3750 0009 REPORT Nevada (289) Item 9

CONSTANT OPERATIONS OF THE RABBIT HOLE PLACER MINE AT RABBIT HOLE, MARIPOSA COUNTY, NEVADA

At [illegible] time of the Galigher Company report of May 16, 1957, all of the lands of the Rabbit Hole Placer Mine were included in an area taken over by the United States Navy and [illegible]ted against trespass by the Navy. During [illegible] time the lands of the Rabbit Hole Placer Mine were under jurisdiction of the U.S. Navy, all mining and milling operations were suspended; [illegible] only a watchman was kept at the mine to look after the [illegible]ilding, equipment, assesment work, etc. During 1960, the U.S. Navy released all lands of the Rabbit Hole Placer Mine, [illegible]uding surrounding lands, thus allowing resumption of [illegible]ing operations.

Rehabilitation of the camp, mill, and appurtenances has [illegible] largely completed, and milling of the stockpile of gravel [illegible]ted adjacent to the mill ore bin has been started on a one-shift basis by a crew of three men. A considerable loss of equipment, supplies and parts took place during the years the mine was shut down, and these losses have been replaced or are being replaced as required.

As soon as the stockpile of gravel adjacent to the mill ore bin has been reduced to a few days' supply, mining of new gravel must be started. No delays due to difficult mining problems will be experienced, as enormous reserves of gravel that have already been tested and sampled lie only a short distance from the mill, and all necessary roads have been constructed. An almost new D-8 Catorpillar tractor and 20 cubic yard Carry-all ore on the property and available for mining and the short haul to the mill. Although some of the most readily available gravel will have to be mined to supply present mill requirements, it is recommended that long-range planning be done at this time to insure adequate future pond and tailings disposal areas at minimum cost. There are numerous areas northerly of the mill that could readily be prepared for future pond and tailings disposal areas by obtaining present mill gravel requirements from such selected areas. Pit mining to bedrock in a selected area would not only supply present mill gravel requirements, but also should, in a relatively short time, supply at least part of present pond water requirements. Mined out pits would normally require only minimal construction expense to be converted to pond reservoirs.

Several immediate advantages will be obtained by selecting mining areas northerly of the mill as a source of present mill gravel requirements. Since the countryside northerly of the mill slopes gently southerly and southeasterly toward the mill, it seems that all gravel can be hauled downhill, with the grade in favor of the load. Also, as soon as water is developed in the pits, minimal pumping will remove the water from the pits where it can be piped directly to the mill by gravity flow. Such gravity flow to the mill will reduce the amount of pond water that is presently being pumped uphill. Information gained during well drilling in the area has shown that water occurs in the gravels in several zones, water-bearing zones apparently lying above thin silt beds, with the coarser intervening gravel strata being too porous to retain water. It appears possible that, if an arc of abandoned mining pits, filled with tailings, were constructed easterly and westerly entirely across Rabbit Hole Placer Mine lands, northerly of the present mill, a nearly impervious barrier could be constructed so that most all other Rabbit Hole Placer Mine gravel lands lying northerly of the barrier could be mined by boat dredge, whith is the most economical method of mining placer gravels. It is true that a nearly impervious barrier sufficient to hold water to float a boat dredge, and located as described above, could be constructed without waiting to mine out the above described ore. Capital requirements for the construction of an impervious barrier or dam, together with the cost of a dredge, appear too great for such a program at this time. However, it is recommended that the Company look ahead to the time when it can afford a bucket dredge, as the gravels are especially favorable for such mining, the gravels being loose and continuous for miles and being without large boulders, cemented areas, or clay beds. It should be remembered that the cost of transporting and assemblying a dredge may be almost as much as the cost of a dredge.

Due to the ease of mining, it may be more profitable for the Company to contract its mining from pits rather than to do its own mining. Contracting the mining would allow the Company to concentrate the abilities of its men on the treatment of the ore and on the development of a very efficient and dependable mill. Payment for mining could be by the cubic yard of gravel delivered to the mill or by a percentage of mill recovery. If payment were made by the cubic yard, a definite understanding should be reached in advance as to whether the payment applied to excavated gravel or to gravel in place. Swell of gravel upon excavation is usually 20 to 30 per cent, and may vary in different parts of the same deposit. Experience has shown that, as a general rule, the coarser gravels have the least swell and the finer material the greatest swell. A reasonably accurate determination of the swell should be made. Swell is important in all sampling work and in avoiding errors in estimating values. A wooden box of exactly one cubic foot capacity should be made and kept in the mill for use as required. When determining swell, several excavations should be made and the resulting gravel measured loose in the one cubic foot box, the percentage of swell being computed from the volume of excavation.

