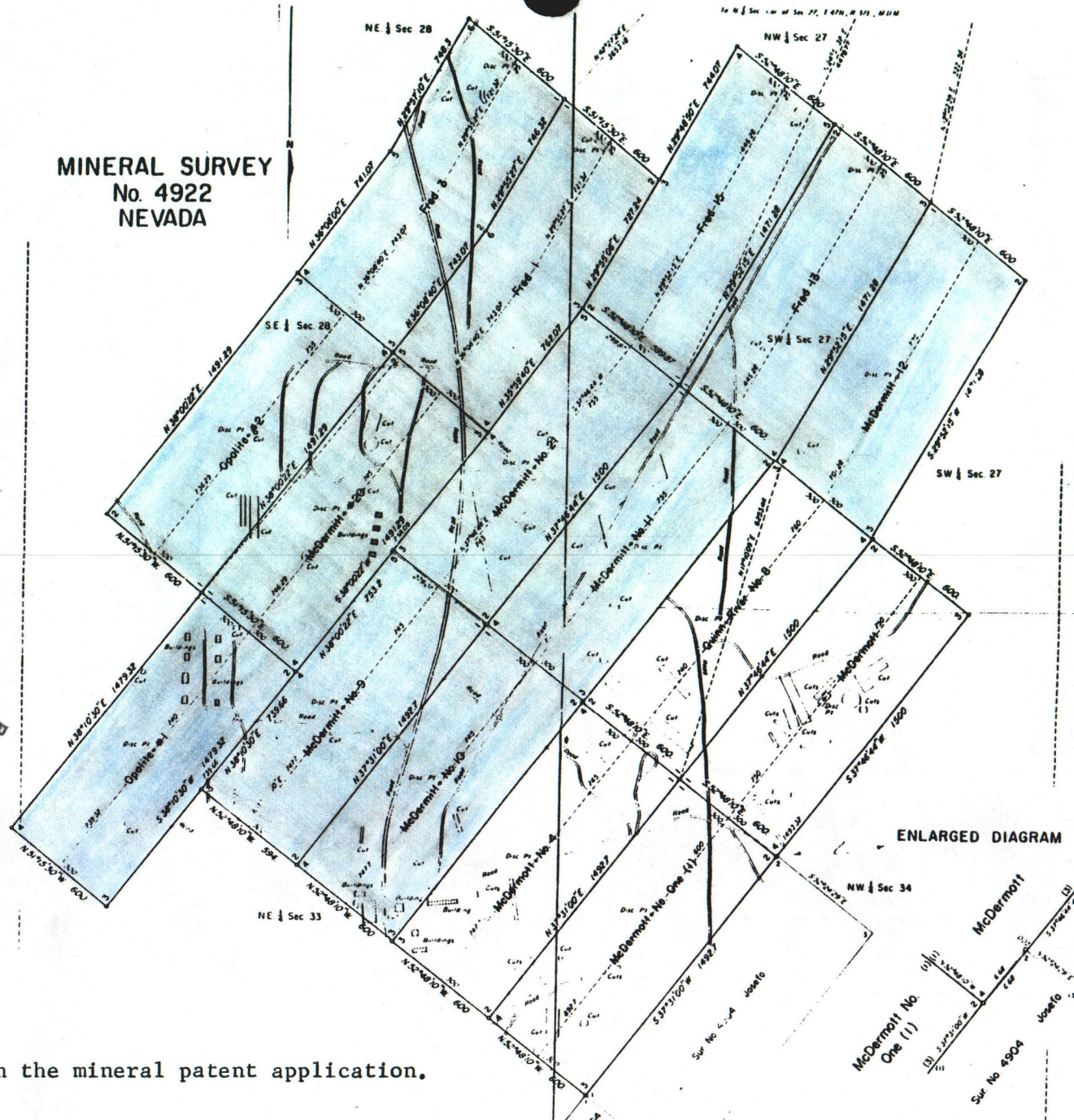


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Photo 2. Panoramic view of the McDermitt Mine, looking south. Stage 1 is in the right foreground and stage 2 is in the left foreground. Stages 3 and 4 are in the center of the photo, middle distance and background, respectively. Stage 5 is in the left middle distance. Calcine pile behind stage 5 is from the furnace of the Cordero Mine. Photo taken July 10, 1979.



