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BIG LEDGE EXTENSION

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INDEX

REPORT SECTIONS

EXHIBITS

DRAWINGS

REFERENCES

Minister of Mines Report for B. C. - 1964. (included)

Geological Survey Canada - Memoir 296 - Vernon Map Area - A. G. Jones. (not included)

Geological Survey Canada. Summary Report 1928 - Part A, Big Ledge Property - C. E. Cairnes & H. C. Gunning. (not included)

BIG LEDGE EXTENSION

SUMMARY

Exploration possibilities on the Big Ledge Extension under option to Northwest 66 focus on the down dip extension of three separate ore bodies in which near surface drilling has proven the presence of major tonnage of medium grade zinc. Economics of mining deposits of this same grade at depth indicate a $3\frac{1}{2}$ year cash return of total cash investment in exploration, mine, mill, and working capital. With general geology favouring the presence of very large tonnage and the principal risk resting on persistance of surface grade to depth, the Big Ledge Extension presents an attractive exploration bet.

I recommend that the proposed program of offset drilling be undertaken to establish the grade and tonnage down dip from each of the three known ore zones.

PROPERTY AND BACKGROUND

The property lies approximately three miles west of the west shore of Upper Arrow Lake in the West Kootenay district of Southeastern British Columbia. The town of Nakusp the terminus of a C.P.R. spur line is located 20 miles to the south, with Revelstoke a divisional point on the C.P.R. main transcontinental line situated 25 miles to the north.

There are 62 claims in two groups which are held by the joint prospecting syndicate Northwest 66, under purchase option from Messrs. Fowler, Cusick, and Fowler, the stakers of the property. The prime group of claims Van 1-50 was staked and recorded by the optionors from June 14th, 1965 - July 26th, 1965 and covers a rectangular area approximately one mile wide by three miles long lying immediately south of a double row of crown granted mineral claims covering the surface outcrop of the ore zone.

These crown granted claims were acquired in 1948 by Consolidated Mining & Smelting Company of Canada from Mr. ~~S. S.~~ A E Fowler, father of two of the present optionors. Prior to 1948 Mr. ~~S. S.~~ A E Fowler had explored the deposit by numerous rock trenches and short tunnels and by 16 short diamond drill holes. Most of this work was done on the outcrops in the footwall part of the mineralization.

From 1943 to 1953 Consolidated Mining & Smelting Company re-sampled the surface outcrops and drilled a total of 13,000 feet in a series of holes spaced at 500 foot intervals along the strike of the orebody from Upper Arrow Lake to Empress Lake, a distance of six miles. The majority of these holes were spotted in the hanging wall

less than 100 feet south of the surface outcrop of the orebody and were drilled an average distance of 400 feet through the true width of the mineralized zone. On the Central Camp orebody a second row of holes was drilled 500 feet south of the outcrop and one deeper diamond drill hole intersected the mineralization at 1500 feet down dip from the outcrop.

From 1953 through 1963 no work was done on the property. It is notable that this 10-year interval followed immediately the period of major exploration discovery by Consolidated which resulted in sizeable orebodies being proven up at Bluebell, H.B., Pine Point, and Duncan. All four of these orebodies contain combined lead-zinc values, more suitable for concentrate feed to the combined lead-zinc smelter lines at Trail than Big Ledge with only zinc.

In 1964 Consolideted resumed work on their crown granted mineral claims on the Big Ledge and a total of 5,000 feet of drilling was done along the outcrop of the orebody to the west of Empress Lake. A similar program was maintained in 1965 and it is understood that underground tunneling and further drilling is intended in 1966.

Resulting from this work three higher grade orebodies have been indicated within the general low grade horizon. At Empress Lake a deposit 200 feet thick has been tested by short holes over a length of 2,000 feet and contains more than 10,000,000 tons of 7% zinc.

The Central Camp orebody is 150 feet thick and has been tested by a number of holes down dip for a dip length of 1,500 feet. It contains approximately 70,000,000 tons of 4% zinc, 12% iron, 14% sulphur with small percentages of silver, lead and barite.

