

CONDENSED INFORMATION CONCERNING DEBENTURE MINE.

- Para. 1. Seven Crown Granted Mineral Claims. Area approximately 300 acres.
PROPERTY
Map 1.
- Para. 2. North 4 miles from the Cronin Mine, Babine Area, Omineca Mining
SITUATION
Map 1. Division, British Columbia.
North of Telkwa, B.C., a station on the Canadian National Railway.
- Para. 3. The ore is LEAD carrying excellent SILVER Values.
CHARACTER
AND GRADE
OF ORE
Average Values estimated at: LEAD— 17%, SILVER— 20.0 oz.
\$ 47.60 gross per ton, at present Smelter Payment Prices.
- Para. 4. Main Vein, 4' to 12' wide. Average width: 6' (minimum).
VEINS
Maps 1 & 2. Two other veins of importance, undeveloped.
- Para. 5. Block 'A', considered as
ORE TONNAGE
Map 2. ' Ore in Sight ':- 20,000 tons.
Exposed on top and on two ends, 200' deep (half-way down to
Cross-cut Tunnel) which exposes the orebody at 400' (on the
dip of the vein) below the outcrop.
Block 'B', considered as
"Indicated Ore" :- 20,000 tons.
Block: 200' long x 200' deep x 6' wide. Reduced to 20,000
tons "indicated" as above.
- Para. 6. Lead: 9½¢ per lb.; Silver: \$1.02½ per ounce.
METALS PRICES
- Para. 7. 20,000 Tons: "Ore in Sight" (Block "A" ---Para.3.)
TOTAL VALUES. \$1,073,000.00
20,000 Tons: "Indicated Ore" (Block "B" ---Para.3.)
\$ 1,073,000.00 (Allowing for same value per ton as "ore in sight".)
- The foregoing deals only with a 200-ft. length and a 400-ft. depth.
The Main Vein is known to extend at least 1,000 feet in length
and conditions are ideal for obtaining an additional 500 feet
vertical depth by means of more, comparatively short tunnels
and/or diamond drill holes.

July, 1917.

REPORT

on the mining property of

DEBENTURE CREEK

HOLDINGS

The property consists of six mineral claims, viz.: "Debenture", "Galena", Mogul, "B. & M.", "Right Rim", and "Centre Fraction", all under perfect title in the records of the Mining Records Office at Hazelton, B.C., and Crown Granted.

They comprise an area of 300 acres, subject only to the Provincial tax of 25¢ per acre on unworked Crown Granted Claims, and are therefore exempt from taxation when being operated. The owners have a clear title, the property-- six claims-- having been bought and paid for in full.

SITUATION

The property is situated on the North-East slope of the Babine Range of mountains which lies between Babine Lake and River on the East and the Bulkley River on the West, and extends from Hazelton on the North to Telkwa, on the Southern end. It is twenty-six miles from Moricetown, a station on the Grand Trunk Pacific Railway, which along here follows the West bank of the Bulkley River, and twenty-four miles from the point on the main Government wagon road where the trail branches off leading to the claims. This Trail was built several years ago, and has been used very little in the past few years, and is therefore in very poor repair. However, the Government, on the recommendation of the Resident Mining Engineer, Mr. Galloway, would no doubt remedy this if assured that it would be used. Ultimately a wagon road will be necessary, but the trail repaired would provide good pack-horse transportation sufficient to meet all requirements until some further development is done.

TOPOGRAPHY

The Babine Range rises to an elevation of about 6000' at this point and lies about 20 miles East of the Bulkley River and the G.T.P. Ry. On its western or Bulkley River side there is a gradual slope from the river, which is at an elevation of sixteen hundred feet, to the pass through the range at an elevation of 4750'. The eastern slope is rather steeper from the Babine Lake side. Both slopes are well timbered to an altitude of about 4700', and drained by numerous creeks, which are in flood in the hot months of the summer and shrink in the winter. It would therefore be absolutely necessary to take measurements of the flow of water in these creeks during the winter to obtain data essential for the installation of a hydro-electric plant.

TOPOGRAPHY cont'd.

The hill on which the claims are located rises abruptly from Sebenture Creek, on which the camp buildings are located. There is no evidence of any heavy snowslides on the property and none on the trail, consequently there is detrimental to the working of the property ~~an~~ all the year round. On account of the heavy snowfall, provision would have to be made in the fall of the year for sufficient supplies to last for three or four months, until the completion of a wagon road which would make the camp accessible at all times.

VEINS and DEVELOPMENT

The vein is of quartz, varying from 4' to 12', and carries galena, without any other mineral, which is in places from 2' to 5' wide of solid mineral. I should judge that the whole vein content would average from 15% to 20% lead, containing from 18 to 24 ounces silver per ton. The vein occurs in what appears to be a highly altered sedimentary rock, quartzite in appearance, and has been distorted and faulted, where exposed on the surface, by the intrusion of a dark medium dyke, which just breaks through to the surface in the bottom of the East gulch. This dyke probably accounts for the twist in the vein where encountered in the tunnel.