MINERAL SURVEY  
No. 4922  
NEVADA



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Figure 2.



Claims in the mineral patent application.



Photo 3. Typical Mineral Survey No. 4922 corner. Corner is common to Fred 13, McDermitt No. 11, McDermitt 12 and Quinn River No. 8 (not in this patent application).



and spring months. Mean temperatures range from about 93°F in the summer to about 30°F in the winter.

Vegetative cover consists predominately of sagebrush and grasses with halogeton growing in disturbed areas.

Power to the mine is supplied by Harney Electric Cooperative in Burns, Oregon which in turn purchases it from the Bonneville Power Administration. Water for operating the mill is obtained from a 750 gpm well on the property, pumped to a reservoir located above the mill and stored until needed. Water consumption is about 1,500 gpm, but drops to about 300 gpm when only the furnace is operating.

#### GENERAL GEOLOGY AND MINERAL VALUES

At the time of this writing, the McDermitt Mine is the only active mine in the Opalite mining district. Other mines in the district (Bretz, Cordero and Opalite) produced 150,000 flasks of mercury before they closed.

The McDermitt Mine lies along the edge of an early Miocene collapse caldera. Regarding the general geology of the area, McKee states that:

Eruption of rhyolitic ash-flow tuffs in the area of the McDermitt (Cordero) caldera began about 17.4 million yr. (m.y.) ago and continued for about 1.5 m.y. During this period of silicic eruptions, a circular area about 30 km<sup>3</sup> in diameter collapsed to form a caldera that subsequently filled with sedimentary and volcanic rocks. A total of more than 200 km<sup>3</sup> of silicic rocks was erupted from the volcano. The final phase of igneous activity, about 15.0 m.y. ago, included resurgent doming and intrusion in the south-central part of the caldera. Three to 4 m.y. later (12 m.y. ago), hydrothermal solutions using the northern part of the caldera ring fractures as

conduits deposited silica, cinnabar, pyrite, alunite, and other minerals in tuffaceous lake beds and volcanic rocks accumulated within the caldera. The ore-forming solutions may have been a residuum from the silicic magma, or connate water, or ground water heated by the still-hot resurgent magma in the central part of the caldera. The source of the mercury and other elements has not been identified.

In the mine area ten to forty feet of postmineralization Quaternary gravels overlie up to 200 feet of lacustrine sediments. The McDermitt orebody occurs in these lake sediments within 150 feet of the surface and extends blanket-like over an irregular area of 2,200 x 2,500 feet (126 acres). Thickness of the orebody averages 20 feet but is extremely variable, depending upon the source and location of the penetrating solutions. The orebody dips slightly northward, increasing in depth as it trends towards the basin floor. Figure 3 depicts the ore body and its relationship to the lode claims.

Cinnabar ( $\text{HgS}$ ) and corderoite ( $\text{Hg}_3\text{S}_2\text{Cl}_2$ ) comprise 75% and 25% of the ore minerals, respectively. Corderoite is a light orange-pink, photosensitive mineral first identified at the McDermitt Mine. Upon exposure to light the mineral rapidly turns dark gray or black. Corderoite is thought to have been provided by the alteration of cinnabar by chlorine-rich waters. Other minerals include metacinnabar, mercury oxychlorides and native mercury. Mineralization occurs as very fine particles deposited parallel with the lake beds, as discrete crystalline particles and as "smears" on clay. The cinnabar and corderoite occur free, but require physical separation from the clay.



At the time of the July examination, active mining was occurring on the McDermitt No. 9, McDermitt No. 10, McDermitt No. 11 and McDermitt 21 mining claims. Mining was also occurring on the Quinn River No. 8 (mineral patent application N-12829) and the McDermitt No. 4 (not under patent application) mining claims. Stage 5 stripping of overburden was occurring on the Opalite #1 and McDermitt #20 claims. (see photo 4).