The Sunshine Camp deposit is intersected by two near-surface holes and shows slightly better lead values with 4% zinc.

This information is based upon supervision of this work as remembered, on published geological reports, and on conversation with government geologists acquainted with the deposit.

GEOLOGY AND MINERALOGY

The Big Ledge is a very large pyrrhotite sphalerite replacement of limestone and schist on a drag fold, on the limb of an immense recumbent isoclinal fold in Shuswap rocks. The age of the Shuswap series is controversial but the Geological Survey of Canada - Memoir 296 - Vernon Map area by A. G. Jones provides strong evidence that it is early precambrian or archean, probably equivalent to the Grenville series of Eastern Canada.

The series is at least 50,000 feet thick and is folded into a succession of recumbent isoclinal folds with horizontal axes or shallow plunging axes showing widespread horizontal thrusting movement. Other folds are clearly superimposed on the recumbent type.

EXPLORATION POSSIBILITIES

The main exploration bet on the group lies in testing the extension down dip from the three known ore bodies. These three ore zones have been reasonably well defined through past drilling on the outcrop by Consolidated Mining & Smelting.

Since the deposits on Northwest 66 ground lie deeply buried, geochemical survey work from surface is of little use in locating the zones of higher grade mineralization.

Similarly, geophysical surveys offer at best inconclusive result. Magnetic and induced polarization surveys have application in locating sulfides but neither will show the areas of higher zinc grade since sphalerite is non-magnetic and non-conductive. Rather it is proposed that diamond drilling be undertaken directly as the first step in testing the down dip extension.

Certainly there is risk presented to this since the limited ground work done todate has established only in general way the downward rake of the three known ore zones. Nonetheless, this risk will be minimized through loeating the diamond drill holes as close to the known ore bodies as property lines permit. This is to say immediately south of the Consolidated property boundary and on the Northwest 66 ground.

As a first stage one such offset hole would be drilled to intersect the downward dip of each of the three ore zones. The proposed collar location of each of these holes is shown in the plan accompanying this report and all the holes would be drilled vertically. Since surface dips between the location of these holes and the outcrop of the ore zone vary between 15 and 45 degrees the drilling plan assumes the worst in the sense of the ore zone dipping at 45 degrees. On this basis drill intersection of this zone from the proposed locations will be made 2,000 feet below the surface and with three such holes Stage One of the exploration program calls for 6,000 feet of diamond drilling.

Stage Two requires a total of 12,000 feet in six holes to be located in two groups of three holes each as offsets around two of the three holes drilled during the first stage which show most favourable results. In this way exploration activity will focus on only two of the known zones during Stage Two.

In Stage Three this will be restricted further to the one zone showing most promise. This decision will be based on the four hole intersection on two of the zones from Stage Two, and with the 500 foot offset spacing of these holes the factual basis leading to this decision will be strong. Indeed, the 24,000 feet of drilling called for in twelve holes in Stage Three is required more for final ore determination and mine planning than it is for exploration purposes in the sense of

establishing the existence of an ore body. Evidence of this would be provided by Stage Two drilling or the decision to enter Stage Three would not be made.

It should be noted that all 21 holes proposed in the exploration program are considered to be 2,000 feet in length. This assumes the steepest dip now indicated by surface structure on the outcrop, namely 45°. Nonetheless, with the dip variable it is reasonable to expect a portion of these holes to intersect the ore zone at shallower depth. To the extent that this occurs the total drill footage and exploration cost incurred will be reduced substantially for the same area of coverage. It would be imprudent, however, to count on this through budgeting on a lesser drilling program than that proposed.

