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HIDDEN CREEK AND BONANZA

Anyox, NASS RIVER M.D.

103 P/5W
1030-A-21,23

Sources of Information: Granby Consolidated Mining, Smelting
& Power Company
Geological Survey, Canada, Memoir 175.

The mill, smelter and town of Anyox on Granby Bay, the Hidden Creek Mine, $1\frac{1}{2}$ miles northerly from Anyox, the Bonanza mine, 3 miles southerly from Anyox, and an hydro-electric power installation were owned by the Granby Consolidated Mining & Smelting Company. At July 1st, 1935, operations were shut down; later the property was sold to the Consolidated Mining & Smelting Company. The latter company did some exploratory work at the mines without establishing the existence of further ore. It is understood that Ventures Limited now have the property and propose melting iron and steel scrap there. It may be assumed that Ventures Limited have in mind the possibility of finding more ore and of salvaging ore left in the mines at the shutdown in 1935.

Available information concerning the equipment remaining in the mines, mill, smelter and townsites is incomplete. Some machinery was removed by the Consolidated Mining and Smelting Company. This is understood to include crushing and some grinding machinery, the main hoist, some rails and some other equipment from the mines. A fire destroyed the Hidden Creek mine townsite and the surface plant. The beach, town and plant - including mill and smelter - escaped the fire. It is understood that the smelter had been allowed to run down very badly in anticipation of the shutdown. It

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has been reported that the mill was generally in good shape at the time of the shutdown and that machinery adequate for production at about 75 percent of former capacity remains there. It is reported that domestic buildings at Anyox suffered a good deal in the removal of windows and of plumbing.

Up to the end of 1932, production from the Hidden Creek mine amounted to 19,400,000 tons of ore averaging copper 1.44%, gold 0.005 oz. per ton, silver 0.50 oz. per ton. The Bonanza mine production amounted to 397,000 tons of ore averaging copper 1.95%, gold 0.0039 oz. per ton, silver 0.33 oz. per ton.

The following figures relating to reserves, production and costs are taken from the 1934 report of the Granby Consolidated Mining, Smelting & Power Company.

<u>Mine</u>	<u>Ore Reserves at Date</u>	
	<u>Dec. 31, 1933</u>	<u>Dec. 31, 1934</u>
Hidden Creek	3,425,700 tons	2,494,140 tons
Bonanza	138,131 "	71,778 "
	<u>3,546,831 tons</u>	<u>2,565,918 tons</u>

Year	Tons Milled	Grade % Cu	Production		Recovery %	Tailings % Cu
			Concentrates Tons Produced	Grade % Cu		
1933	1,534,200	1.31%	109,000 tons	16.50	89.58	0.147%
1934	1,875,800	1.17%	120,663 tons	16.21	89.37	0.137%

Costs 1934

Operations	\$2,853,354.16	
Administration, Insurance, Taxes	201,917.63	
Interest & Exchange	61,679.00	<u>\$3,116,950.79</u> Operations
Depreciation	760,297.83	
Depletion	<u>494,510.36</u>	<u>1,254,808.19</u> Written off
Total		\$4,371,758.98.

For present purposes we are interested only in operating costs, not in amounts written off against depletion and depreciation. \$3,116,950.79 therefore covers the cost of mining, milling and smelting. Divided by the tonnage milled, this works out at a total production cost of \$1.66 per ton of ore treated in 1934. It is understood that combined mining and milling costs per ton of ore milled amounted to about \$1.25. This leaves some \$620,000 as the cost of smelting, or roughly \$5.00 per ton on 120,663 tons of concentrate smelted.

The ore mined in 1934 was considerably below the grade for 1933 (1.31% copper) and further below the average grade up to 1932 (1.44% copper). Ore milled in 1934 amounted to 1,875,800 tons while the reserves decreased by 998,913 tons, dilution with low grade or waste, and extra ore found amounted

then to more than 375,000 tons. The copper content of the reserves, computed at mine average, was reduced by approximately 1,440,000 units, while production for the year amounted to 2,190,000 units.

Operations continued for the first half of 1935 but figures for this period are not available. It is reported that ore was milled at a rate comparable with that of 1934, that is about 5,200 tons per day, and that grade was comparable with that of 1934, a substantial part of the material milled consisting of waste or low grade which had not been included in the reserves. It may be assumed that the ore milled in the half year amounted to about 900,000 tons, and judging by the 1934 figures, reserves of mine average ore would be depleted by not more than 600,000 tons.

