C. M. DYE

Report on

THE H & S MINE

Chinatown District

Beaverhead County, Montana

June 1951

TABLE OF CONTENTS

Subject	Page
Introduction	1
Location	1
Claims	2
Topography	2
History and Production	2
General Geology	5
Mine Geology	6
Development	8
Facilities	8
Reserves	10
Costs	11
Milling	12
Conclusions and Recommendations	14

Photographs

Plate 1 - Claim Map

Plate 2 - Plan and Section Map of Shafts

Plate 3 - Upper Tunnel

Plate 4 - Lower Tunnel

Plate 5 - Composite Plan and Surface Map

Introduction

The purpose of this examination was to obtain all available and pertinent information as to past history and production of the H & S Mine and to determine and correlate the geological features of the property so that the following report could be submitted as a basis for a development program to increase the existing ore reserves of lead and silver ore to the extent of making a long-time milling operation possible.

Unfortunately, no records of production are available prior to 1941 and the history prior to that time is sketchy and not very reliable.

This plan proposes a diamond drilling program of about 1350 feet with possible additional footage, depending upon those results, so that a large tonnage of ore for milling can be outlined and development and mining methods and milling procedures can be determined.

Location

The H & S Mine is located in Section 9, Township 11 South, Range 13 West, in the Chinatown Unorganized Mining District, Beaverhead County, Montana, and about 32 miles by road southwest of Armstead, Montana. Armstead is also the nearest rail connection, a station on the Union Pacific's Oregon Short Line.

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Claims

Seven unpatented claims, the H & S, and the H & S Nos. 1, 2, 3, 5, 6 and 7, comprise the group. All are full 1500 by 600 foot claims with the exception of the H & S No. 6, which is 900 by 600 feet. The group represents a total area of 136 acres.

Topography

The mine is located in a semi-arid region, in the sagebrush-covered foothills of the Continental Divide, at an elevation of just under 7000 feet. Jeff Davis Creek and its two smaller tributaries, French Creek and Colorado Creek, drain the area.

History and Production

The earliest mining done in Chinatown was gold placering in Jeff Davis Creek, from which a production of about 11 million dollars has been recorded. As far as can be learned, the lead-silver deposit, which is now known as the H & S Mine, was discovered by prospectors looking for the source of the placer gold.

A. Mr. Pearson, who drove the original part of the lower tunnel by hand, and a Dr. Irvin, who held the property for a number of its earlier years, are both dead. The mine was once known as the Hamilton, so-called after the ranch at the mouth of Jeff Davis Creek. Although an effort was made to

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verify and amplify this early history, the stories were so much at variance that it is impossible to report any more definite facts. It was determined that Standard Silver and Lead completed the long lower tunnel and several sources agree that this was done in 1928 but no records of this operation are available.

In 1941, Louis Hoffman and William Steele located the H & S and the H & S Nos. 1, 2, 3, and 5 claims. Subsequently, Ben H. Davis of Dillon, Montana, acquired Hoffman's interest in those original five claims and in 1949, he and Steele located the H & S Nos. 6 and 7. In December of that year, Ben Davis bought the interest of Mr. Steele and is now the sole owner.

Following is a record of the production from the mine since 1941, copied directly from the original smelter sheets and segregated as to the location of the working places.

Shipments by Hoffman & Steele from Low Grade Stope (Plate 3)

Date	Tons	Oz. Au	Oz. Ag	% Pb	$/ton	Pb price
1/25/44	37.882	.01	4.00	17.30	$16.34	0.065
7/30/47	59.597	.01	2.70	10.40	23.77	0.15
11/24/48	35.948	.01	3.75	7.60	24.11	0.215
Total & Average	133.427	.01	3.35	11.60		

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Shipments by Hoffman & Steele from Incline Shaft #1(Plate 2)

Date	Tons	Oz. Au	Oz. Ag	% Pb	$/ton	Pb price
10/27/41	45.018	.06	6.00	29.35	$30.63	0.0585
5/14/42	33.872	.06	5.90	30.00	32.52	0.065
5/28/42	30.575	.0575	5.50	27.55	29.80	0.065
6/15/42	54.779	.035	6.00	32.40	35.72	0.065
7/22/42	58.506	.04	6.10	33.30	34.71	0.065
9/9/42	57.288	.05	5.70	26.90	29.13	0.065
9/14/42	48.937	.05	6.40	29.40	31.79	0.065
Total & Average	328.975	.049	5.97	30.04		

Shipments by Davis & Steele from Stope between Shafts #2 & #3 (Plate 2)