Bands of argillite and schist also appear in the immediate vicinity, in which are promising outcroppings of mineral which have not, as yet, been prospected.

Nature has exposed the main vein on the surface by means of two deep gulches on either side of a remaining, protruding ridge of the mountain, down through which the vein cuts. This shows a triangular block of ore, approximately 50' across the top, 200' across the base, with a vertical depth of 200' and averaging about 6' in thickness, giving a tonnage "in sight of, say, 20,000 tons.

A crosscut tunnel has been driven from the base of the bluff, at an

elevation of 4750' for 400', gaining in that distance a vertical depth of about 375' below the apex of the vein on surface. At 350' from the portal of the tunnel what is thought to be the main ore body has been encountered and continued in for a further 20'. This seemingly runs almost parallel with the direction of the tunnel and further work is necessary here to demonstrate the extent of the orebody and its relation to the ore above. However, its exposure at this depth is highly satisfactory and thoroughly warrants an extensive plan of development work.

Should the exploration of the ore shoot on this level prove satisfactory and of the same extent and content as that on the surface, it would easily double the tonnage in sight.

The following assays show the relative silver and lead values in the ore:

<u>Sample</u>		<u>Silver</u>	<u>Lead</u>
No. 1 Surface	60 ozs.	52%
No. 2 "	76 "	60%
No. 3 "	71 "	65%
No. 4 "	94 "	78%
No. 5 "	19 "	35%
No. 6 Tunnel	28 "	18%
		—	—
		58 ozs.	51.3%
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Or about 1.13 ozs. silver to the percent of lead.

An additional depth of 400' or 500' can be obtained on the vein below the present tunnel by means of crosscut tunnels, but the selection of the starting points of these, and especially the lowest or main working tunnel, should be taken into very careful consideration in order that it fit in with the general scheme of equipment, making for resultant efficiency and economy.

GENERAL EQUIPMENT

A wagon road will be about the first essential. There are two feasible routes: One by connecting with the end of the Cronin road at the Cronin mine and the other by building your own road from your property to connect with the main road somewhere above Moricetown. The first mentioned would require 8 or 9 miles of road from your camp to the Cronin's, from which there has been built a winter road 32 miles to Telkwa, or a total of about 40 miles of haul. The alternative is to build about 26 miles to Moricetown.

I prefer the latter on account of the shorter haul, and also because a route can be selected crossing one of the larger creeks where a hydro-electric power plant may be installed on the Bulkley River slope of the range since there are no large creeks on the east slope. The country should be thoroughly cruised and the best possible route selected and surveyed, from which data a close estimate can be made of the cost. I would favor contracting for its construction.

The following is a rough estimate of the cost of a wagon road with a 12' bed and 25' right-of-way; the mileage costs are based on trail conditions and, while the road would not likely follow the present trail, yet conditions would be similar. All the grades are with the load coming out from the mine except the -3.5 and minus 3.0 which would be eliminated on the surveyed route: -

Govt. road to 1 ..	4.5	6.6%	\$1,000.00	\$ 4,500.00
Sta. 1 to Sta. 2 ..	3.5	3.5	1,000.00	3,500.00
" 2 to " 3 ..	1.0	6.0	1,500.00	1,500.00
" 3 to " 4 ..	1.0	11.0	1,500.00	1,500.00
" 4 to " 5 ..	2.0	-3.5	1,500.00	3,000.00
" 5 to " 6 ..	3.0	-3.0	1,750.00	5,250.00
" 6 to " 7 ..	2.0	2.0	1,750.00	3,500.00
" 7 to camp ..	7.0	0.3	2,500.00	17,500.00
	<u>24.0</u>			<u>\$40,250.00</u>
Cruising and surveying.....				<u>\$ 2,000.00</u>

A SMALL SAWMILL would be necessary before any construction work could be started. There is sufficient water power in Debenture Creek at the camp to operate a sawing plant of, say, 8 to 10 thousand per day. It would require a 12" pipeline of about 3,000' in length to obtain a head of approximately 400'. Or a small gas engine could be used for power until the main power plant were in operation. This installation of engine and mill would cost about \$1,500.00.

SEPARATE BUILDINGS, such as office messhouse, bunkhouse, machinshop, assay office, blacksmith shop, etc., would be built as required and probably would cost \$5,000.00.

WAGONS AND MOTOR TRUCKS, say, \$10,000.00.

TELEPHONE, say, \$3,000.00.

POWER PLANT: This would require considerable data before any estimate could be made as to the probable cost. The available water would have to be measured at time of lowest flow, the length of pipe determined to obtain the required head, the size of pipe necessary to carry the requisite amount of water, the length of the transmission line, etc. For the development of 500 h.p. or more I have in mind Two Bridge Creek, which rises just over the summit from the property and flows west into the Bulkley River.

The wagon road might be surveyed to cross it at some convenient site for a power plant. The transmission line could be taken directly over the hill. It is safe to say that such a plant, under very favorable conditions, would cost \$20,000.

THE MINING PLANT, consisting of compressor (5-drill), engine or motor, drills, etc., etc., \$15,000.00.

