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REPORT

ON

SYLVANIA MINE

BY

HARRY H. HUGHES, E. M.

July 10, 1959

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ESMERALDA COUNTY, NEVADA

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LOCATION AND ACCESSIBILITY

The Sylvania mine is located in southwestern Esmeralda County, Nevada, almost on the California State line. The nearest trading point is Big Pine, California, about 50 miles westerly, reached over all but 8 miles of paved highway. The closest rail head is Zurich, California, one mile out of Big Pine. The 8 miles of unpaved highway into the mine is County maintained, easily travelled by both trucks and passenger cars.

HISTORY

Sylvania was discovered in the early 1870s and was worked principally by Mexicans, who built two of their native adobe smelters, until in 1909 it was bought by the Clair family. The father of the present owner, Don Clair, operated the mine for a number of years and then passed it on to his sons who have made a good living from mining for a number of years. The Clairs have usually been difficult to deal with, and possibly for this reason no big mining company has ever optioned the ground; although this writer knows several companies that have tried to deal for it.

PROPERTY

The property consists of 10 lode mining claims 1500 feet by 600 feet wide, located end to end, for a total length of 15,000 feet. These are held by possesory title through location, and are recorded in Goldfield, the county seat of Esmeralda County, Nevada. Elevation of the mine varies from 7100 to 7800 feet

GEOLOGY

The lead-silver ore occurs as a typical replacement in limestone, of probable paleozoic age, with a considerable increase in zinc content in depth. The lime beds vary in thickness from about 250 to 600 feet over a length of more than two miles. They strike about N 55° W and dip about 65° to the northeast. On both sides of the lime beds are intrusives of alaskite, known locally as granite; and on the tops of the higher hills are flows of andesite. Mr. Lyttleton Price, a distinguished mining engineer, who made an examination of this property in 1925 wrote a comprehensive report on same (as later referred to), refers to this andesite as intrusive, but this writer feels sure that it is flow capping.

The alaskite intrusive is irregular, and in places makes "noses" into the lime beds. And in other places it has metamorphosed the lime to tactite. In some of these areas are commercial occurrences of tungsten; and in others are beautiful showings of molybdenite which no doubt are of commercial value, although no attempt to the present has been made to mine them. However, the tungsten has been mined profitably by Mr. Clair -- and it was for these ores that the concentrating circuit of the mill was installed.

The structural controls of the mineralization are probably two "mud veins" roughly 600 feet apart, and parallel to the lime beds. However, the writer believes that another control of the individual orebodies is very likely. The surface trace of the orebodies is usually only an outcrop of limonite in the lime; but almost without exception it was noted that at each orebody there was a considerable area of the limestone which has been dolomitized. This has been shown by Hewitt in the Goodsprings, Nevada camp; and in the lead-silver deposits of northern Mexico the orebodies are always found in two separate beds of dolomitic limestone.

ORE DEPOSIT

As already noted, the ores occur as replacements in dolomitic limestone. The orebodies are tabular in shape, vary from 50 to 200 feet in length and in width

from 3 to 20 feet or more. The old prospector's statement that "she gets wider as she goes down" does not necessarily hold, but it is claimed that on the 200-foot level of the original Clair inclined shaft there is a 20-foot width of ore. This is now under water to just under the 100-foot level where it is pump controlled. An underground spring was encountered at the 200-foot level in such volume that it now provides an adequate water supply immediately to the concentrating mill. The writer considers this a very fortunate occurrence, as adequate water supply at these altitudes is often a serious problem. The loss of such ore as is denied by the occurrence of this water supply is not considered as important as having the water supply, since this shaft can still be worked down to the 100-foot level. No other similar water occurrence has been encountered in any other underground mine workings over the entire property.

In general, the ores on the surface and to a depth of about 100 feet are almost completely oxidized, with carbonate and sulphate of lead and silver chloride; and the zinc almost completely leached. Below this depth sulphides predominate, with an appreciable increase in zinc. This is seen in the Meyer tunnel on the Four Aces Claim, where the backs above the tunnel are about 150 feet.