Insufficient mining has been done on the Rabbit Hole Placer Mine to date to yield much information concerning the nature of bedrock or the distribution of values above bedrock. Similar placer mines throughout the world almost always show the most profitable sands confined to the 5 or 6 foot of gravel immediately overlying bedrock and often, where bedrock is highly altered or creviced, sufficient values to make mining of the top few feet of bedrock profitable. Study of the A. O. Smith Company drilling records above that all but one of their best test holes, that were divided into two or more sampling depths, indicate the best values at the bottom zone tested. Seventeen holes showing this result were particularly noted. With the information available, it would appear safe to assume that the best gravel values will be found lying adjacent to bedrock; hence, any mining contract should specify that pits be opened to bedrock. Bedrock of regular contour is desirable for all placer methods, and records should be kept of all bedrock exposures to assist in future mining operations. Testing to date indicates that all surface gravels contain sufficient values to warrant milling and that there are no zones that would require stripping to reach profitable gravel.

Present milling is at the rate of approximately 75 loose yards per hour or 600 loose yards per eight-hour shift. The gravel is taken into the mill ore bin through an 6-inch grizzly, and is fed onto a 30-inch conveyor belt by a pan feeder. The gravel is elevated by the conveyor belt and discharged into a revolving trommel with 3/4-inch square openings. Water is added from a 16-inch diameter pipeline, and oversize is discharged from the trommel onto a conveyor belt carrying it to the tailings pile. Examination of the plus 3/4-inch tailings shows the material to be completely washed. Under-size from the trommel is fed into three parallel and adjacent sluice boxes 73 feet long equipped with riffles for their entire length. A locked cover is provided for the upper 3 feet of the sluice boxes. Tailings from the three sluice boxes drops into a single sluice box set at right angles, and are discharged to the tailings pond. Riffles are being installed in the tailings sluice, but are not yet completely installed.

The sluice boxes are covered by a well constructed frame building 108 feet long by 12 feet wide which adjoins the mill building (also of frame construction) which is 24 feet wide by 50 feet long. A frame construction addition to the mill building 30 feet by 30 feet is nearly completed, which will house the jig section of the mill and the clean-up section. Two banks of two-cell 42-inch by 42-inch Placer Type, Pan American jigs, mounted parallel, and one bank of two-cell 42-inch by 42-inch Berdelari jigs in series are on hand; and the necessary launders for their installation have been ordered. One 3-cell Bendelari and one 2-cell Yuba jigs, mounted in series for cleaning sluice box concentrate, are also on hand. Electric power is supplied by a new Caterpillar 150 kw generator located in a power house at the lower end of the tailings pond. Also in the power house is a 100 H.P. pump connected with a diesel GMC engine that supplies water to the 16-inch diameter pipeline carrying water to the mill. Make-up water for the tailings pond is supplied from a water well located near the camp buildings, the well pump being powered by an electric motor. Ten well built camp buildings, including six houses, receive electricity from the power distribution system. Also, on hand for mining and road construction and maintenance is a Model DG Cletrac bulldozer, 3/4-yard Link-Belt Speedor power shovel, and a Series 4-A Caterpillar road grader.

Clean-ups to date from the sluice boxes yield a heavy material in large quantity that requires considerable labor and much time to recover its gold content. The heavy material caught by the riffles consists of gold, cassiteritie, black sands, brown sands, and dense particles of rock. This riffle concentrate is presently being shoveled from the sluice boxes into pans that are transported to a Mine & Smelter washer where a gold concentrate is made. The gold concentrate is then reduced and the gold separated by panning. The gold obtained is in three forms; (1) plate gold ranging from 1/10 inch thick up to 1/[illegible] inch thick, the plates being nearly square to rectangular in shape and ranging in size from 9/16 inch to 1/4 inch; (2) grains of gold ranging in size from 1/4 inch to 1/10 inch in the longest dimension, and showing considerable rounding and pegning; and (3) flakes of leaf gold from 1/10 inch in the long dimension down to particles that can only be seen with the aid of a hand lens. All riffles concentrate rejects after recovery of gold are being saved for future treatment.

Removal of the riffle concentrate from the upper 10 feet of the sluice boxes was made on March 20 by two men. Including time of cleaning, putting riffles back in place, and getting sluices in condition to resume mill operations, it took a total of four hours for two men, or one man-shift. The consumption of labor can be reduced 75 per cent for this operation by remodeling the sluices, installing clean-up launders, a clean-up sump and sufficient hose water. While the labor saving on sluice clean-ups is important as affecting operating costs, the greatest benefit will be derived from reducing mill down-time from four hours to one hour or less.