EXPLORATION BUDGET

Discussions with two of the three established drill contractors operating in British Columbia have led to their formal drilling bids on each of the three exploration stages. Total set up, move, camp, and drilling cost varies from $8.75/ft. for the 6,000 feet called for in Stage One to $8.00/ft. for the 24,000 feet required in Stage Three. Fixed cost of drill set up and moving are based on the assumption that the three stages would be enterred into in three successive summer seasons. If condensed then the fixed cost of establishing drill operations similarly would be reduced. The drill labour element in these costs has been increased by 5%/yr. in each of the second and third years to reflect increasing union activity in the diamond drilling trade seen in this Province. As a result, total drilling costs are as shown in the proposed exploration budget in the exhibit accompanying this report.

Assay costs are based on assays run for all minerals contained in split cores on 10 foot sections from drill intersection of the ore zones. Sufficient recording costs are included to record all of the drill work against the claim group for purposes of assessment. Provision is made for purchase of surveying equipment to survey in diamond drill holes, also for a 4-wheel drive vehicle for camp service during Stage Three. In this sense drill moves during Stage Three will be more economically made by driving tractor roads to the drill zones. Estimated cost of this contract roadwork is included.

Service of a senior exploration engineer is called for throughout the time when drilling is in progress and for a further period of one month each year for the purpose of thoroughly evaluating results from the exploration stage then completed. Provision is also made for a core splitter helper and in Stage Three for a junior engineer to assist in drill supervision and core logging. Adequate food and transportation costs have been included in the budget to permit this engineering personnel to do their job.

On the administration part of the budget, part time costs of a business manager are included. This is considered necessary to administer this project through this critical formative period and to assure value and sound business practise in following through on the major exploration expenditure which is proposed. Legal and accounting consultants are included for this same reason, as are their expected fees. Clerical and general office expenses have been budgeted at a level sufficient to permit the part time work of the business manager and senior engineer.

Finally, payments due on the underlying option with Messrs. Fowler, Cusick & Fowler have been included under the assumption that Stages One, Two, and Three are enterred upon respectively during 1966, 67, and 68. As a consequence the exploration budget calls for expenditure of $100,000; $175,000; and $300,000 for these same respective stages, or a total of $575,000 for the complete program. Of this $527,300 or 92% relates directly to field work.

ECONOMICS

As described in the section on geology the dip of surface structure becomes progressively less when advancing south. With the entire middle limb of Fosthall Mountain showing marked structural uniformity it is a reasonable geological assumption to expect the subsurface dip of the ore zone also to reflect this progressive flattening. In the proposed drilling area on Northwest 66 ground south from the ore zone at Central Camp, the average dip of surface outcrops is 24° and based on the assumed persistence of surface to subsurface attitude in this bedded structure the dip of the ore zone in this area also is expected to be 24°.

Again based on the pronounced regularity of this bedded structure as traced by drill holes, adits, and outcrops over a horizontal distance of 18,000 feet and from elevation 1,500 feet to elevation 7,500 feet, it is reasonable to look for marked uniformity in size and shape of the ore extensions down dip from the known zones. At Central Camp the ore zone is 150 feet thick, 3,000 feet long and does not change appreciably in grade or thickness when intersected at 1,500 feet down dip from the outcrop by the deepest hole so far drilled.

In view of this regularity and for purposes of preliminary economic study it is assumed that this same thickness of 150 feet persists further down dip for a dip length of at least 2,000 feet. At the expected angle of repose of 24° this 2,000 foot continuity corresponds to vertical continuity of 800 feet. This may be compared with the vertical continuity of the whole structure which has been proven to extend over a vertical distance of 6,000 feet, from elevation 1,500 feet to elevation 7,500 feet.

No plunge factor not considered.

For similar reasons of continuity the horizontal width of the ore block is assumed to average 2,000 feet. This compares with a width of 3,000 feet on the known ore zone at Central Camp. Further, this assumed width of 2,000 feet bears comparison with the marked regularity of the entire ore bearing middle limb which has been traced over a horizontal distance of 18,000 feet.

Certainly there is question on basing this approximation on the Central Camp ore zone as opposed to the Empress Lake zone. The reason for this approach is that Central Camp presents a grade of 4% Z_n as opposed to 7% Z_n on the Empress Lake ore zone. The economic thought is that if mining is feasible on the 4% Z_n down dip extension from Central Camp it will be substantially more attractive on the down dip extension of the higher grade Empress Lake zone.