Because cordierite is photosensitive it is relatively easy to visualize the presence of ore zones and roughly estimate grade from the amount of black material present. Within the pit, zones of mineralization on the McDermitt No. 10, McDermitt 11 and McDermitt No. 21 claims were examined and a grab sample taken. Drill logs in the remaining claims were examined and cuttings of selected intervals were sampled. The grab samples were taken by Fred Boyd; splits of drill cuttings were taken by this writer. All samples were analyzed by Rocky Mountain Geochemical Corp. at their Salt Lake City, Utah office. A copy of the assay certificates is in the Appendix.

Sample MD10-1 was a grab sample taken from a mineralized zone southeast of the northwest (no. 1) corner of the McDermitt No. 10. Grab sample MD11-1 was taken from an ore zone located approximately in the center of the McDermitt No. 11 claim. Grab sample MD12-1 was taken from a mineralized area on the McDermitt No. 21 claim at a point corresponding to the farthest penetration of the open pit (as of the August, 1978 examination) into the claim. See Figure 3 for sample locations in relation

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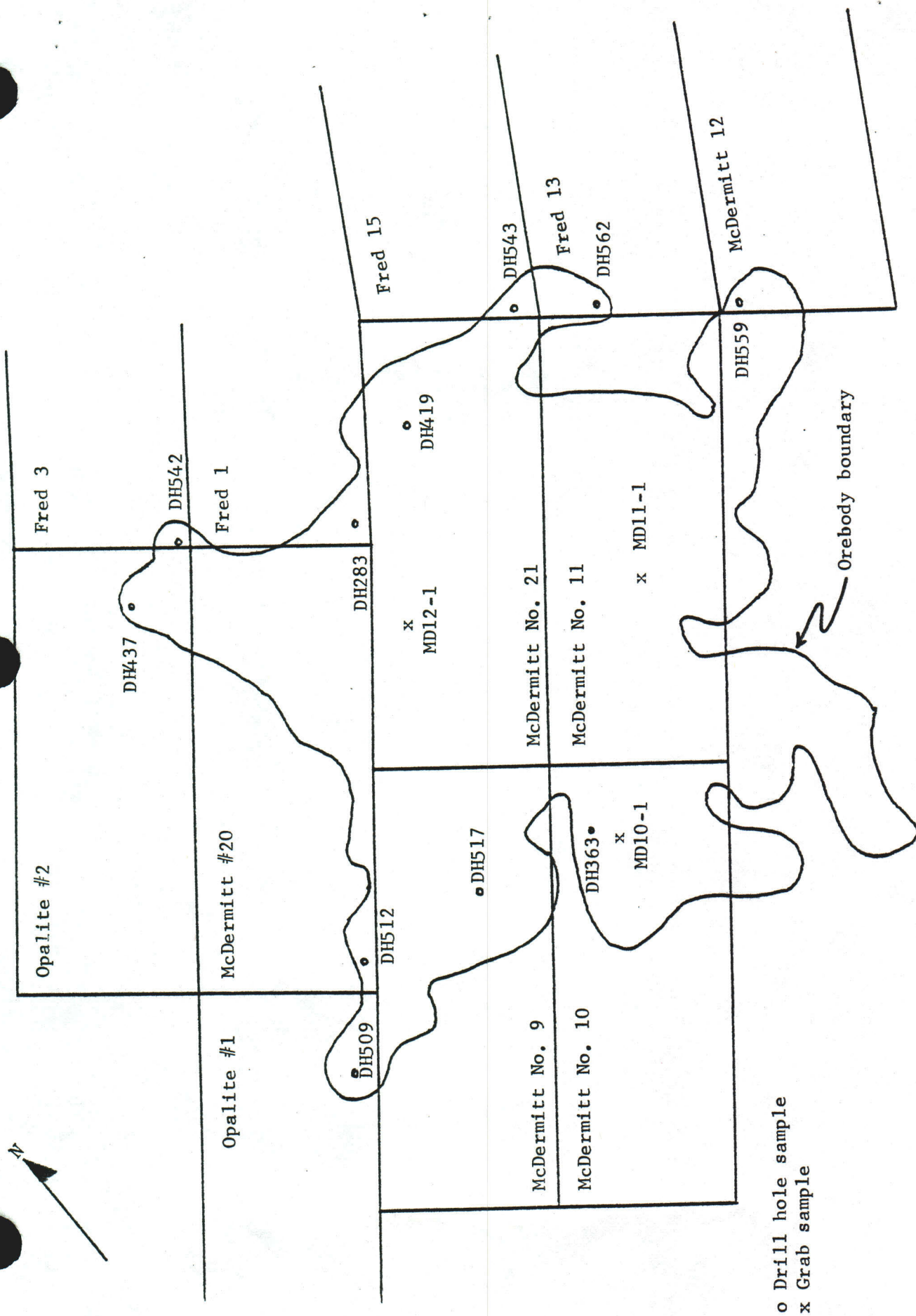