The source of water for the mill is by a 10-inch diameter pipeline supplied by the pump located at the lower end of the tailings pond about 1,000 feet from the mill. When the mill is to be shut down, one of the mill men is sent to shut off the pump; and as soon as the water flow starts to slacken, mill feed is cut off accordingly. If mill feed is not continued until the water supply is ahut off, the water flow washes concentrate from behind the riffles and carries it down to the tailings pond where the values are lost. The present method is satisfactory only for an orderly planned mill shut down. If any mechanical failure were to occur to interrupt the normal gravel-feed to the sluice boxes, washing of the riffles would continue until a man could get to the pump to shut it off. Because all mills will suffer mechanical failures from time to time, it is recommended that means be provided so that the water supply can be shut off from the mill at an easily accessible place in the mill.

Panning of the sluice box tailings shown that considerable black sands, brown sands, cassiterite grains, and particles of gold are being lost in the tailings. Due to the newness of present mill operations, the percentage of values lost in the tailings and the percentage of values recovered in the mill have not as yet been accurately established. Continued work to determine these percentages is recommended. If it is determined, as presently indicated, that substantial values are being lost, then additional riffle are indicated, together with closer control of water in the mill. If it is decided to construct additional sluice boxes, consideration should be given to the evidence that values presently being lost are confined to the minus 1/4-inch portion of the tailings. Screening out the plus 1/4-inch material from the sluice box tailings by trommel for immediate rejection would then permit the use of wide, low-gradient sluice boxes for concentration of the values in the minus 1/4-inch portion. Some evidence was noted that suggests that too much water is being used; at times in the sluice boxes, which would partially account for present tailings losses. More accurate control of the water used in the milling circuit is advised. Experience of your mill operators will probably indicate what controls should be installed in the water supply system that will furnish best mill-water control.

The trommel is sufficiently large to furnish feed to both the present mill circuit and the new jig circuit. Adequate mill-feed can be obtained by speeding up the feeder and conveyor belt. It is proposed to equip the feed-end portion of the trommel with 1/4-inch mesh screen for feed to the jig section of the mill and

and to retain the 3/4-inch mesh screen for feed to the sluice boxes. A blinding band will be provided for the 1/4-inch mesh screen to regulate quantity of feed to the jig section until experience has indicated correct screen length. An increase in the percentage of plus 1/4-inch and minus 3/4-inch material will be experienced in the sluice box feed after the jig section is in operation, and it is not known what effect this will have on sluice box recovery. For this reason, it is believed netrual operating conditions will have to be established and maintained over a period of time before maximum recoveries can be achieved.

Iron shot was formerly used in previous jig experiments at the property, and may be necessary when starting up wet jigging operations; but iron observations made at the property, I believe that sufficient cassitorite exists in the ore so that a cassitorite jig bed can be used. The largest cassitorite piece found measured 1-3/10 inches across, and all sizes down to particles that could only be identified by a hand lens were found. Cassitorite has a specific gravity very close to that of iron shot, and a hardness somewhat greater. I can think of no reason why a cassitorite jig bed cannot be used at your property, and the advantages are obvious. Besides saving the cost of iron shot, the jig beds should be a source of a high-grade tin concentrate.

Wet jigging is much more complicated that sluice box operation, and it is recommended that testing of the jig products be done at frequent intervals, including the tailings, in order to establish good operating results. Jigging of mixed sizes greatly reduces the capacity of a jig; and, in general, it can be said that the greater the range of size in jig feed, the smaller the tonnage that can be handled per unit. Although your jigs could handle material up to 3 inches, it is believed that limiting the feed to the size of material that contains the greatest concentration of values will result in the most economical operation. For Rabbit Hole ore, this would appear to be in the minus 1/4-inch or minus 3/8-inch size ranges. By using minus 1/4-inch feed, it is believed that a 42-inch by 42-inch jig will have a capacity of approximately 50 to 70 loose yards of gravel per 8-hour shift.

Some of the jigs are presently equipped with diagonally punched-slot fixed screens with openings 3/32 inch by 5/8 inch. Screens should have the maximum possible percentage of opening in order to obtain the highest fluidity of bed; and screens should have the maximum size openings possible, these requirements being balanced with strength of screen requirement. It is thought advisable to test several types of screens to determine the one best suited to the ore.