This conservative approach is rendered doubly conservative by purposely failing to credit bi-product values that reasonably can be expected in the down dip extension of the Central Camp zone. In particular, the 12% F_e and 14% S values in the Central Camp ore may well present business opportunity for successful iron sinter and sulphuric acid plant operations. Nonetheless, the economic proposition rests on whether an ore body 2,000 x 2,000 x 150 feet thick averaging 4% Z_n is commercial.

OPERATING RATE

The general viewpoint on future zinc sales is that zinc is one of the four major non-ferrous metals and as a consequence of compounding growth in population coupled with mounting levels of industrialization throughout the World that healthy long term expansion in zinc demand is inevitable. Conversely, supply sources to meet this increasing demand are seen as limited by the restricted investment climate presented by socialistic and nationalistic political trends in many countries. This applies to most of Africa, South America, Central America, and Asia and severely limits investment in mine exploration as well as mine development. In brief, the demand for zinc is mounting and the opportunity for Canada to supply the principal part of this added demand awaits but the doing.

Inductively this conclusion is seen even now in expanded Canadian production of zinc at the Mattagami, Newcastle, East Kootenay, and Pine Point camps.

Certainly there is the point that considerations in the short term may delay for several years the time in which a starting position can be obtained in this expanding long term market. In this event total exploration investment of $575,000 would lie dormant for that period and interest cost could be thought as accruing at approximately $35,000/year for that time. Such an interest cost,

however, is quite secondary compared with the investment and profit magnitudes that successful conclusion of this exploration opportunity will yield, and therefore is ignored in this study.

In view of the healthy long term picture for zinc the question of start up rate of production really rests on engineering considerations involved in balancing out equipment capacities. Appraisal of alternatives here indicates a rate of 5,000 TPD as the logical first step.

MINING

As established earlier in this report the expected average dip of the extension of the Central Camp ore zone on Northwest 66 ground is 24°. Accordingly, the mining problem is to design an efficient extraction system for an ore body 2,000 x 2,000 x 150 feet thick lying at this angle of repose. This geometry is very close to that encountered on Gaspé Copper and since the mining method there represents one of the most envisioned underground designs seen recently in Canada, a system very similar is proposed on the Big Ledge Extension.

This features trackless mining with a room and pillar system using high volume, high productivity equipment. Development units consist of rubber tired jumbos each mounting 4 hydraulically controlled heavy duty drills, crawler mounted 2-yard mucking machines, deisel powered low bed bottom dump trucks, and truck mounted hydraulic "cherry picker" booms for roof bolting and powder loading. Low voltage electrical service would be supplied to portable and electrically driven turbo-type compressors in each of the two development headings.

Production will be achieved by successively slabbing off 40 foot benches down from a 30 foot first cut driven by the development crew. There will be three such bench cuts which with the overhead cut total 150 feet, the thickness of the ore body. Room area is based on 40 x 150 feet with 50 foot wide pillars between the rooms. Benches would be shot from holes drilled by a crawler mounted "oversize" drill, with loading of muck by an electrically powered 2½-yard low boom shovel. Intermediate conveyance is based on 35 ton high bed deisel powered dump trucks equipped with exhaust scrubbers and oil cooled disc brakes. Again, one portable turbo compressor would accompany each production crew and both low and high voltage electrical service would be provided for the compressor and shovel respectively.

Balanced operation to produce 5,000 TPD requires two development units so equipped, and three production units. On production, the high bed trucks would be used on a three-shift per day basis to haul ore on successive shifts from each of the production stopes. This permits drilling and shooting of benches in these rooms on the two non-production shifts. Much as round-the-clock service would be obtained from the trucks, limited mobility of the shovels requires one such unit in each room and in this way loading capacity will be 7,500 TPD, 50% more than that required.

Truck haulage is through 20 x 20 roadways driven in switch-back manner across the orebody to maintain 10% grade. Trucks would run loaded down this grade to a dump pocket located centrally in the foot-wall, and then return unloaded up grade to the production room being worked during that shift.

