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Item 10

REPORT ON THE EASTERN STAR MINE,
Gold Circle (Midas Post Office) Elko Co., Nevada.

Mr. G. S. Johnson,
San Francisco, California.

Dear Sir:

At your request I have made a personal examination of the Eastern Star Mine, and I herewith hand you my report.

The property consists of six lode locations, the title to all of which have been perfected by U. S. Patent.

LOCATION.

The Eastern Star Mine is situated in the Gold Circle Mining District, Elko County, Nevada, and located more exactly in Section 13, Township 39 North, Range 46 East, Mt. Diablo Base and Meridian. The Eastern Star Mine is eight miles by wagon road from Gold Circle and thirty-eight miles from Red House on the Western Pacific Railroad.

TRANSPORTATION.

An excellent wagon road connects the shaft of the mine with the railroad station at Red House, and a freight rate of $15.00 per ton for in haul and $12.50 per ton for out haul is now being paid by the present management. By operating their own freight outfit and figuring an out haul of one car load of shipping ore per month the freight rate could be cut in half. The more freight handled up to an amount necessary to keep an eight or ten mule team busy continually, the less would be the cost of hauling.

TOPOGRAPHY.

The Eastern Star Mine is located on the low rolling foothills of the Owyhee Bluffs on the western slope of Squaw Valley. As will be seen by Map. No. 2, the shaft is situated on a bold out-crop. The precipitious slope below is an ideal location for a mill, making it possible to build one through which the ore would go from the ore bins above to the tailings pond below by gravity alone.

WATER.

They are now pumping from the 140 foot level 38,000 gallons of water every 24 hours, enough to supply a mill treating 50 tons of ore per day. There are available two other sources of water, a spring flowing about 50,000 gallons per day in the dry season, situated about 2,000 feet from the shaft, and also 100 feet higher; and Frazier Creek about one quafter of a mile east. Frazier Creek always contains sufficient water to operate a 200 ton mill.

EQUIPMENT.

The equipment consists of:
A 25 H. P. Fairbanks, Morse gasoline hoisting engine, with a ton skip, and sufficient cable to develop and work the mine to a depth of 500 feet. This equipment is sufficiently large to take care of all the ore produced up to 100 tons a day.

A 32 H. P. Fairbanks, Morse stove oil engine has been installed to operate a cornish pump. This pump requires 20 H. P. to operate at its full capacity, which is 140 gallons per minute from a depth of 500 feet. The pump is required to do about one-sixth of its maximum capacity to handle the water at present. The reason for installing an engine so much larger than required to operate the pump was to have surplus power to run an air compressor and a blower so that either or both could be installed if it was deemed expedient.

DEVELOPMENT.

Practically all of the development work has been done on the Eastern Star No. 2 lode. Gold was first discovered in the sands of the gulch and traced up to a large spring nestled in a draw at the foot of a bold outcrop. The water came out of the vein itself which was traced up over the bludd and on beyond the crest of the hill, finally disappearing under the wash. A tunnel was run into the hill for four hundred feet and some excellent ore was found. At a point 250 feet from the portal of the tunnel a raise was put through to the surface. The hoisting plant was installed and the raise, now a shaft, was sunk to its present depth. Stations have been cut at the 140, 160 and 240 foot levels. A large flow of water was encountered on the 140 foot level and the spring at the surface became dry. A pump was installed and sinking continued. The 140 foot level on the south side was sulk-headed and the water has since been pumped from this level. As the work on the 140 foot level had to be abandoned a station was cut and drifts started on the vein at the 160 foot level. A large flow of water was encountered in the south drift of the 160 foot level, but it was plugged up and work discontinued there pending the lowering of the pump so as to take care of the water from the bottom of the shaft. Very little water has been encountered below the 160 foot level and work is being pushed at the 240 foot level as fast as possible with a full crew of men on two shifts. The shaft is down 30 feet deeper than the 240 foot level and will be used as a sump until the management again begins sinking.

"A"

GEOLOGY.

In Tertiary period the country was extensively fissured and these fissures were filled with flows of rhyolite, some of which came to the surface and flowed over. What remained in the fissures are known as rhyolite dykes. It is certain that we have on the Eastern Star a rhyolite dyke in a country rock of andesite.

Character of the Vein.