The ore remaining consists of remnants in stope backs and floors, and in pillars scattered through the mines. Close estimates of the recoverable ore are not available. An engineer long associated with the Granby Company told the writer that he believes operations could have continued for another year. Another engineer has estimated reserves at the shutdown, allowing for dilution, as 2,200,000 tons averaging 0.90 percent copper.

There seems to be little doubt that a substantial quantity of copper could be recovered from material left in the mine workings. Destruction of the mine camp and surface plants by fire, and removal of hoisting machinery and underground

equipment would necessitate substantial expenditure before production could be resumed. On the other hand, if necessary equipment can be obtained, and if it is possible to operate the mill at say half its former capacity, production could be started in a few months.

For production at 2000 to 2500 tons of milling ore per day, it is assumed that expenditures for machinery and reconstruction, less salvage value at the end of the short operation, would cost about \$500,000, and that mining and milling costs would be about \$2.00 per ton (as against about \$1.25 in 1934). Costs of producing concentrate to be shipped to the smelter at Tacoma are calculated below, based on two assumptions as to available tonnage and grade. It is assumed that the grade of concentrate would be higher than was produced for smelting at Anyox and mill recovery is placed at about 85% as against 89+ % in 1933 and in 1934.

Assumed Grade of Concentrate

Assumed grade in gold and silver is based on the average analyses of a considerable quantity of concentrate - assaying copper 15.59%, gold 0.02 oz. per ton, silver 1.73 oz. per ton. Assumed grade of concentrate, copper 24.75%, gold 0.03 oz. per ton, silver 2.5 oz. per ton.

Costs for Freight and Treatment of Concentrates

Copper content per ton	495 lbs.
Less metal deduction	<u>15</u>
	480 lbs. per ton.

Charges per ton

Treatment	\$6.00 U.S.
Deduction 2½¢ per lb. payable copper	<u>12.00</u>
	\$18.00 U.S.

Credits

Gold 90% of 0.03 oz. @ 35.00		
	oz. .94	
Silver (2.5 oz.-0.5 oz.)		
2 35¢ oz.	<u>.70</u>	
	1.64	
	<u>16.36 U.S.</u>	
Exchange Premium	1.64	\$18.00 Cdn.
Freight Anyox to Tacoma		<u>3.60</u>
Total Freight and Treatment		\$21.60
Equivalent cost per pound of payable copper		<u>4.50¢</u>

Mining & Milling Costs

Assumption A Recoverable ore, 1,000,000 tons average grade 1.15% copper, 19.6 lbs. recovered per ton, or say 19 lbs. of "payable copper" per ton of ore.

	<u>Per Ton</u>	<u>Per Pound of Payable Copper</u>
Mining & Milling	\$2.00	10.526¢
Amortization $\frac{\$500,000}{1,000,000}$	<u>.50</u>	<u>2.631</u>
	\$2.50	13.16¢
Add Freight and Treatment		<u>4.50</u>
Total cost per pound of payable copper		<u>17.66 cents.</u>

Assumption B Recoverable ore 2,000,000 tons, average grade 0.9% copper. Recovered in concentrates 15.25 lbs. per ton of ore, "payable copper" 14.8 lbs. per ton of ore.

<u>Costs</u>	<u>Per Ton of Ore</u>	<u>Per Pound of Payable Copper</u>
Mining and Milling	\$2.00	13.51¢
Amortization $\frac{\$500,000}{2,000,000}$	<u>0.25</u>	<u>1.69¢</u>
Total	\$2.25	15.20¢
Freight and Treatment		<u>4.50</u>
Total cost per pound of payable copper		<u>19.70 cents</u>

Treatment of concentrates to produce blister copper at the Anyox smelter was materially less expensive than would be the cost of shipping concentrate to Tacoma for smelting. The writer does not know whether or not any saving over the estimated cost of 4.50 cents per ton could be made by producing copper matte or blister copper at Anyox. In view of the limited quantity of ore available, the cost of reconditioning the smelter would have an important bearing

on the cost of treatment. If the cost of reconditioning the smelter were not great, it might be profitable to reopen it. The mill could probably make a better recovery in a concentrate of grade somewhat lower than assumed for the foregoing calculations; and a lower grade concentrate would be suitable for smelting at Anyox, since freight on waste would be avoided.

A small saving per ton of ore in the costs for mining, milling and amortization, or a small increase in payable copper per ton, would materially improve the cost per pound of copper, as the payable copper per ton of ore is low.