It might be noted here that the physical shape of the area is such that it will be possible to work almost all of the mine for years through tunnels, so that all mining will be overhead, thus saving the cost of hoisting. There are two shafts on the ground but unless one of them should be needed to furnish immediate ore for the mill, no other shaft will be required for many years.

There are at the present time five orebodies developed to the state where a small amount of final preparation can furnish ample ore to feed the mill capacity. Since Price's report, some 1200 tons of dump ore have been milled; but Mr. Don Clair, the owner of the mine, has developed a considerably greater tonnage of ore in two different tunnels. So that the 13,000 tons estimated by Price can be increased to at least 15,000 tons, and possibly to 20,000.

This writer met Mr. Price only once, on the west coast of Mexico, years ago, but Price was a very good friend of the writer's father (who was also an engineer), and Price enjoyed a very fine reputation as an examining engineer.

This writer did not have the time available that Price had; but he has used the Price report to check with; and except for differences in costs between those of today and 34 years ago found Price's report to be very accurate. For example, Price estimated an average grade of ore for mill feed to be 10% lead and 6 ounces silver per ton. The writer took only a few samples considered to be representative of the ore and these averaged 9.81% lead and 6.28 ounces silver.

Actually, the writer is convinced that mill heads will average closer to 15% lead and 10 ounces silver because in most of the places available for sampling Mr. Clair, the owner, has mined selectively the better ores; and if mined as a whole the above average should hold.

On separate sheets are listed the inventories of all machinery and equipment, and the two flow sheets of the mill; and it will be noted that the mill is fully equipped except for the flotation cells (the writer understands that these are on order). And the two circuits available will be of very great value -- the concentrating end will be used for the oxidized, low zinc, ores; while the flotation will handle the sulphides with higher zinc content, selectively separating the lead and zinc. Attention must be called to the fact that in the cost-income estimates no value has been allowed for zinc. However, in spite of the fact that the smelters here in the West pay very little for that metal it will at least make a few dollars per ton for the ores, which will be all velvet.

Mr. J. Paul Jones, a consulting engineer, had been retained to make this report but unfortunately he died before completing his work. However, we have his preliminary notes and among them are his cost estimates. These are $22.77 per ton overall, including royalties. And using his gross ore values of $31.70, this indicates an operating profit of $8.93 per ton. This writer is willing to accept

these figures; although as stated previously he believes that the mill heads will be higher than either Price or Jones estimate.

Also, the writer feels that it is unfair to the mine to use as tonnage the 13,000 or even 15,000 figure. In these limestone replacement deposits it is absolutely impossible to block out "positive" ore. The writer recalls one of these mines in Mexico at which he was responsible for calculating ore reserves for the annual reports. The mine was producing 200 tons per day or roughly 70,000 tons a year. Yet for the 2 years which we had to furnish estimates, 6000 tons of positive ore were all that could be seen at the end of the year. This was in 1924-25, and the mine is still producing.

SAMPLING

As stated previously, only a few samples were taken by this writer, and these were for the purpose of checking the sampling done by Mr. Price. A list of the writer's samples is appended; and it will be noted that in the average is included No. 2, which assayed only .04% lead. This was a grab from a small pile of ore said to be from the old Clair shaft. And it is the only one which the writer did not see the ore in place. If this were omitted from the average it would be 11.77% lead and 7.25 ounces silver.

MAPPING

The accompanying map shows the extent of the mineralization and places where mining can start immediately with very little preparation. It also shows where the writer took samples.

RECOMMENDATIONS

Very little is needed in this report in the way of recommendations. The mill, except for actual installation of the float cells, is ready to operate.

Except for a very minor amount of preparation a number of faces and/or stopes are ready to produce ore. It is naturally recommended that these be put in readiness while the flotation units are being installed.

There are several other points where with a very nominal footage of development additional orebodies will be opened; and it is recommended that, from operating profits, these be driven -- but not until the work can be from profits, which should be soon.