From the dump pocket the muck will drop to a 65 inch gyratory crusher and then to two short head cone crushers thereby knocking ore size to 1/2 - 1/4 inch. Mainline haulage is by 30 inch rubber conveyor belt mounted to one side of the floor of the 7,500 foot horizontal 25 x 20 main entry adit leading to the mill plant on surface. Double door air locks on this entry will maintain positive pressure throughout the mine from fan induced draft situated in trunk entry adjoining the portal of this main entry adit. Exhaust from production rooms will be carried up 5 x 7 ventilation raises driven in the back and end of each room, then across a horizontal 6 x 6 ventilation drift, and up a 10 x 10 ventilation shaft to surface. Hydraulically powered doors mounted in this ventilation drift and operated remotely from the production level will permit concentrating ventilation flow on the room just shot, thereby permitting low cost ammonium nitrate prills in production breaking.

Personnel escapeway from the mine area will be provided in the ventilation raises, drifts and shaft.

Individual pieces of equipment have been priced out with suppliers and are listed in detail in the exhibits accompanying this report. Suppliers have been chosen on the basis of their producing the most reliable units now available for the particular mining function required. This "cadillac" approach results in overstatement of capital cost for the sake of certainty of productivity result and so mine operating cost. This protection is carried one step further by purposely calling for a larger mine crew than that required for balanced operation at 5,000 TPD. Breakdown of the underground crew totalling 101 men also is shown in the exhibits accompanying this report. Similarly, the detail of the labour and supply costs for each of the mining functions is listed together with the estimated total operating cost of mining of $1.44/T of ore produced.

MILLING

Mill construction and operating costs have been taken from the detail engineering done four years ago on the Bethlehem Copper mill. This plant was designed for operation at 5,000 TPD and has given sound cost and recovery since start up.

Acceptance of this design is based on the premise that ore characteristics are very similar between the two properties. The Bethlehem copper ore is contained in a quartz diorite gangue whereas the Big Ledge Extension ore consists of disseminated pyrrhotite and

sphalerite in a biotite and graphitic gneiss and limestone. If anything the Bethlehem ore should be harder to crush than that of the Big Ledge Extension. Nonetheless, the larger crushing capacity in the Bethlehem design has been accepted as has the higher operating and capital cost inherent in this excess capacity.

Grinding necessary to liberate mineral bearing sulfides at Bethlehem is 60-70% minus 200 mesh and close visual comparison of ore specimens from the two properties indicates fineness of sulfide particle size is very similar. For this reason similar grinding capacity and operating cost of grinding has been used.

On flotation the Bethlehem copper ore at 0.9% Cu is approximately 1/5th as concentrated as ore containing 1% Zn at the Big Ledge Extension. Conversation with experienced metallurgical engineers leads to the conclusion that installation of another bank of flotation cells will provide more than enough added capacity to make up for this difference and this has been included in both capital and operating cost. On flotation reagents the Bethlehem mill design calls for the use of relatively expensive xanthates. If anything the point that these are required at the Big Ledge Extension remains to be proven, which is to say that unit cost of flotation could well be lower than that estimated in this study.

On this basis milling cost at a rate of 5,000 TPD at the Big Ledge Extension is estimated as $0.82/T. This includes $0.02/T for operation of the 7,500 foot conveyor belt from the underground crusher location to the surface plant, which in turn corresponds to industry experience for a near horizontal haul of this length using a 30 inch belt. Similarly, the total equipment and installation cost of this belt at $33/ft. as verified by two established suppliers, has been included in the capital cost of the mill. Excavation cost of $48,000 for the underground crusher station also has been included in estimated capital cost of the mill.

On the remaining mill equipment and installation costs, the 1961 detail estimates for Bethlehem have been used. These proved to be slightly above actual costs incurred in that mill and to reflect inflationary increase in costs e factor of 20% has been used to bring these estimates up to a 1965 base. In this way total capital cost of building and equipping the proposed mill is estimated at $4,641,000.