On cooling, the rhyolite in the dyke contracted, leaving seams and veinlets through which ascending solutions had easy passage. During the time of cooling, or later, the rhyolite dyke was extensively fissured leaving some quite large openings, besides numerous small ones. The ascending solutions, which came up from below under tremedous pressure, and at extremely high temperatures, circulated freely through all these fissure openings and as the pressure was relieved and the high temperature reduced, the quartz, gold and silver and other minerals that it contained were deposited in all the fissures and cracks and seams in the vein. The vein is composed of a number of veins or seams of quartz varying from one inch to ten inches thick with a filling of rhyolite in between which has been broken and checked through and through. All of these seamlets thus formed have been impregnated with quartz carrying gold and silver, often in sufficient quantities to show the native gold and silver when broken along the fracture planes.

"B" The ore has been more or less oxidized down to the 100 foot level and free gold and silver is much more often seen in pieces taken from the vein in the oxidized zone than in the rock taken from below, although the assays show that the ore is much richer at the 140 and 160 foot levels than above. The silver in the sulphide zone is in the form of argentite (silver sulphide) and the gold is associated with the primary iron pyrite. Nevertheless I found several specimens at the 140 and 160 foot levels showing free gold.

The limited time at my disposal for this examination and the fact that the quartz and the rhyolite in the sulphide zone is extremely hard, made it difficult to secure averages across the vein at the points sampled. When we consider; first, that the width and number of the quartz seams vary greatly along and up and down the vein; and secondly, that the values in the quartz itself vary greatly - in places running as low as $16.72 (see sample No. 7) and as high as $758.30 (see sample 38) and of course much higher where specimens containing free gold and silver are found, it is easy to understand how one sample could give high results and another taken within ten feet along the vein could give low results.

Both the winze on the tunnel level and the bottom of the shaft were full of water and could not be sampled.

By reference to Map. No. 2 and the list of assays, giving distances across which assays were taken, it can easily be computed that on the tunnell level the average value of the ore across an average of 3' 10" is $32.80 per ton. There are 105 sacks of ore on the dump which was sorted out of the ore mined from the stope and winze on the tunnel level. The assay value of this ore is $656.62 per ton.

The average value of ore on the 140 foot level is $38.50 across an average of 3' 10".

The average value of the ore on the 160 foot level is $24.00 across an average width of 5' 6". Between samples Nos. 33 and 34 a piece of quartz 14" long by 10" wide by 4" thick was taken out of one of the quartz seams next to the footwall. This piece was crushed up and quartered down and assayed. Returns showed $758.30 in gold and silver. This sample (No. 38) was not included in determining the average value of the ore on the 160 foot level.

The assay returns of samples 23 to 30 inclusive have no value except to show that where the quartz veinlets are not prominent the average value of the ore is low. By a careful examination of Map No. 3 it will be seen that the vein widens rapidly in depth. Just below the 160 foot level the shaft left the foot wall side of the vein next to which all of the quartz veins and veinlets lie. So practically all of the high grade ore of the quartz seams eliminated from the sample it could not be expected that the sample would assay up to the average. The drillings from a hole drilled four feet deep at a depth of 14 feet below the 160 foot level gave returns of $181.58 (See sample No. 22b).

The average value of ore sampled in the shaft down to the 174 foot level is $40.80 across an average width of 4' 4".

The average values obtained above were arrived at on the basis of the foot value; the value of each sample was multiplied by the distance over which it was taken and the sum of the multiples or foot values were then divided by the total footage.

CERTIFICATE OF ASSAY.