Normally the writer frowns on retaining the owner of a mining property to supervise the operation thereof, for usually it works out only to the benefit of the owner. But in the case of Sylvania we are sure that it is different. We have known Don Clair for many years and know that he is not only capable but is also honest. In fact, this writer has on two different occasions discussed deals with him for the ground, with a view to operate the property. And it was only because of limited capital (as pointed out by Clair) that no start was made. And it was only because the writer has complete confidence that Sylvania will be a big producer if properly financed that he was willing to accept the assignment of writing this report. We all like to pick winners.

In estimating the possibility of profits in a venture such as this, the metal markets always are a factor. And of course are imponderable. However, the writer cannot conceive of the price of lead going lower; and by all standards it should be much higher, as should that of silver. The consumption of silver is exceeding production year by year.

As must be apparent from what he has written, this writer is convinced that with proper, tho modest, financing and will competent supervision the Sylvania mine will make a very profitable producer for many years.

NOTE: In some respects this report is not too complete; but in view of the fact that those of Messrs. Lyttleton Price and J. Paul Jones are available, it is felt that for the sake of brevity they can supplement what is lacking in this.

Harry H. Hughes (signed)

Inventory of Equipment and Milling Machinery

at

SYLVANIA MINE

1 - 12000 gal. steel water tank, 1/4" plate	$1,500
1 - 4000 gal. " " " 1/8" plate	500
1 - 8' x 16' steel tank, 1/8" plate, w/cover (new)	1,000
1 - Diesel fuel tank, 5' x 8'	500
1 - 24' x 16' hoist house	
1 - 6" x 8" Rix air compressor w/G.M.C. gas motor and 3' x 6' air receiver	
1 - 10 k.w. Koehler electric plant	
1 - Gasoline hoist w/85 h.p. motor	
1 - Pedestal bit grinder $15,000	15,000
1 - 26' welded steel pipe headframe w/dumping device and 1000-lb. bucket	1,000
1 - Concentrate dryer on steel frame	1,500
1 - 18" x 24" Universal jaw crusher w/30 h.p. motor and extra jaw	2,500
1 - 4' x 8' Symons vibrating screen	2,000
1 - 4' x 9' heavy air receiver	400
1 - 3' x 12' " " "	400
1 - 130' long x 24" belt conveyor, w/head and tail pulleys, belt and geared head motion	1,500
1 - Old boiler (water tank) 5' x 16'	200
1 - Pan feeder, 3' x 10', w/chain drive and pulley	1,000
1 - 27' x 24" belt conveyor, w/gear red., chain dr.	800
1 - 8" x 10" Llewelyn Blake rusher w/gas engine	700
1 - 10' x 11' Conical steel ore bin (fine)	500
1 - 1-1/2 h.p. gear head feeder w/conveyor	1,000
1 - 30" x 14" Denver Engineering Co. rolls	3,000
1 - 20 h.p. motor for same	300
1 - Small vibrating screen w/1 h.p. motor	150
1 - 4' Wheeler ball mill w/15 h.p. motor, v-belt drive	4,225
1 - Switch panel	350
1 - 4' x 5' grid discharge Allis Chalmers ball mill w/Wuest gear, 60 h.p. motor and starter plus new set of liners	15,000
1 - 30" x 15' single rake Dorr classifier	2,500
1 - UD 24 75 k.w. International generator set	7,000
1 - McCormick-Deering 30 k.w. " "	3,500
2 - Wemco 2" diaphragm pumps	300
1 - 16' Wilfley concentrating table	900
1 - 16' Straub " "	900
1 - 16' Diester diagonal " "	900
1 - 15' Plato slime " "	900
2 - Cone classifiers	100
1 - Esperanza drag classifier	100
Miscellaneous pipe, fittings and material	3,000
Various pipe lines, surface and underground	750
1 - 4" heavy duty pump jack w/7½ h.p. motor	1,000
1 - 60 g.p.m. F. M. tailing water return pump and tanks	1,000
Total	$ 77,875

Note: No consideration is given here to the four housing units, three well furnished and occupied, and the rolling stock now in use at the mine.