PLANT SERVICES

Tailing disposal area is favourably located in the valley of Fosthall Creek upstream from the proposed mill site. Through daming off this creek with a tailing dam 150 feet high, more than 300 million tons of tailing can be placed in this area. Capital cost estimates include running a 500 foot concrete pipe and water bypass line with decant risers up this creek. Stave pipe has been assumed for tailing

movement from the mill. Two barge mounted electric pumps have been included to syphon off rapid water accumulation on the tailing pond in case of flash flood through heavy rain or rapid spring run off. Standby deisel power units have been provided for these pumps.

Mill water feed moves by pumps mounted at the lower end of the decant line to a holding pond and then by gravity to the mill. Fosthall Creek flow is more than sufficient for mill water feed requirement.

Concentrate movement will be by bottom dump truck down the five mile distance from the mill to Upper Arrow Lake. Discharge will be to boom style conveyor loader mounted on the shore, and so to open gondola rail cars carried on a barge. Year round open water on Upper Arrow Lake permits barge movement to both Arrowhead and Nakusp, the terminus of separate C.P.R. spurs at either end of Upper Arrow Lake. Tug and barge service will be contracted.

Electric power will be supplied from the mainline transmission now serving Nakusp. Principal construction cost of the twenty mile line north to the mine will be forthcoming from higher initial power rates that have been included in the operating cost estimate. In addition, $280,000 has been provided to cover electrical transformer, distribution, and control equipment situated at, and owned by the mine.

A townsite located at the mine is not considered necessary since adequate housing in established communities already exists at Revelstoke, Arrowhead, and Nakusp, each within easy daily driving from the property. However, the capital cost of five company owned houses has been included to provide inducement in securing the services of competent men for senior operating management.

Cost of improving and extending road service on the west shore of Upper Arrow Lake has been assumed to be the responsibility of the Provincial Government since prime use will be by mine employees and loggers. However, $220,000 is included to cover improvement of roads already existing on the mine property. Finally, adequate office, warehouse, and maintenance buildings have been included in the capital cost estimate.

The amount of $1,250,000 also has been added to total capital cost to cover a three month period of plant start up and circuit buildup. This is a cash investment cost whereas further working capital required to support concentrate in transit will come from bank loans through assignment of eventual concentrate receipts. This further working capital therefore lies outside of required cash investment.

Principal operating costs of maintaining general services at the mine involve salary payment to the senior management and administrative personnel, all of whom are listed in the detailed labour schedule at the end of this report. Together with miscellaneous overhead supplies total mine general cost is estimated at $0.25/T.

OPERATING REVENUE

At 5,000 TPD operation annual zinc production from the Big Ledge Extension amounts to 60,000 short tons per year which is equal to approximately 6% of annual U.S. zinc smelter capacity. Much as this percentage figure is small the point remains that relative to the capacity of given smelters, the annual concentrate volume from the Big Ledge Extension is large. As a result, it is a near certainty that cost of converting concentrate to slab zinc will be based on negotiated smelter price rather than standard smelter schedules, designed as they are for sporatic and small volume shippers of zinc concentrate.

In this sense the succession of major deduction and minor clippings contained by such schedules is expected to bear little relationship to the smelter contract eventually concluded for conversion of concentrate from the Big Ledge Extension.

In negotiating this smelter contract it further is reasonable to expect the bargaining strength to lie with the mine. The underlying supply-demand argument leading to this conclusion was spelled out in the section dealing with Economics. It knows further support in the following three ways: (1) movement of Canadian zinc concentrates to smelters in the U.S. Northwest has accelerated sharply in the past two years; (2) supplies from Mexico to smelters in the U.S. Southwest have declined and are expected to dry up completely when Mexican owned smelting capacity comes on stream in the next several years; (3) both situations are recognized in recent repeal by Congress of the U.S. quota system on imports of foreign zinc.