Date	Tons	Oz. Au	Oz. Ag	% Pb	$/ton	Pb price
7/26/48	2.067	.04	15.10	34.20	$106.37	0.17
12/6/48	6.146	.035	30.65	37.60	155.33	0.215
6/29/49	11.918	.035	11.35	37.40	76.34	0.12
7/5/49	13.171	.0325	14.40	39.00	81.94	0.12
7/6/49	13.606	.0325	11.10	41.20	83.01	0.12
8/1/49	40.860	.028	11.75	35.90	86.17	0.14
8/26/49	36.794	.085	9.25	35.00	90.48	0.15125
8/27/49	40.387	.055	12.30	35.90	94.43	0.15125
11/17/49	38.866	.027	16.30	28.80	68.81	0.13
Total & Average	203.815	.045	12.98	35.06		

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Shipments under Lease & Option from Davis from #2 Winze(Plate 3)

Date	Tons	Oz. Au	Oz. Ag	% Pb	$/ton	Pb price
2/24/50	17.396	.02	9.90	29.60	$59.60	0.12
6/9/50	12.033	.03	13.35	30.70	65.68	0.12
8/22/50	8.207	.025	10.15	31.95	64.15	0.12
11/20/50	8.141	.0175	15.15	34.55	97.53	0.16
12/15/50	11.765	.0375	14.55	39.40	117.08	0.17
12/29/50	10.639	.025	14.50	39.25	115.43	0.17
1/17/51	10.687	.033	13.10	29.00	87.18	0.17
Total & Average	78.868	.027	12.78	33.20		

Shipment under Lease & Option from Davis from #3 Winze(Plate 3)

Date	Tons	Oz. Au	Oz. Ag	% Pb	$/ton	Pb price
3/28/51	10.066	.0265	15.55	29.35	$89.32	0.17

General Geology

The general geology of the immediate region is difficult to decipher. To the west of Horse Prairie Creek, into which Jeff Davis Creek empties four miles west of the mine, the country rock has been mapped as sediments of the Siyeh group of the Belt series of pre-Cambrian age. At the mine, the country rock appears to be older and is composed of gneiss and schist, probably of the Cherry Creek series of pre-Beltian age. These rocks are greatly contorted and have been

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intruded by igneous rocks of late Cretaceous and early Tertiary age and, in places, covered by volcanic rocks also of that age. The whole sequence has been much folded, faulted and brecciated so that detailed mapping of any rock group would be extremely difficult, if not impossible.

Mine Geology

The principal country rock in the mine is gneiss and schist. The gneiss varies from a granite gneiss to a thinly banded fine-grained rock resembling schist. Green chlorite schist is found in the lower tunnel. Soft shiny black graphite is locally presented in these metamorphic rocks. Intrusive feldspathic quartz-free igneous rock - probably syenite but perhaps may be hydrothermally altered monzonite--may be found throughout the mine. In places the wall rock resembles a stony volcanic rock of acidic composition. All types of rock have been subjected to folding, faulting, brecciation, hydrothermal alteration, and oxidation and the different rock types appear to grade into each other without any appreciable contact that can be mapped. The entire workings appear to be in a single zone of faulting and brecciation so that in mapping individual faults a definite fault pattern is not apparent.

The ore deposits, however, do show definite trends. They cannot be described exactly as veins, but rather as zones in

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which the chimney-like replacement orebodies occur in echelon pattern. Two such zones are known, called for purposes of identification, Zone 1 and Zone 2. (Plate 5) The larger is that enclosing the ore body mined in #1 Inclined Shaft and the orebody mined between #2 Shaft and #3 Shaft. North of this is a smaller zone in which three echelon bodies occur as shown in the section on the map of the upper tunnel. (Plate 3) The high grade ore mined from these two zones and that encountered in the #1 Raise in Zone 2 consists of massive galena, cerussite, some anglesite, brecciated country rock, quartz, and small amounts of copper and zinc minerals.

The low grade ore in the irregular stopes of the upper tunnel, and in the lower tunnel 190 feet below, and on the surface where it is exposed by a bulldozer cut (Plate 5) consists of a breccia of various rock types cemented by secondary chalcedonic quartz and galena. In many places quartz crystals may be seen in the matrix of the breccia. The fragments of breccia are mainly light-colored hydrothermally altered fragments whose original character is hard to determine but many cases show a schistose or gneissic structure. Some specimens show fragments of hard cherty-looking stony volcanic rock. Some of the breccia is fairly soft but some of it is extremely hard. The best ore seems to be in the softer gneissic or

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schistose breccia.