Harry H. Hughes (signed)

MILL FLOW SHEET

SYLVANIA MINE, ESMERALDA COUNTY, NEVADA

Concentration -
Primary crusher to rolls to vibrating screen --undersize to concentrating tables, oversize to 4' Wheeler screening discharge ball mill (12 mesh). Middlings from 1st table returned to Wilfley table. Total tailings to Esperanza drag classifier. Overflow from Esperanza to slime table. Underflow to Diester Diagonal table.

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This straight concentrating circuit will be supplemented with the Allis-Chalmers ball mill circuit for the sulphide lead-zinc ores with banks of flotation cells for selective flotation to separate the lead and zinc. This gives two complete circuits, either one of which will be available at any time, depending on the type of ore being supplied to the mill.

The Wheeler ball mill has a grinding capacity of about 30 tons/day. The Allis-Chalmers mill has a capacity of up to 150 tons/day depending on the mesh required.

Harry H. Hughes (signed)

HARRY H. HUGHES, M. E.

Professional Experience

Born Jan. 10, 1899, Springfield, Mo.
B. S. in Mining, 1922, Missouri School of Mines & Metallurgy (University of Missouri), Rolla, Mo. E. M., same school, 1926, for thesis on non-resident work.

Sept. 1921 - July 1927 -	Mine surveyor, mine foreman, mine superintendent, Cia Mra de Penoles, S. A., Monterrey, N. L. Mexico. (This is the Mexican subsidiary of The American Metal Co., Ltd., with (at that time) 18 operating mines and smelters.
July 1927 - Jan. 1928 -	Party Chief, Geophysical prospecting, Quebec, Canada. The Radiore Co., Southwestern Engineering Co., Los Angeles, California.
1928 - 1929 -	Superintendent, The Memphis Corp., Organ, New Mexico. (copper mining)
1930 - 1931 -	Superintendent, California-Ahumada Mining Co., Alcaparra, Chih., Mexico. (lead-silver mining)
1931 - 1932 -	Manager, Alamo-Hidalgo Copper Co., Lordsburg, New Mexico.
1933 - 1935 -	Built and operated cyanide treatment plant for gold ores, Searchlight, Nevada.
1936 - 1937 -	Mine examinations, Nevada, Utah, Arizona and California for M. W. Hayward, consulting mining geologist, El Paso, Texas. (He was chief geologist for Cia Mra de Penoles, Monterrey, Mex., referred to under first job)
1938 - 1941 -	Geologist, Black Mammoth Cons. Mining Co., Silver Peak, Nevada.
Oct. 1941 - May 1942 -	Manager, Davenport Mining & Milling Co., Kingman, Arizona. (125-ton lead-zinc-silver flotation mill)
1942 - 1943 -	Division Engineer, U. S. Purchasing Commission, mining quartz crystal, Bahia, Brazil.
1944 -	Writing technical reports for U. S. Navy under contract with Southwestern Engineering Co., Los Angeles, California.

Jan. to July, 1945	-	Geologist, Flood Control Project on upper Los Angeles River, Pasadena, California.
Aug., 1945 - 1950	-	Independent mine operator, Silver Peak, Nevada. (Nivloc and McNamara mines)
1950 - to date	-	Independent consulting mining engineer and State Water Right surveyor. Registered Professional Engineer: Nevada No. 599; Missouri No. E-5704.
		Consulting engineer for following companies: Apex Minerals Corp. (uranium) White Caps Gold Mining Co. (gold, mercury, arsenic, antimony) Tonopah Divide Mining Co. (gold, silver) National Boron, Inc. (borax, fluorspar) Gold Placers Nevada (gold placer) Big Pine Mine, Manhattan, Nev. (gold)

Note: Not included in the above, and the reason for the apparent discrepancy in dates of college degree and going to work is that from August 1918 to December 1918, was Chief Quartermaster (aviation cadet), U. S. Navy. College work was made up in summer school, 1921, but am listed with class of 1922.

Harry H. Hughes (signed)