The important operating factors of jigs are: length of stroke, number of strokes per minute, screen aporture, depth of bed, size and character of bedding material, quantity of cross and back water, size and richness of feed, capacity and power consumption. These factors are closely dependent. Rate, size, and richness of feed are fixed by the character of your ore and the design of the mill; screen aperture, speed, and depth of bed are parts of the jig design; the only variables within the control of the jig operator are length of stroke, character of bedding and quantity of water. Jig operation requires more skillful labor than other forms of gravity concentration. Shutdowns should be as infrequent as possible, since it may easily require an hour or more to get back to good operating conditions after starting up again. Length of stroke should receive special attention as it is directly dependent upon the number of strokes per minute. In any case, the length of stroke must be sufficient to produce a certain amount of fluidity of bed; i.e., it must be sufficient to cause the bed to be lifted and the grains spread apart enough to allow interstitial settlement. If the jigs are run at relatively high speed, the length of stroke need not be so great as when low speed is used. Also with a given maximum size of particle, unsized feed requires a shorter stroke than sized feed because of the greater lifting effect of the water when the interstices of the bed are filled with fine material.

To reduce labor of clean-ups of jig hutch products, it is recommended that jig hutch products from all jigs be piped or pumped by a sand pump to a Deister or Marcy and table where a high-grade gold concentrate can be made.

To further reduce clean-up labor, consideration might be given to feeding table concentrates and Mine & Smelter washer concentrates over a laboratory sized table so that a very rich gold concentrate could be obtained. Panning and hand cleaning of this rich concentrate would produce a clean placer gold product that would be salable to the jewelry markets that pay premium prices for the product. All rejects and tailings from hand-cleaning operations could be fed into a 14-inch by 24-inch ball grinder, mounted horizontally and loaded with 2-inch steel balls in a single row, as a grinding agent. This grinding would clean the gold particles sufficiently so that mill discharge could be fed to a barrel amalgamator. Barrel amalgamators must be operated completely balanced on smooth rollers to prevent vibration from flouring the mercury with consequent large mercury losses.

It is reported that approsimately 30 pounds of black sands, brown sands, cassiterite, and gold occur per yard in place in the Rabbit Hole Placer Mine. Assuming a swell of gravel on excavation of 20 to 30 per cent and a mill recovery of approximately 80 per cent would mean that from 15 to 20 pounds of clean concentrate would be produced per loose yard of mill-feed gravel. Thus, from 8 to 10 tons of clean concentrate per mill-shift may be expected in the near future, when it is expected mill-feed may approximate 1,000 loose yards per mill-shift. Hence, it is important to give immediate consideration to reducing the amount of labor required in recovering values from the concentrate.

Recovery of the gold values from this amount of concentrate has already been largely considered; and with the suggestions given in this report, may be considered adequate, except for residual values left in the black sands. Previous experience has shown that black sands have assayed from $80 to over $1,000 per ton. It is believed that poor mill operations will leave substantial gold values and that good mill operations will effect gold recoveries so that black sand assays may be considerably lowered from previous experience. However, experience around the world shows black sands that contain gold values from $8 to $10 per ton are common. Assays should be taken of all products; and if it is found that final black sand tailings contain sufficient gold to be economically recovered, then work to this end should be undertaken. One method would be by grinding, followed by cyanidation. The amount of grinding could be determined by test work. In any event, all black sand tailings should be stored until determinations are made.

No quantitative information is available concerning the amount of cassiterite (tin dioxide, 78.6% tin) in the ore. Visual examination of the ore, pannings of the ore, tailings and concentrates indicate sufficient cassiterite to warrant economic recovery. Tin is the only major metal whose price is subject to international control, and the price has been maintained at approximatdy $1 a pound for all of this country. No future price decline may be anticipated. It is recommended that jigging and tabling of sluice box concentrates be done, not only to save labor but also to make an effort to recover what appears to be a very considerable tin value. To make studies for such work, all concentrate products should be assayed for tin, and the amounts applied to the weights involved to determine the values of tin that may be recovered. When such figures are known, it will be much easier to determine the importance that should be given to tin recovery.