In some places the low grade ore is cut by one quarter to one half inch seams of pure galena and these seams are not confined to the principal ore zones but may be observed in the lower tunnel 210 feet from the portal and at the end of the first small west crosscut 300 feet in from the portal. In both places some low grade disseminated ore is also present.

Development

The present underground development consists of about 2186 feet of workings, as follows: Lower tunnel, 1316 feet; upper tunnel, 520 feet; #1 incline shaft, 230 feet; #2 winze, 40 feet; #3 winze, 30 feet; and the upper stope between #2 shaft and #3 shaft, 50 feet. All workings are in good condition. Future development will have to be determined by the results of the proposed diamond drilling.

Facilities

Power is not available at the present time. A small 105 cu. ft. compressor, gasoline driven, has been in use for the limited operation during the past 1½ years. However, if development and production warrant, REA power can be obtained. The present line, which extends to within 8 miles of the mine, is single phase. REA officials estimate that the cost of converting this line and extending for the rest of the distance

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would be about $20,000.00. They require that a performance bond be secured so that they are assured of being able to liquidate this cost over a period of 5 or 10 years from the receipts of the power bills. The rates are based on the following schedule:

.025¢ per KWH for the 1st 50 KWH per KW of demand

.02¢ per KWH for the 2nd 100 KWH per KW of demand

.012¢ per KWH for any balance over and above

Demand charge - $1.50 per KW

The available power at this time is only about 300 horsepower but upon completion of a new substation at Dell, Montana, in the spring of 1952, REA will be in a position to distribute 1000 horsepower.

Although Armstead is a shipping point on the Union Pacific Railroad, there is now no loading ramp available. The distance from the mine to Dillon, where the nearest ramp is located, is 54 miles, and from that point to East Helena, the railroad quotes a price of $5.75 per ton of ore or concentrates valued at $100, on the basis of a minimum shipment of 40 tons.

There are three possibilities for a water supply for mining, milling and camp purposes. Jeff Davis Creek will furnish an ample supply but it will be necessary to pump a distance of 1650 and to an elevation of 250 feet above the creek level to

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furnish water at the portal of the lower tunnel. The south side line of the H & S #2 claim is about 750 feet closer to the lower portal than the creek and about 50 feet above the creek. A well sunk at this point might furnish sufficient water. The third alternative is to pipe the flow of a spring located about 2000 feet east of the portal. Some 600 feet from its source it is flowing through a pipe at the rate of 20 gallons per minute. Considerable water is lost from the head of the spring to where it discharges at present and several times that flow could probably be developed at the source. This spring never freezes.

Reserves

Since, in the past, no effort has been made to develop or block out the low grade ore, the extent of present ore reserves can only be an estimate. In the lower tunnel, from the two exposures cut by the two east crosscuts 200 feet apart, there should be 20,000 tons of low grade ore, averaging 5.5% lead and 1.7 oz. of silver. In the irregular area exposed by bulldozing on the surface and by work in the northeast end of the upper tunnel, there should be another 20,000 tons of low grade that will run not less than the representative sample taken from the surface exposure, i.e., 6.5% lead and 1.8 oz. of silver. This totals 40,000 tons of low grade ore with an average value of about $22 at the present market price of 17¢ lead.

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No attempt will be made to predict the amount of high grade ore recently cut in the #1 raise because of the irregularity of these lenses. However, it is a very favorable showing and gives indications of continuing to the surface, in which case it would probably produce at least 200 tons of 30% lead, in addition to an equal tonnage of lower grade mill feed from both walls.

Costs

The only available data on cost of mining is for the period from January 1950 to April 1951, during which time 88.934 dry tons of ore were mined and shipped from #2 winze and #3 winze, having a gross value of $6968.81. The price of lead varied from 12¢ to 17¢ during this period and had it been constant at 17¢, this gross value would have been increased by $1027.86 to a total of $7996.67. In addition to the work of one of the leasers, one man was employed part of the time - a total of 137 days - and was paid wages $1445 plus 11.2% for insurance, Social Security and Unemployment Compensation. Since the two lenses mined were small, the cost was high per ton, due to the necessity for short holes, tedious hand sorting, and hand hoisting.

Costs will be greatly reduced in the mining of the low grade ore and will depend upon the method of mining it is found advantageous to use after the ore body has been out-

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lined. Mining costs for the high grade will also be greatly reduced since it will be possible to mine to greater widths, thereby utilizing the lower grade ore in both walls which hitherto has been left or put over the dumps.

