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INTER OFFICE CORRESPONDENCE January 20, 1980

ATTENTION OF: J.C. Stephen

SUBJECT: Production costs of the Queen Mine based on the Gold Belt Operation

FROM: J. Shearer

A tour of the Gold Belt operation, Sheep Creek, was made on January 14, 1980. Discussions with Bill Brown, Mine Manager, and Floyd Fleming, Mine Superintendent, emphasized mining cost and methods. Future production with a small cyanide mill has been studied by Gold Belt and they are presently defining enough ore reserves to justify the capital expense of such a mill. Geological studies are being done by D. Cannon, consultant, and C.E. Gordon Brown who visits the mine every two weeks. Gordon Brown has extensive experience in mining narrow gold bearing quartz veins. Smelting charges by Trail, even without penalties for minor elements is about $60.00 per ton. Adding mining and transportation cost indicates a break even grade of more than $100.00 per ton. This is not an attractive proposition for the Gold Belt or with possible production from the Queen Mine. A stockpile of about 3,000 tons @ 0.3 oz per ton has been dumped outside the 1850 portal.

In the Gold Belt, present ore reserves increase in elevation toward the north but the service adits are located at the south boundary. This is opposite to the Queen where future ore zones are progressively deeper to the south but the only shaft is in the north.

At Gold Belt, access is provided by a large crosscut (1850 level). The old millsite was situated near the 2100 level portal

but this level is not used in the present operations. Work force totals 17 men and a second shift is planned to start in the near future. To date approximately $1,200,000.00 has been spent largely rehabilitating the old workings and limited new development headings. This work is costing about $50,000.00 per month. A major benefit is a stable work force mainly from the former Remac and HB mines, who live in nearby Salmo. Serious work on the Gold Belt started in 1978. Some initial funding came from the Excelerated Mineral Development Program.

The search for new ore reserves at the Gold Belt is presently confined to three levels: 1850, 1400 and 1100. Several veins were seen on the 1850 level notably 2360 vein, 2590 vein and 3040 vein. A raise to test for ore grade material in the 3040 vein above 1850 level is scheduled to start shortly. No work is apparently being done on the 8000 and 8200 veins (refer to Mathews 1953 Figure 6). The intersection of the 1850 cross cut and the 2360 vein is shown on Figure 2 (Mathews 1953) as being to the east of the axial plane in the Western Anticline. This is opposite to information from Mr. Brown.

An irregular shaft equipped with an air hoist connects 1850 level with 1400 level (450 feet above). A potential bottle neck may occur in the future due to the narrow 40 inch space hetween guides in this shaft. On the 1400 level, several old stopes were viewed that had been developed in the 3500 and 3040 veins. The 3500 vein is thought to be an extention of the Motherlode vein which was productive in the Eastern Anticline (refer to Figure 5, Mathews 1953). Some ore has been blocked out and more raises are planned.

A shaft connects the 1400 level up to 1100 level and beyond 600 level to surface providing good natural ventilation. Air flow reverses in the spring and fall. No hoist has been installed in this shaft although one is planned. All workers must climb from the 1400 level to 1100 level. Veins examined on the 1100 level were the 3500, 3900, 4600, 4800 and 4900.

Ore has been outlined in the 3500 vein (refer to Figure 5, Mathews 1953) with the 1135 raise and sampling has been done in both 1400 and 1100 levels in the west limb of the Western Anticline for a 3 foot m mining width as follows:

| | |
|---|---|
| 1400 level | 46 feet long @ 1.25 oz Au per ton |
| 1100 level | 128 feet long @ 1.19 oz Au per ton |

An old stope on the 3900 vein is presently being filled with waste from the 1145 drift to save the long haul down to surface.

Major exploration potential for substantial tonnage is hoped for in the 4600 or 4800 veins. Either one could be the extention of productive Nugget vein on the Eastern Anticline in the Upper Nugget member (refer to Figure 4, Mathews 1953). Drifting is presently in progress. The 4900 vein is apparently a large barren vein although sampling is not complete.

The following items relate to costs at the Gold Belt, Dankoe and Beaverdell (Teck) operations.

(A) GOLD BELT

(1) Air Supply - 900 Garnder Denver with back up 750 Holman just enough for 5000 feet of workings.

(2) Power line from HB Mine to Gold Belt was quoted in 1978 at $140,000, now 1980, more likely $200,000.

(3) Shrinkage stopes, 3 foot minimum, old production thought to have excessive dilntion (0.31 oz per ton average) to feed 200 ton per day mill.

(4) Development costs approximately $102.00 per foot total, $800.00 per ton for rail, ties ½% grade, track laying 100' to 120' per day. 4" Airline - $2.00 per foot, couplings extra.

(5) Mucking machines - $34,000.00 new, many used still available at around $5,000.00, Hard rock, 6" per bit per sharpening, 6 sharpenings per bit., Jack leg drills.

(6) Labour - $130.00 per day for muck, drill and blast, 2 men in drift. $96.00 per day standby, pay for climbing.

(B) BEAVERDELL (Teck)

(1) Development costs approximately $250.00 per foot total

(2) Mining and milling costs - $50.00 per ton.

(3) Rail more like $900.00 per ton.

(C) DANKOE

(1) Alimak raise - $148.00 per foot direct costs only, $7,350.00 per month rental plus shipping (approximately $4,000.00 return). Cost of Alimak new: $150,000.00 to 175,000.00. Contract raise: lowest price $150.00 to $200.00 per foot, without problems.

(2) Development work (1700 level) $61.00 per foot direct costs 4000 feet long. (1978)

(3) Milling and Mining - $60.00 per ton direct costs, 5 foot mining width, ore won't run, needs slusher.

At the Gold Belt and Queen Mines the veins are steep enough so that ore will move by gravity. Bill Brown suggests that about 40,000 tons of ore (presumably about 0.35 oz per ton) is needed as proven ore reserves before a 100 ton per day mill can be purchased which would cost in the neighborhood of 2 million dollars.

Assuming 7,000 feet of development work (@ $102.00 per foot) plus a mining and milling cost of $100.00 per ton, then direct costs to produce 40,000 tons of ore would be $4,714,000.00. Revenues from this $40,000 tons at 0.35 oz Au per ton with 98% recovery and an average gold price at $450.00 per ounce is $6,174,000.00. A mining break even gold price would be $343.60. Considering that the mill and power are about 2.5 million dollars then 40,000 tons is not sufficient to retire the capital expense. A larger ore reserve is needed or higher gold price.

The price of gold on the L.M.E. on January 18, 1980 was $835.00 per ounce U.S. An average gold price in 1980 of around 500 dollars U.S. seems likely.

Problems particular to the Queen Mine are:

(1) Ventilation south of 44 vein, a new decline or shaft will likely have to be sunk.

(2) Pumping out the 50,000,000 gallons of water estimated at greater than $200,000.00.

(3) Presence or absence of track in the old workings. If track has been removed the cost of rehabilitating the workings would be dramatically higher.

In the Queen Mine, undeveloped blocks of ore remanents, as known in 1950, total about 13,720 ounces of gold. Development, mining/milling and capital expenditures on a scale similar to Gold Belt assuming that pumping out the Queen is broadly comparible to rehabilitating Gold Belt (hoping that the track is still intact in the Queen) then an average gold price of $550.00 per ounce is needed to reasonably expect to break even. (refer to December 16, 1979 report by J. Shearer) Of course, a major consideration would be the likelyhood of finding a rich vein south of the 44 vein.

A key to the Gold Belt approach is to start out on a small scale until sufficient ore reserves are in sight.

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