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R E P O R T  
on the  
EMMA AND ORO DENORO  
Mines.

Lots 591 and 692, Crown Granted  
Grand Forks Mining Division  
British Columbia,  
by  
R. Roberts, A.R.S.M.  
Mining Engineer  
Royston, V.I.  
B.C.

15th October, 1929.

R. Roberts,  
Mining Engineer,  
Royston, V.I.  
B.C.

Royston Station, P.C.  
Vancouver Island, B.C.  
15 Oct. 1929.

R E P O R T

On the Emma & Oro Denoro Mines  
Lots 591 & 692  
Grand Forks Mining Division.  
B.C.

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GENERAL

These are old mines. They were developed and worked

DESCRIPTION.

for a considerable number of years by different companies. The Emma from 1894 to 1923, the Oro Denoro from 1899 to 1917.

Emma Output 251,597 tons valued at \$1,107,079 from 6,824 oz. gold, 78,065 oz. silver, and 5,132,118 lbs. copper. Approximate value \$4.40 per ton.

Oro Denoro output 146,447 tons valued at \$742,171 from 3,744 oz. gold, 30,652 oz. silver, 3.605 lbs. copper. Approximate value \$5.43 per ton.

SITUATION.

These claims, or mines, are situated in what is known as the "Boundary" district (close to the International Line) which was at one time a scene of considerable mining and smelting activity. The Granby Company's smelter was at Grand Forks and the B.C. Copper Company's smelter at Greenwood, the ores coming by trainloads from the mining camps of Phoenix, Deadwood and Summit.

The Emma and Oro Denoro, adjoining one another, are in Summit Camp, elevation 3500 feet, some 2½ miles from Eholt, a station on the Nelson-Midway branch of the C.P.R. Eholt is 12 miles from Grand Forks, 8 miles from Greenwood and 407 miles east of Vancouver, the journey being made by the Kettle Valley Railway branch of the C. P. R.

SYSTEM OF  
MINING.

These deposits being wide bodies, some 30 feet wide and extensive they were mined on the "Glory Hole" system. Mined in this way the ore values were low, little or no separation from waste rock being made. The ore, however was self-fluxing. Thus no fluxes had to be added in the smelting furnaces. This fact permitted cheap smelting and the glory hole method, cheap mining.

This system of ore mining and smelting continued until the large deposits at Phoenix and Deadwood were worked out, and the smaller mines could not afford sufficient tonnage to keep the smelters in profitable operation.

This has led to the taking up of the rails on the C.P.R. and Great Northern Railway systems, which served the camps and smelters, <sup>and</sup> the dismantling of the latter, and gradually most of the mines and claims in the district have been abandoned by the owners.

Thus very little mining, if any, of the comparatively low grade deposits is being done.

For quite a number of years following the war, the price of copper has been low, thus copper mines and claims have either been closed down or abandoned.

In spite of the abandonment of the district by the large mining interests, all the copper deposits were not worked out, and possibilities still remain, especially with the advance of concentration methods in treating copper ores. Thus the Le Roi-Summit Syndicate having acquired control of some 500 acres in a block comprising the Emma and Oro Denoro and adjoining claims, I was requested to examine these two mines with a view to ascertaining whether sufficient ore would be available, and if so, a probable method of profitable treatment.

D E T A I L S.

SITUATION.

Summit Camp, Grand Forks Mining Division, 2½ miles by highway from Eholt, B.C.

TOPOGRAPHY

Mountainous, but not rugged. Mountains dome shaped..

ELEVATION

3500 feet.

CLIMATE

Temperature comparatively, summer max. 90 F. Winter minimum rarely below 20 F. Snowfall 2 to 4 feet.

TIMBER

Small, mostly second growth. Supplies would have to be obtained from a distance. The original timber was used up in mining or burnt by forest fires.

WATER

Wells, Wilgrass Lake, a small lake.

TRANSPORTATION.

Is traversed by the Provincial Highway. The property is crisscrossed by abandoned tracks of the C.P.R., and G.N.R.

GEOLOGY.

In the immediate neighborhood the following rocks are found Viz:-

Limestone

Grano-diorite.

Chloritic hornblende Schists, highly altered.

Alkali Syenite (pulaskite) and various other rocks of volcanic origin.

Nearly all the deposits of Copper Ore in the "Boundary" are associated with the limestone and are probably replacements of the latter brought about by contact metamorphism. They are not true fissure veins, though their forms take that resemblance; they extend to but shallow depths comparatively, their vertical termination being marked by the appearance of unaltered limestone. No doubt considerable erosion has taken place in the ages past; thus a large amount of mineral has been eroded and carried away.

WORKINGS.

EMMA MINE.

These have been extensive. On the west side of the property a shaft was sunk to the 400' level and a large amount of ore stoped out by glory holes and underground stopes. A considerable quantity still remains, though whether easily available or not I was unable to determine on account of the mine being full of water.

Immediately to the north lies the Jumbo claim and apparently, the deposit continues into this property for several hundred feet as shown by open cuts.

Some 500 to 600 feet east of the main workings and shaft there is another large deposit named the East Glory Hole. Whether this is a separate deposit of an offshoot is uncertain, though the apparent strike appears to be towards the main body. Not much ore appears to have been mined from this. It was mined originally from a tunnel, no shaft having been sunk. Apparently there are possibilities of a large tonnage of ore to be won from this body.

These workings are shown on the accompanying sketch plan.

STRIKE OF  
DEPOSIT.