Labor has been available at the rate of $10 per day but due to the high wages paid by ranchers in the vicinity and the relative shortgage of available labor, this may have to be increased somewhat when a larger crew is employed.

Insurance on the workmen is paid at the rate of $7.00 per hundred dollars of compensation.

Recent operators have not been liable for county or state taxes. County taxes are based on a levy of 76 mills on the taxable valuation, which in the case of machinery, buildings and improvements is 30% of the true value (taken at from ½ to 2/3 of the cost) and in the case of tools, etc. is 20% of the true value. A license tax and a net proceeds tax are levied by the state. The license tax provides for payment on gross proceeds of ¼ of 1% over $100,000 and up to $250,000; ½ of 1% from $250,000 to $400,000; 3/4 of 1% from $400,000 to $500,000; and 1% of the gross proceeds over $500,000. The net proceeds tax is figured on a 100% basis at the rate of the county levy, in this case at the present time, 76 mills.

Milling

A mill test was made on a 10 foot wide, 400 pound sample

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broken from the surface exposure, using the experimental equipment of the Bureau of Mines at Butte, Montana. The ore was crushed, run through rolls until reduced to a minus 20 mesh, and then run over a small Wilfley table. Heads from the sample run carried 6.5% lead and 1.8 oz. of silver. The concentrates from the test assayed 51.7% lead and 14.2 oz. of silver and the tails assayed 1.0% lead and 0.5 oz. of silver. The recovery was 86% with a ratio of concentration of about 9 to 1.

This test proved that the ore is very suitable for gravity concentration and should be particularly suitable for a sink and float process. Under operating conditions with sink and float, recovery should be increased by at least 10% and a higher grade concentrate obtained with a smaller tailings loss.

A very suitable mill site is available beyond the portal of the lower tunnel. The ground elevation is 40 feet below the top of the dump, a distance which could be increased 10 feet or more by bulldozing, and the ground level from that point gradually lowers so that a gravity flow could be maintained practically throughout the mill operation. There is sufficient area below in which a settling pond could easily be constructed by bulldozing and building up three sides with a dirt retaining wall.

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Conclusions and Recommendations

In view of the amount of high grade which has been mined, the attitude of these ore shoots, and the tonnage of low grade ore now available, the H & S Mine warrants an extensive development program with a view toward opening up additional reserves to the extent that the erection of a mill will be justified.

For this purpose a diamond drilling program is proposed, consisting of five 250 foot holes and one 100 foot hole, this latter hole to be extended to 250 feet if the preceding hole shows ore. These holes are indicated and tentatively located on Plate 5 and are numbered from 1 to 6 for reference to this report. All will be drilled horizontally with additional holes to be drilled at an angle up and down if results from the horizontal holes warrant.

It will be necessary to provide 2500 feet of water pipe and 900 feet of air pipe, a gasoline or Diesel compressor of at least 210 cu. ft. capacity, a gasoline pump large enough to pump water from the creek 1650 feet to the portal or 2500 feet to the end of the lower tunnel, with a head of 250 feet, preferably equipped with a governor so that the water may be pumped directly to the drill rather than to a tank from which it could flow by gravity, in addition to the drilling equipment.

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Hole #1 is located to cut both high grade ore zones on their westward extension and to prospect for other zones which may be located northward. #1 Incline Shaft was mined for a slope distance of 230 feet. Above it the echelon ore body between #2 Shaft and #3 Shaft was about 50 feet long. There may also be other echelons below the one mined in #1 Inclined Shaft. Surface showings in the pit 37 feet west of #3 Shaft indicate a westward extension of this ore zone. Mining of high grade in Zone #2 has not been extensive nor has it reached any depth. This hole will determine the westward extent and depth of both ore zones as well as to explore further to the north.

Hole #2 will also cut both zones. As shown by Plate 5, Zone #1 takes a decided turn to the south and is nearly vertically over the low grade exposure in the last 10 feet of the lower tunnel. It is possible that this low grade exposure as well as that cut by the two east crosscuts may be a vertical extension of this ore zone.

Should Zone #2 take a similar turn to the south, Hole #3 will cut this structure as well as prospect northwards.

Hole #4 is directed to cut the vertical extension of the low grade surface exposure and to prospect eastward.

Hole #5 will crosscut and prove the continuation of the low grade structure exposed in the two east crosscuts and is

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extended to 250 feet to pick up a possible low grade structure which may be a continuation of Zone #2 if it takes a southward turn.

Hole #6 is designated as a 100 foot hole to cut at another point the same low grade vein and will be extended to 250 feet if Hole #5 shows ore at that distance.