Pannings of riffle concentrate, in addition to gold and cassiterite, also shown the presence of large smounts of magnetite (magnetic iron oxide, usually in small grains) with lesser amounts of ilmenite (forrous titanium oxide), cinnabar (mercuric sulphide), and other minerals that have been tentatively identified as chromite (ferrous chremium oxide), zircon, corundum, sapphire, etc. In addition, small metallic nuggets are occasionally found that may belong to the platinum group of metals. Assays from several samples have yielded the consistant presence of rhodium, which may account for the small grey metallic nuggets. Because of the large amount of concentrate involved, showing the presence of what appear to be valuable by-products, it is recommended that a complete study of the constituents be made by microscopic analysis, with assays to determine the quantitative amounts. To further the program of research for valuable by-products, table tailings, after removal of the gold and tin values, can be magnetically treated to remove the large percentage of magnetite leaving a concentrate miling of non-magnetic particles. Microscopic analysis and assays of this non-magnetic product would give valuable information as to the processes necessary to recover any valuable constituents. A thumb-button operated electric hand magnet should be kept in the mill for assisting in cleaning gold clean-ups, and would also be necessary in preparing non-magnetic samples.

In the effort to achieve continuous and efficient mill operation, attention should also be given to security of values. All equipment making gold or other very valuable products should be located in wire enclosures that are kept locked during off-shift periods. Also, a vault should be provided where gold products of all kinds could be kept when not in process of treatment. The vault should be large enough to store tubs of concentrate pending treatment, and the combination of the vault should be changed as soon as men having the combination leave the employ of the company. Gates should be installed on all roads leading to the mill and vault areas, and kept locked ruing off-shift periods. Also, due to the isolated area of the mine, frequent shipment of salable gold products should be made to reduce the amount of gold kept at the mine at any one time.

In order to give the alarm immediately in case of theft and also to make ordering of necessary parts or supplies easier, it is recommended that the telephone company be approached with the purpose of getting one or more cars or pickup trucks equipped with a two-way radio. It is thought that the rental cost of one or two radios will easily pay for themselves by eliminating many trips to town, and could also save valuable operating time by making necessary parts more quickly available. Portable car radios would call the nearest telephone office where the call is sent over phone lines to any desired address.

Hopkins R. Fitzpatrick

March 31, 1961
1515 Delta Place
Lovelock, Nevada

LABORATORY REPORT

Mariposa Spectrographic Laboratory

5029 FOURNIER ROAD, MARIPOSA, CALIFORNIA 95338
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CHARGES: $5.00
LAB NO. 23444
SUBMITTED BY:

Mike Fowler
155 Glenn
Folsom, Calif.

Qualitative Spectrographic Analysis

Date 10/11/74 PM

ELEMENTS FOUND
AND ESTIMATED PERCENTAGE RANGE
OF CONCENTRATION

SAMPLE MARK
#5
(Copper sulphate)

ELEMENT	Not Less Than %	Not More Than %	ELEMENT	Not Less Than %	Not More Than %	ELEMENT	Not Less Than %	Not More Than %
Aluminum Al_2O_3	5.0	15.0	Lithium	0.01	0.04	Thallium		
Antimony			Magnesium	0.10	0.20	Thorium		
Arsenic			Manganese	.0006	.002	Tin		
Barium	.002	.008	Mercury			Titanium	.0007	.003
Beryllium			Molybdenum	----	.0005	Tungsten		
Bismuth			Nickel	.0004	.0008	Uranium		
Boron			Osmium			Vanadium	.002	.007
Calcium CaO	0.30	0.60	Palladium			Zinc		
Cadmium			Phosphorus			Zirconium		
Cesium			Platinum Not detected in sample			RARE EARTHS:		
Chromium	.0007	.003	Potassium	2.0	4.0	Cerium		
Cobalt			Rhenium			Dysprosium		
Columbium			Rhodium			Erbium		
Copper	.0005	.001	Rubidium			Europium		
Gallium	.003	.009	Ruthenium			Gadolinium		
Germanium			Scandium			Holmium		
Gold Not detected in sample			Silicon (as SiO2)	55.0	75.0	Lanthanum		
Hafnium			Silver	----	.00008	Neodymium		
Indium			Sodium	0.5	1.5	Praseodymium		
Iridium			Strontium	.0005	.001	Samarium		
Iron	1.0	3.0	Tantalum			Ytterbium		
Lead	----	Trace	Tellurium			Yttrium		

Remarks: The green mineral in this sample is due to potash feldspar. It is an altered volcanic rock

Respectfully Submitted,
[signature]
MARIPOSA SPECTROGRAPHIC LABORATORY (Spectrographer)

percent to ton (2,000 lbs.)
1.0% = 20.0 Lbs. AVOIR.
0.10% = 2.0 Lbs. AVOIR.
0.01% = 3.2 oz. AVOIR
0.001% = 0.32 oz. AVOIR.
0.0001% = 0.032 oz. AVOIR.