Figure 3. Extent of McDermitt orebody, 1.5 lb/ton mercury cutoff. Interval and assay values of drill holes described in Table 1.





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Photo 4. Stripping of overburden during development of stage 5 at the McDermitt Mine.



to the claims. Samples MD10-1, MD11-1 and MD12-1 assayed 30.7% (614 lbs/ton), 1.62% (32.4 lbs/ton) and 4.67% (93.4 lbs/ton) mercury respectively.

All of the claims have been extensively drilled during the course of evaluating the property. Numerous drill logs were examined and selected intervals of representative drill holes with corresponding Placer Amex and BLM assay values are presented in Table 1. See Figure 3 for the location of drill holes sampled.

At the end of 1977, more than 2.6 million tons of ore averaging 10 pounds of mercury per ton had been delineated at the McDermitt Mine. Based upon current production plans, mine life will be 20 years. As currently programed, mining will go through six stages with the removal of the highest grade, center portion of the orebody first. Average grade mined in 1976 was 18 pounds of mercury per ton. In 1977, the average grade dropped to about 12 pounds of mercury per ton, with mill feed almost doubling to 211,300 short tons. High grade ore zones of 20 or 30 pounds of mercury per ton are not uncommon. Cutoff grade is 1.5 pounds of mercury per ton; however, depending upon configuration of the ore body, lower grade ore (1 lb/ton Hg) is mined and either sent to the mill or stockpiled for later processing.

The July, 1979 E & MJ metal market quotes mercury at \$340-350 per flask, delivered, minimum of 20 flask lots. Spot market prices in July have reached \$358 per flask. By late July the market had softened

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Claim	Interval	Assay value lbs/ton mercury	
		Placer Amex	BLM
McDermitt No. 9 Drill Hole 517	30-35'	3.0	
	35-40'	5.7	5.2
	50-55'	51.9	
	55-60'	6.6	
McDermitt No. 10 Drill Hole 363	30-35'	1.0	
	35-40'	46.32	
	40-45'	3.52	3.4
McDermitt No. 12 Drill Hole 559	135-140'	0.7	
	140-145'	1.6	1.78
	145-150'	1.0	
McDermitt #20 Drill Hole 512	65-70'	1.8	
	70-75'	1.1	
	75-80'	1.8	1.39
McDermitt No. 21 Drill Hole 419	65-70'	0.92	
	70-75'	2.06	
	75-80'	1.78	
	80-85'	23.44	31.4
	85-90'	1.65	
Opalite #1 Drill Hole 509	35-40'	7.0	10.0
	40-42.5'	6.8	
	50-55'	3.2	
Opalite #2 Drill Hole 437	100-105'	1.52	
	105-110'	1.16	
	110-115'	1.72	1.71
Fred 1 Drill Hole 283	85-90'	1.2	
	90-95'	1.88	
	95-100'	1.26	
	100-105'	1.10	
	105-110'	10.04	12.6
Fred 3 Drill Hole 542	80-85'	1.3	
	85-90'	1.4	
	100-105'	2.6	2.2
Fred 13 Drill Hole 562	145-150'	1.9	1.67
	150-155'	1.9	
	155-160'	1.0	
Fred 15 Drill Hole 543	150-155'	1.4	
	155-160'	3.1	
	160-165'	2.1	2.0

Table 1. Selected drill hole intervals and assay values.  
See figure 3 for location of drill holes.