Sample	Width of Sample		Oz. Gold	Oz. Silver	Total Val.
		75 Foot Level.			
2.	3'5"		0.34	2.50	8.25
3.	3'8"		0.38	1.60	8.52
4.	3'0"		0.14	1.90	3.90
5.	4'2"		0.48	3.00	11.34
6.	1'10"		2.96	5.70	62.51
7.	1'4"		0.72	4.00	16.72
8a.	2'5"	Next to foot wall	0.26	1.30	5.95
8b.	4'6"	Next to hanging wall	0.28	1.10	6.24
8a.	2'5"	Next to foot wall	0.16	1.60	4.12
9b.	6'0"	Next to hanging wall	0.08	1.60	2.35
10.	2'6"		0.38	5.20	10.61
11.	2'10"		0.26	3.80	7.40
		Samples from shaft.			
12.	2'0"		3.12	3.50	64.43
13.	3'0"		3.48	5.00	72.50
14.	2'6"		2.88	5.20	60.61
15.	5'2"		0.12	0.70	2.80
16.	5'0"		0.60	3.40	13.97
17.	5'0"		0.16	6.30	6.85
18.	6'6"		2.12	3.30	44.31
19.	4'0"		1.32	3.00	28.14
20.	4'0"		1.20	4.20	26.44
21.	4'6"		0.32	3.00	8.14
22a.	6'2"		0.14	1.00	3.38
22b.	4'0"	Drill Hole	8.76	11.00	181.58
23.	4'6"		0.02		0.40
24.	6'6"		0.02		0.40
25.	6'0"		0.06	0.30	1.37
26.	6'0"		0.02		0.40
		Samples from 3rd level.			
27.	5'9"		0.04		0.80
28a.	1'0"	Quartz seams	1.12	1.00	22.98
28b.	4'0"	next to hanging wall	0.04-	0.20	0.92
29a.	5'2"	Next to hanging wall	0.44		8.80
29b.	1'6"	In and beyond " "	0.12		2.40
30.	5'6"		0.10		2.00
		Samples from 2nd level.			
31.	5'9"		0.20	0.40	4.23
32.	6'4"		2.68	17.30	63.63
33a.	4'0"	Next to foot wall	0.64	5.40	15.93
33b.	4'0"	Next to hanging "	0.08	2.00	2.76
34.	6'11"		0.80	7.20	20.18
38.	0'4"		25.88	415.00	758.30
		Samples from 140" level.			
35.	3'6"		2.60	25.40	66.73
36.	4'		0.64	3.00	14.54
37.	0'8"		6.90	29.00	154.82

"C" **Ore in Sight and Probable Ore.**

From a technical standpoint, which requires ore to be opened on four sides before one can claim it to be in sight, the

ore in this mine so developed at present is a very small amount.

Probable Ore.

Determining the average value of all the probable

ore in this mine so developed at present is a very small amount.

Probable Ore.

Determining the average value of all the workings according to foot values we get $35.40 across 4'2". As the foot wall is not exposed below the 140 foot level and that part of the vein adjacent to it could not be sampled, the above conclusion is undoubtedly low. The vein is 5' wide at the collar of the shaft; 6'5" wide at the 75 foot level, and we know that it is 6'5" plus 4'0" or 10'5" at the 174 foot point where drill hole was made toward the foot wall in the shaft. The ore chute is 100 feet long on the 75 foot level. Assume that it is no longer on the lower levels, although I personally believe that the ore zone will continue much further than 50 feet on each side of the shaft; in fact it would be fair to assume that the length along the vein would bear a definite relation to the depth, and we would have enough ore to run a 50 ton mill for a year.

"D" Cost of Mining and Milling.

The Rex Mine operated a five stamp mill for over a year in the camp of Gold Circle, mining ore from a vein of about the same width as the Eastern Star vein. Their mining and milling cost was $5.05 a ton (not allowing for loss in the tailings). The ore in the Eastern Star is harder to drill and will not mill as fast as the Rex ore so that the cost would be greater for the Eastern Star ore. But as a larger plant would be in operation the overhead expenses (office and surperintendence) would not be so large a propertion of the whole. After carefully calculating the amount of ore that could be handled with the present equipment and assuming that the present price of supplies and the present scale of wages will continue, I find that this ore can be mined and milled at a cost of $5.60 per ton, provided power drills are installed. Taking the value, as determined from all the workings, of $35.40 per ton, deduct $3.50 for loss in tailings and $5.60 cost of mining and milling and we have $26.30 net profit on every ton of ore milled. This would give a net profit of $1315.00 a day with a mill of fifty ton capacity.

"E" Conclusions and Recommendations.

The Eastern Star vein is one of the strongest veins I have ever seen. The method of deposition of the gold and silver values will lead to the conclusion that they will be found as deep as the fractured or fissured zone, probably very deep.

"F" The ore is very hard and I would advise the installation of air drills at once. The shaft should be continued down to the 500 foot level and drifts run off at 80 foot or 100 foot intervals.

A shipment of the ore should be made to a testing plant to determine the best method of extracting the values and a mill constructed to handle at least 50 tons per day. This will put the company in a position in another year where they will have enough money for all development and improvement purposes and a handsome divident besides.

Respectfully submitted,
(Signed) Chas. A. Liddell, E. M.

San Francisco, July 7, 1913.