The vein or deposit strikes some 26 N.E. with a steep westerly dip.

WIDTH.

Some 20 to 30 feet wide.

ORO DENORO MINE.

WORKINGS

THIS MINE WAS OPENED UP BY A TUNNEL GIVING SOME 250 feet of depth.

(continued)

The ore was mined by glory-holes, and connected by winzes to the tunnel. Ore from the glory holes was discharged into the winzes and loaded onto mine cars, then trammed through the tunnel to a crusher house, which delivered the crushed product to the railway bins.

STRIKE OF

Appears to have a general trend of 30 N.W. with a steep dip to S.W.

DEPOSIT

WIDTH.

Mineral zones some 30 feet wide run through the property, and without an adequate and lengthened survey, it is difficult to correlate them or the glory hole workings with one another, though these are more or less undefined zones.

CHARACTER of

ORE.

The ore from the Emma mine consists of chalcopryrite (copper, iron, sulphide) and magnetite (magnetic iron) carrying gold, silver and copper.

The magnetite occurs in large masses and is a conspicuous feature of the ore. The iron contents made it desirable as a flux in smelting silicious ores.

The ore from the Oro Denoro mine is of similar character but is not so heavily impregnated with magnetite, and more copper mineral or chalcopyrite is in evidence.

VALUE OF ORE.

A few samples of ore were taken with a view to ascertaining the probable value of the ore when mined fairly clean and sorted. When mined in bulk with little or no sorting the figures given previously no doubt would be correct, viz:-

For the Emma Mine                   \$4.40  
 For the Oro Denoro                5.43  
 Sample from East Glory Hole

Emma Mine.

	per ton
Gold, oz. .04 @ \$20 per oz.	0.80
Silver oz. 2.3 @ .50¢ " "	1.15
Copper 2.12% @ 18¢ per lb.	7.63
Total value per ton	\$ 9.58

ORO DENORO MINE

VALUE OF ORE

(continued)

From the face of the lowest Glory Hole taken across 12 feet in sections of 2 feet, gave following results:-

No. of Sample.	Gold, <u>oz.</u>	Silver, <u>oz.</u>	Copper, <u>oz.</u>	Total value. <u>per ton</u>
No. 1	.08	2.5	3.87	\$16.80
" 2	.06	2.6	3.09	13.64
" 3	.09	1.6	2.97	13.30
" 4	.08	.7	3.26	13.70
" 5	.10	1.3	5.03	20.77
" 6	.02	.6	8.91	32.79
" 7	.08	.4	3.81	15.52

No. 7 sample was an average for the 12 feet and coincides closely with the arithmetical mean of the first five samples, No. 6 being disregarded.

ORE DENORO MINE.

VALUE OF ORE.

Samples from No. 3 westerly.

Glory Hole contained considerable Magnetite.

<u>Sample No.</u>	<u>Gold,</u> <u>oz.</u>	<u>Silver,</u> <u>oz.</u>	<u>Copper %</u>	<u>Value per ton.</u>
No. 8	.24	1.7	2.53	\$14.78

Gold valued at \$20.00 per oz.

Silver " " .50 approximately per oz.

Copper " " .18 per lb.

This last sample No. 8 showed higher gold content than the other samples and should be noted.

MILLING TESTS

Large samples of ore from both mines have been sent to the South Western Engineering Corporation of Los Angeles, California, for milling tests. Results are now being awaited.

AMOUNT OF ORE.

In both of these claims or mines, the deposits being as wide as 30 feet, a large amount of ore has been left in the workings evidently with the idea of again shipping from them when conditions were favourable.

The following quantities have been shipped:

From the Emma mine	251,597 tons.
From the Oro Denoro	<u>136,447 tons.</u>
Total Tons	<u>387,044</u>

Probably half this amount is available in the present workings thus giving some 190,000 tons.

With development or opening up the East Glory Hole on the Emma, the continuation of the Emma workings into the "Jumbo" and deeper workings of the Oro Denoro some 400,000 tons might be expected.

With regard to the matter of the amount of ore "in sight" or whatever term may be used, a close estimate is not possible in the absence of development and means to measure with some exactness.

Having an uncertainty to start with, precise calculations based on that uncertainty cannot clear the matter up.

When an area 1500 feet square is impregnated with mineral deposits in irregular masses squirming here, there, and everywhere, through hard rock and concealed by an overburden, it is impossible to give figures which may not have to be revised.

However, an inspection of the claims will give an impression of a large quantity of ore now available and in the future.

EQUIPMENT

All plant such as hoist, pumps compressor, ore crushers and conveyor belts, ore cars, blacksmith shops and other accessories have been removed.

The ore bins and headgears are still standing and might be utilized.

BUILDINGS.

Very few of the buildings are inhabitable, if any. On the Mary B. claim a former hotel stands belonging to Mr. Wm. Ludlow, and accomodation for a crew of men could be obtained there.

CONCLUSION.

There is thus a probability factor of tonnage and values, which warrants the expenditure of enough money to carry out treatment tests and if these are favourable, the eventual equipping of the mines with suitable mining equipment and the provision of milling facilities.

The ore values, if mined carefully and sorted will probably yield profitable returns.

The ore from the Oro Denoro mine evidently carries a greater percentage of copper than that from the Emma, This is an encouraging feature.

IMMEDIATE WORK.

Surface caving having taken place, the re-habilitation of the tunnel on the Oro Denoro should be undertaken as soon as possible.

Signed R. Roberts.