Photo 5. Rotary Drillhole 562 on Fred 13 lode mining claim.



to around \$300 per flask, primarily because of excess stock in the hands of overseas producers and rumors of the Italian government about to subsidize domestic mercury production.

Mercury prices averaged \$281 and \$158 for the years 1974 and 1975, respectively, when the mine was being developed. When the McDermitt mine began producing in 1976 the price of mercury averaged \$125 per flask for that year.

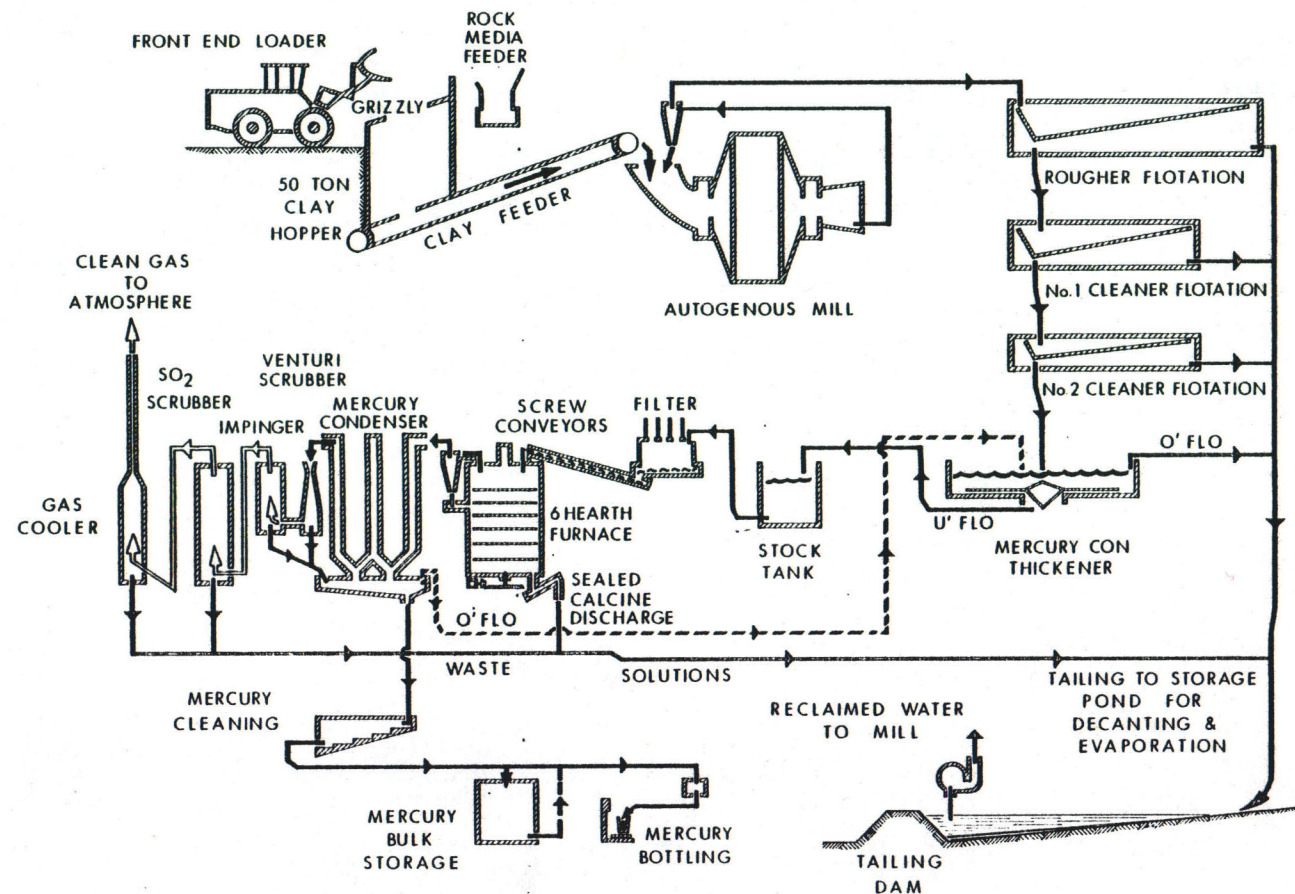
#### MINING AND MILLING OPERATIONS

Construction of the \$9.7 million mining facility began in April 1974 and was completed in 1975. The open-pit mining operation utilizes scrapers and bulldozers to supply a concentrator with 700 tons of ore per day. The ore is mined at a ratio of 1 ton ore to 4.7 tons waste. To date, the cost of stripping and mining in itself has greatly exceeded the \$500.00 expenditure for the benefit of the claims.

The milling operations (see flow chart, Figure 4) consists of autogenous grinding, flotation, concentration, concentrate dewatering and tailing disposal. Design capacity is 100 tons per hour. The furnace section consists of a concentrate filter, a vertical 6-hearth furnace for vaporizing the mercury, a condensor system and gas purification towers. Furnace capacity is about 1,000 pounds of concentrate (containing up to 75% metal per hour).

Because the tailings remain in suspension at very low densities (tails settle to a maximum of 30-35% solids), it is not possible to

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produce large volumes of reusable water for mill operations. Because of the difficulty in dewatering the tailings, four successive ponds are used for tailings storage. The filling period per pond is three months. When the fourth pond is filled, the first pond has evaporated from about 4 feet of 35% solids to 1 foot of dried clay. Pond design has been approved by the Environmental Protection Agency with the stipulations that two monitoring wells be maintained to detect the presence of any mercury that may have seeped through the pond bottoms.