This procedure will determine the extent and depth of the known existing ore bodies and will open up any additional ore bodies not yet located. From the results a development, mining and milling program can be more definitely set up.

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View of the property with the dump of the lower tunnel in the foreground and the dump of the upper tunnel in the background. Difference in elevation is 190 feet.

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View looking east, showing lower portal dump with mill site below and Jeff Davis Creek and placer diggings at the right.

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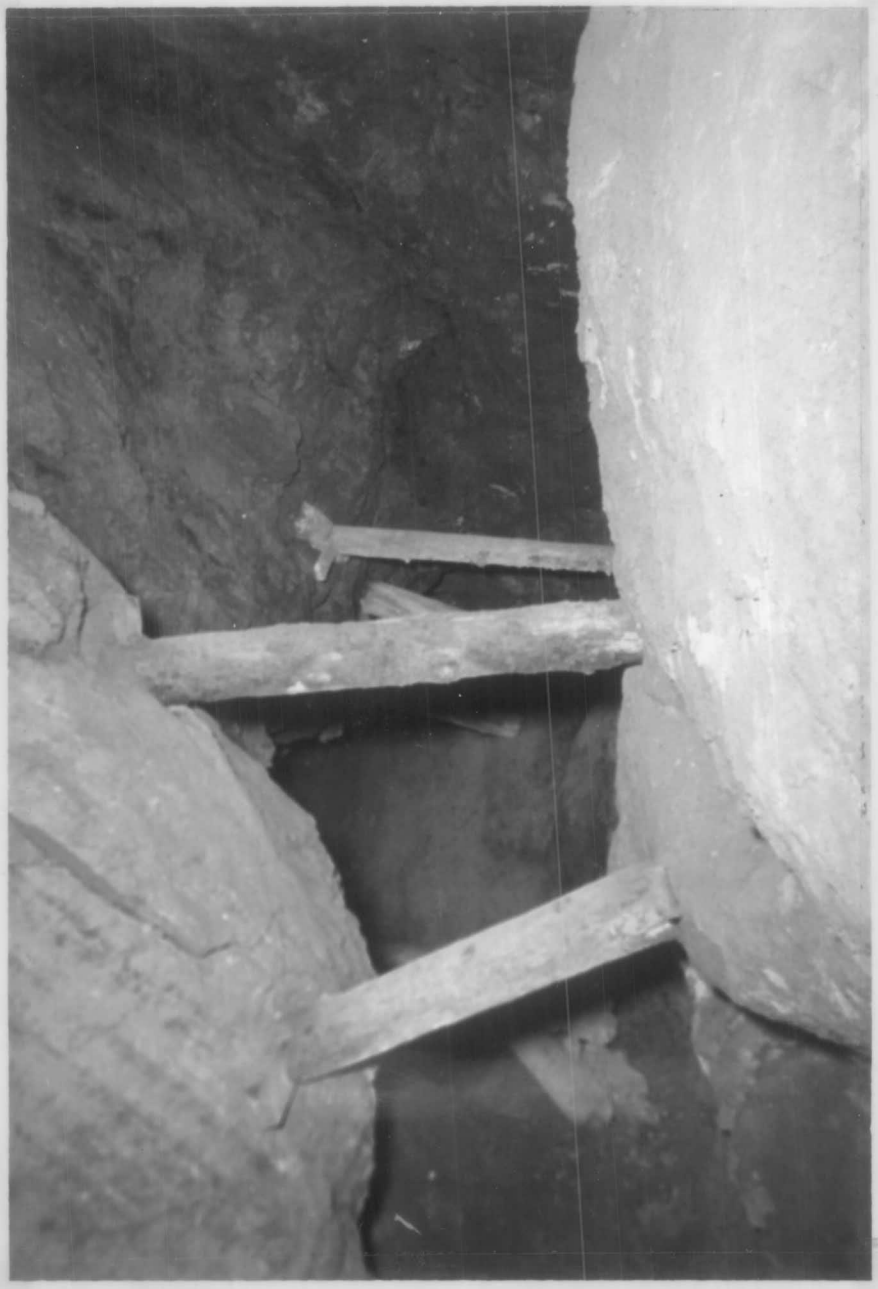

View of stope off Inclined Shaft showing banded gneissic structure of wall rock at left.

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Specimen of low grade mill ore from the bulldozed surface exposure. Breccia of light colored, hydrothermally altered fragments with the darker seams and crystals of galena.

CLAIM MAP
H & S MINE
Scale - 1" = 400'
C.M. Dye - May 17, 1951

Plate 1