As a consequence of this mounting inadequacy in U.S. supply of zinc concentrates it is expected that the bargaining basis for conversion negotiations will be the cost of building smelter capacity at the Big Ledge Extension vs. the cost of throttling back the production on one or other plants in the U.S. In this light demand for assorted smelter tolls contained in standard schedules should disappear rapidly in negotiations.

While this is the expected approach in negotiating for smelter conversion, it remains for purposes of this study to define a smelter cost that will not be exceeded by this future contract. Looking at the open schedule for zinc concentrates at the nearest smelter located in Trail, B. C., again the point is clear that terms are stiff and mine returns minimal. Nonetheless, this is a basis that presently can be defined and for the reasons just expressed is unlikely to be exceeded by contract for major concentrate conversion in the future.

On price, the American East St. Louis quotations for slab zinc has varied from 10.5 to 14.5¢ (U.S.) per pound since 1960. This six-year interval has seen two periods of depressed price, and corresponds roughly to the three-year frequency of "economic corrections," in the U.S. economy. It is expected that this aspect of the U.S. economy will continue and as a result that average zinc price over this six-year period generally is representative of what can be expected in the future; this is to say a price of 12.4¢ (U.S.) which is the daily weighted average of the East St. Louis price as quoted in the Engineering & Mining Journal.

Translating this to Canadian currency at a discount rate of 8% results in a price of 13.4¢ (Cdn.). Again, it is expected that exchange discount on Canadian currency will continue in similar amount. In a political sense this is an expedient way for the Federal Government to promote raw material development in Canada while avoiding the issue of ever-increasing wage demands by labour.

Based on this price of 13.4¢/lb. and the expected concentrate grade of 56% Zn, the Trail smelter schedule will yield a mine return of $82.80/T. of concentrate delivered. This is equivalent to net revenue of $5.32/T. of ore mined.

RETURN ON INVESTMENT

Total operating cost of $2.51/T. when subtracted from net revenue of $5.32/T. results in net operating profit of $2.81/T. At the planned rate of 5,000 TPD this is equivalent to operating profit of $4,920,000/yr. Dividing this into total cash investment in exploration, mine, mill, and working capital of $16,324,000 results in a 3.32 year cash return of total cash investment.

The point that net operating profit over this time is synonomous with cash profit, is supported by the three-year tax free period plus cumulative depreciation on plant investment thereafter. This combines to shield operating profit from income tax through at least the fourth year of production.

CONCLUSION

The detail of this report has addressed the two basic questions facing pursuit of mining opportunity on the Big Ledge Extension. What is the nature of the exploration risk? What is the investment payoff if exploration is successful?

On the first, the exploration risk is an offset drilling risk on three separate and known ore bodies. Local conditions of structural geology are particularly uniform compared with those usually encountered in British Columbia. Conversely, very little is known about persistence of grade with depth and the principal risk rests on this point. Even so the offset drilling nature of the exploration bet, and on three separate ore bodies, substantially reduces the impact of this "mineralogical" risk. Said differently, overall exploration risk while real is much less than that presented on an attractive but as yet untested new property.

Economic appraisal leads to the conclusion that if the exploration program is successful then a 3-1/2 year cash return can be expected on total cash investment. Assumed grade of 4% Zn is the lowest encountered so far on the three known ore bodies. Total plant investment has been estimated liberally as has the total operating cost. Use of standard schedule for smelter conversion further reduces estimated cash operating profit. Collectively this approach should result in understatement of estimated cash return.

Further understatement is indicated by the estimated operating rate vs. the projected magnitude of the ore reserve. The basis used implies a 50-year reserve life. Knocking this back to twenty years through stepping up mine production will leverage further the cash return on total cash investment. If exploration proves that the reserve is there, surely mounting metal demand in the long term will present the opportunity to expand mine production, thereby realizing even higher return on incremental investment necessary to increase mine production beyond 5,000 TPD.

RECOMMENDATION

Since exploration risk on the extension drilling is low, and possible return from mine investment is high, I recommend that the proposed exploration program be undertaken on the Big Ledge Extension.

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