#### CONCLUSIONS:

Examination of the McDermitt No. 9, McDermitt No. 10, McDermitt No. 11, McDermitt 12, McDermitt #20, McDermitt No. 21, Opalite #1, Opalite #2, Fred 1, Fred 3, Fred 13, and Fred 15 lode claims indicates that a sufficient quantity and quality of mercury is within the claims to constitute a valid discovery. More than \$500.00 has been expended for the benefit of the claims. All else being regular, it is recommended that patent issue on these claims.

*Rob E. Bennett*



#### SELECTED REFERENCES

Boyd, Fred S., Jr., 1977, Mineral Patent Application of Joe Jaca, Jr., et. al., for the Quinn River No. 8 Lode Mining Claim (N-12829): Unpub. BLM Rept. N-12829.

Fisk, Elwin L., 1968, Cordero Mine, Opalite Mining District, in Ore Deposits of the United States, 1933-1967, (Graton-Sales Volume): New York, Am. Insti. Mining Metall. Engineers.

Greene, Robert C., 1972, Preliminary Geologic Map of Jordan Meadows Quadrangle, Nevada-Oregon: U.S. Geol. Survey Misc. Field Studies Map MF-341.

McKee, Edwin H., 1976, Origin of the McDermitt Caldera in Nevada and Oregon and Related Mercury Deposits, in Transactions, v. 260, p 196: Am. Inst. Mining Metall. Engineers.

Mining Engineering, 1978, Industry Newswatch: Mining Engineering, v. 30 no. 8, p 1148.

Roper, Michael W., 1976, Hot Springs Mercury Deposition at McDermitt Mine, Humboldt County, Nevada, in Transactions, v. 260, p 192: Am. Inst. Mining Metall. Engineers.

Sisselman, Robert, 1976, New McDermitt Mine Joint Venture Emerges as Dominant Force in U.S. Mercury Production: Eng. and Mining Jour., v. 76, no. 12, p 72.

Yates, Robert G., 1942, Quicksilver Deposits of the Opalite District, Malheur County, Oregon and Humboldt County, Nevada: U.S. Geol. Survey Bull. 931-N, p 72.