CONCENTRATOR: The ore on the whole will necessitate concentration, though there is a considerable proportion that could readily be handsorted to a shipping product. It will make an ideal mill feed since there is practically no mineral except galena, though zinc sulphides may appear any place, and will require no complicated process for separation.

I should judge, from the nature of the ore encountered so far, that the ordinary water concentration method, using jigs and tables with probably a flotation cell at the end to recover the values from the slimes, would meet all the requirements. This, however, is a matter for future investigation when sufficient ore has been blocked out to justify the installation of a concentration plant. An average sample should then be taken and a mill test made on it to determine the most efficient and economical method of concentration.

To get some idea of what may be expected from such an ore on concentration, take an average feed of say 12% lead and 14 ozs. silver. This would concentrate about 6 into 1 and, with a recovery of, say, 95% of the values, would make a product assaying 70% lead and 80 ozs. silver. Seventy percent (70%) or 1,400 lbs., of which the smelter pays for 90% or 1,260 lbs. of lead at say 5¢ per lb., gives \$63.00 per ton; 80 ozs. of silver, of which the smelter pays 95% or 76 ozs., at the market price of 85¢ per oz. give \$64.60 per ton; a total of \$127.60 per ton of concentrates. The cost of producing a ton of concentrates will be as follows:

Mining (and development) of 6 tons at \$4.00.....	\$24.00
Mill 6 tons at \$1.50	9.00
Transportation of 1 ton of Conc. to R.R.	7.00
Freight and treatment	20.00
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Total	\$60.00
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Leaving a profit of \$127.60 minus \$60.00 or \$67.00 on one ton of concentrate, representing 6 tons of ore mined, or \$11.25 per ton profit on mine run of ore.

Estimating \$20,000 tons of ore in sight would mean a profit of \$225,000.00.

In other words, there is sufficient tonnage now exposed to pay for all equipment.

The cost of a suitable concentrator would run about \$1,500 per ton capacity or \$75,000 for a 50-ton plant.

Summarizing the Preceding Costs:

Wagon Road (Gov't would probably refund 50%) ...	\$ 42,250.00
Sawmill.....	1,500.00
Buildings.....	5,000.00
Wagons and Motor Trucks.....	10,000.00
Telephone.....	3,500.00
Power Plant.....	20,000.00
Mining Plant.....	15,000.00
Concentrator.....	75,000.00
Development Work.....	18,000.00
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	\$190,250.00
Less refund from gov't on road account.....	21,125.00
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	\$169,125.00
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CONCLUSIONS

I would advise that sufficient development work be done by hand this coming summer to thoroughly prove the ore body above the present tunnel level. The camp and equipment are entirely adequate for this work. The trail should be put in first class condition for getting supplies in by packhorses from Moricetown. Application should be made to the Provincial Mines Department as soon as possible in order that the Resident Mining Engineer for the District may inspect the property and trail and recommend the necessary improvements.

I would suggest that two shifts of two men each or four men should be put drifting both ways on the ore, making eight men employed in drifting. Also two shifts of two men each shift or four men raising and sinking, a blacksmith, two muckers, a cook and helper and a superintendent, making a total crew of 18 men. This would get about 6 ft. of work done per day or 180 ft. per month - or say 1,000 ft. in six months - at \$18.00 per foot, amounting to \$18,000.00.

Also, as early as possible, a surveyor should be cruising out and surveying a wagon road so that, as the above development work progressed and results proved satisfactory, a crew could be employed cutting out the right-of-way and doing sufficient grading to put it in condition for use as a sleigh road for the coming winter. A telephone line could also be constructed along the right-of-way,

connecting the mine camp with the office at the selected railroad point.

I would then take in on the first snow a small outfit consisting of compressor, gas engine, drills, etc., and proceed with the opening up of the lowest or main working tunnel, suitably situated to conform with the site of the concentrator. Also, I would install a sawmill outfit and start lumbering operations preparatory for construction work during the summer.

The sleigh road would be converted into a wagon road during the following summer and equipped with motor trucks and wagons. Everything then would be in readiness for the transportation of milling and power plant machinery - and the installation of the same could then be gone ahead with.

The above proposed development work is not arbitrary, by any means, and only a portion of it might be necessary, my idea being to prove up sufficient ore before going into the heavy expenditure of a wagon road, etc. This very probably will be done with a small amount of work, in which case the handwork can be discontinued and mining work resumed when the necessary plant has been provided. However, I would hand-sort sufficient ore to insure loads for outgoing trucks while machinery and supplies are being brought in.

The only item in the equipment list liable to any great increase over the estimate given is that of the power plant. There are so many unknown conditions and difficulties liable to enter into this installation that it is almost impossible to give even an approximate figure.

Judging from the extent of the ore exposures on the surface and the fact that the ore has been encountered in the tunnel at a depth of 150' or more below the lowest surface outcropping, together with the nature and content of the ore in both places, it is very reasonable to expect that this property, with two years of aggressive and efficient work, will become a profitable shipper.

Respectfully submitted,

(Signed) "G. A. CLOTHIER"

Mining Engineer.