CONFIDENTIAL

002985 YMIR YANKEE GIRL GOLD MINES LIMITED

A mill, with rated capacity of 100 tons per day, began treating ore from the Yankee Girl Mine in January 1935. The mill is at Ymir, south of Nelson, a short distance from the Great Northern Railway. Concentrates are trammed in a mine car, and loaded in railway cars on the siding.

Ore from the Yankee Girl Mine contained values principally in gold, with some silver, associated with sulphide minerals including galena, sphalerite and pyrite. The mill made a flotation lead concentrate containing most of the lead and about 80 percent of the gold and silver, which was sold to the smelter at Trail. The sulphides remaining in the ore, sphalerite and pyrite, were concentrated in another flotation machine; this concentrate was cyanided to recover gold and silver. The sulphide tailings from the cyanide treatment were stacked.

Company operation of the Yankee Girl Mine ceased at about the end of 1940 with the exhaustion of most of the orebodies. In the last two years, some ore had been produced from the Ymir Dundee property and milled in the Ymir Yankee Girl mill. During the latter part of the operations a considerable part of the ore was mined by lessees and purchased by the company. In the early part of 1941, tailings from the former cyanide operations were re-treated to recover zinc. A zinc concentrate of fair grade was made and was exported to the United States. Later that year some additional ore mined by lessees, was milled using the former "gold flowsheet."

The re-treatment of zinc-bearing cyanide plant tailings has been done with a minimum of rearrangement of the mill. In the present operation the tailings are loosened and flushed into a launder by hydraulicing, then pumped into mill tanks - formerly used in cyaniding - and thence into the flotation machines. The circuit does not permit washing. Consequently cyanide remaining from the former milling, and the oxidation products formed while the material was stored, remain in the pulp and to a degree inhibit flotation of the sphalerite. Material which has not been badly oxidized responds to the treatment but more oxidized material does not permit adequate recovery of sphalerite in a concentrate of marketable grade.

It seems probable that washing the reclaimed tailings and eliminating the wash water before conditioning for flotation would permit treatment of more oxidized material. A light grind followed by washing to permit more complete removal of the zinc depressers would probably make it possible to treat rather badly oxidized material. Mill equipment includes a small tube mill, used in the former cyaniding operations. To permit use of this mill, and to wash following the regrind would probably require one or two small pumps, and say a 3-disk filter, or possibly washing could be done in batches using shallow wooden settling tanks, in place of the filter.

The manager, Mr. L.G. Morrell, told the writer that he had been unable to get pumps for the operation. The quantity of material remaining is not great and total profit to the company would be relatively small. Mr. Morrell kindly supplied information under date May 30th, 1942, as follows:

"Two zinc milling campaigns have been conducted on our stored tailings from the cyanide section of the Yankee Girl mill. The first was January to May inclusive, 1941; and the second is now in progress having started on the 1st of April and expected to run to about the middle of next month (June).

"On Jan. 1st, 1941, the dumps contained about 33,000 tons which had accumulated in the six years 1935 to 40 (inclusive). We retreated 16,118 tons of this in the first campaign which is briefly summarized as follows:

Feed: 16,118.3 tons, averaging Au - 0.07, Zn - 7.04%, Cd - 0.19% plus a little lead and silver.

Conc: 1,668.6 tons, averaging Au - 0.13, Zn - 48.12%, Cd - 1.28%, Pb - 1.6%, and silver - 0.92 Ozs/T. Metal production totals: 221.66 ozs Gold, 1,530.80 ozs Silver, 53,010 lbs Lead, 1,605,954 lbs. Zinc and 42,702 lbs Cadmium.

Tailings carried 2.30% Zinc, 0.06% Cadmium plus most of the gold and silver which went with discarded pyrite.

Payments received were: Gold - $3,518.72, Silver - $207.70, Lead - $1,150.68, Zinc - $88,487.11, Cadmium - $7,678.71. Total production paid for amounted to $101,042.92. Charges totalled $74,228.05: Freight - $11,165.22, Marketing - $712.74, Treatment - $43,671.17, and Duty $18,678.92. Add the monetary premium $3,866.90, and the Net returns amount to $30,681.77

Direct production costs, excavating, milling etc. amounted to $26,087.80. So, the

Gross Profit amounted to $4,593.97 (about 28.5¢ per ton feed.)

"On April 1st of this year the second zinc reclamation campaign was started. Material available was estimated at 8,000 tons accumulated since May '41, plus about 6,000 tons left previously because of its chemical idiosyncracies. I would prefer not to give figures on this present effort for the reason that smelter results for the first month's production are not yet in, and such would be merely guessing to some extent.

We doknow that recent feed grades have been around 10% Zn as against last year's 7%. We know also that the present excavation cost by hydraulicking is considerably cheaper than scraping and breaking frozen muck. Likewise that the price of zinc is up and smelting costs slightly more favorable. Hence my expectation for the present campaign are along lines of a dollar or $1.25 per feed ton profit.

"We anticipate leaving about 6,000 tons untreated because of its oxidized condition. Some of this is bottom, mixed with old vegetation and rubbish and not reclaimable under any circumstances. If our mill provided facilities for a pre-wash, say a light grind followed by thickening and filtering or even a triple filter wash, we might consider trying to reclaim another 4 - 5000 tons. All things considered, the game isn't worhh the prize.

"Freight rates on zinc concentrates, Ymir to Black Eagle, are $5.83 per ton on value $30; $6.36 per ton on value $100. Add 7% to either for prepayment in Canadian funds.

"I trust that the foregoing will serve your purpose. If there are omissions or if I can supply further information, please do not hesitate to call on me."

Mr. Morrell's figures show that the first campaign recovered 96 pounds of zinc, and that the total return (principally from zinc and cadmium) was about $1.84, per ton of tailings re-treated.

It may be assumed that the more oxidized tailings which the company does not propose to treat, contain about the same quantity of metal per ton as the tailings treated in the first campaign. If it should be possible to recover 75 pounds of zinc per ton from treating the more oxidized tailings, and if returns from other metals correspond, sale of the concentrates would yield(75/96 of $1.84) $1.43 per ton of tailings re-treated, under former prices and smelter contract. Prices and contract are more favorable now, so the yield should be a little higher. If 4000 tons of tailings can be re-treated and would yield 75 pounds per ton, 300,000 pounds of zinc in zinc concentrate, as well as some cadmium and some lead would be made available.

The machinery needed would be tied up on this job for a very short period. Installation is a very simple matter. Outside of the charges for installing and using the pumps and filter or settling tanks, the operation should about pay for itself. This source might well provide 300,000 pounds of zinc at a cost not greatly above the present price; probably remission of the United States duty would be adequate to cover the cost of production.

Vancouver, B.C.
June 4, 1942.

H. Sargent
Mining Engineer.