## APPENDIX



WEST JORDAN OFFICE

# ROCKY MOUNTAIN GEOCHEMICAL CORP.

1323 W. 7900 SOUTH • WEST JORDAN, UTAH 84084 • PHONE: (801) 255-3558

## Certificate of Analysis

Page 1 of 1

Date: March 9, 1979  
Client: Bureau of Land Management  
300 Booth Street  
Reno, Nevada 89509  
Attn: Raw Bennett  
Client Order No.: NV 950 PH9-000263  
Report On: 12 Samples  
Submitted by: Raw Bennett  
Date Received: 2/20/79  
Analysis: Mercury  
Analytical Methods: Determined by atomic absorption.

RMGC Numbers:  
Local Job No. 79-34-37-S  
Foreign Job No. 79-2-29R  
Invoice No. M 94211

Remarks: enc.  
file (2)  
cc: report: RMGC - Reno  
GJC/lw

Sample No.	% Mercury	Sample No.	% Mercury
M - 10-1	30.7	DH - 419	1.57
M - 11-1	1.62	DH - 509	0.50
M - 12-1	4.67	DH - 512	695 ppm
DH - 57	272 ppm	DH - 517	0.26
DH - 283	0.63	DH - 541	0.38
DH - 363	0.17	DH - 542	0.11

By Jim Cardwell  
Jim Cardwell

All values are reported in parts per million unless specified otherwise. A minus sign (—) is to be read "less than" and a plus sign (+) "greater than." Values in parenthesis are estimates. This analytical report is the confidential property of the above mentioned client and for the protection of this client and ourselves we reserve the right to forbid publication or reproduction of this report or any part thereof without written permission.  
ND = None Detected      1 ppm = 0.0001%      1 Troy oz./ton = 34.286 ppm      1 ppm = 0.0292 Troy oz./ton

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## Certificate of Analysis

Page 1 of 1

Date: August 29, 1979  
Client: Bureau of Land Management  
300 Booth St.  
Reno, Nevada 89502

RMGC Numbers: 79-48-21-SL  
Local Job No.:  
Foreign Job No.: 79-13-15R  
Invoice No.: M 2021

Client Order No.: none  
Report On: 12 Reno pulp  
Submitted by:  
Date Received: 8/14/79  
Analysis: Mercury  
Analytical Methods: Determined by atomic absorption.

Remarks: enc.  
file (2)  
cc: report: RMGC - Reno  
GJC/lw



<u>Sample No.</u>	<u>ppm Mercury</u>	<u>Sample No.</u>	<u>ppm Mercury</u>
DH - 437 a	855	DH - 561 b	717
437 b	584	561 c	504
438	798	562 a	838
559 a	657	562 b	818
559 b	892	543 a	0.15%
DH - 561 a	497	DH - 543 b	0.10%

By Jim Cardwell  
Jim Cardwell

All values are reported in parts per million unless specified otherwise. A minus sign (-) is to be read "less than" and a plus sign (+) "greater than." Values in parenthesis are estimates. This analytical report is the confidential property of the above mentioned client and for the protection of this client and ourselves we reserve the right to forbid publication or reproduction of this report or any part thereof without written permission.  
ND = None Detected      1 ppm = 0.0001%      1 Troy oz./ton = 34.286 ppm      1 ppm = 0.0292 Troy oz./ton

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CLAIM	DATE OF LOCATION	BOOK	PAGE
McDermitt No. 9	5/3/41	A2	91
McDermitt No. 10	5/3/41	A2	92
McDermitt No. 11	5/3/41	A2	92, 93
McDermitt 12 relocated	5/3/41 5/10/74	A2 80	93 217
McDermitt #20 amended	6/4/41 6/25/74	A2 80	189 219
McDermitt No. 21	7/1/41	A2	189, 190
Opalite #1	7/15/56	9	568
Opalite #2 amended	7/15/56 6/25/74	9 80	569 220
Fred 1 amended	11/28/70 6/25/74	53 80	369 222
Fred 3 amended	11/28/70 6/25/74	53 80	371 223
Fred 13 amended	11/28/70 6/25/74	53 80	381 225
Fred 15 amended	11/28/70 6/25/74	53 80	383 226

All mining claims are recorded in the book of Notices or Official Records,  
Humboldt County, Nevada.