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REPORT
on
SILVER STAR MINES LTD.
SCRANTON MINE PROJECT
AINSWORTH, BRITISH COLUMBIA

by

J.J. CROWHURST, B.A.Sc., P.Eng.

W.R. BACON, Ph.D., P.Eng.

Vancouver, B.C.

January 8th, 1970

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BACON & CROWHURST LTD.
CONSULTING ENGINEERS

January 8th, 1970.

Rolling Hills Copper Mines Ltd. (N.P.L.),
1758 West 8th Ave.,
Vancouver, 9, B.C.

Attention: Mr. R.C. Campbell, President

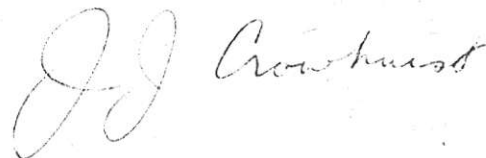
Dear Sir:

Pursuant to your recent request, we are pleased to submit herewith a preliminary report concerning an approximate economic evaluation of the Silver Star-Scranton Mine Project, Ainsworth, B.C., together with our recommendations regarding future exploration work.

This report is as complete and accurate as present sources of information coupled with the application of sound engineering principles will allow. Its preparation has been based largely on a one-day visit by Dr. W.R. Bacon, P.Eng., and J.J. Crowhurst, P.Eng., to the property and a study of the basic data contained in reports written by W.M. Sharp, P.Eng., Geological Consultant, during 1969.

Yours truly,

BACON & CROWHURST LTD.



J.J. Crowhurst, P.Eng.

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TERMS OF REFERENCE & ACKNOWLEDGEMENTS

In early December 1969 Bacon & Crowhurst Ltd. were requested by Mr. R.C. Campbell, President of Rolling Hills Copper Mines Ltd., to proceed with a one-day examination of the Silver Star-Scranton mine property, to be followed by the preparation of this report.

At subsequent meetings it was agreed that Bacon & Crowhurst Ltd. would accept, without check, the basic data submitted in Mr. W.M. Sharp's 1969 reports, and would confine this report to a preliminary economic analysis together with the submission of future exploration possibilities.

In particular, reference is made to Report 69-1 and Report 69-2 "Exploration-Development Program, Silver Star-Scranton Mine Project" dated February 1969, and November 5th, 1969, respectively, both written by Mr. Sharp for Silver Star Mines Ltd.

Attention is drawn to the sections in Report 69-1 entitled "Property", "Location, Access & Workings", "Mining & Milling Facilities", "General History", "Summary of Mine Production 1892-1954", "General Geology-Mineralogy", "Principal Vein Intervals" and "Estimated Ore Reserves".

These sections comprise a well-written comprehensive summary concerning the property. This information, for the sake of brevity, is not repeated herewith but it is suggested this be studied in conjunction with this report.

SCOPE OF THE REPORT

This report considers the following:

(1) RATE OF PRODUCTION

It is anticipated for the purposes of this report that the Blue Star concentrator will treat an average of 2496 tons of ore per month, operating on a 24 hour per day, 5 day per week basis and that the concentration toll charge now in effect as per the agreement between Blue Star Mines and Silver Star Mines will remain as is.

It would appear that mine development and ore stockpiling have not progressed far enough to support such a daily rate; hence this assumption is predicated on either an intervening concentrator shut-down period, during which the necessary underground preparation would be completed; also metallurgical and other investigations would be carried out, or an accelerated corresponding program.

(2) ORE SUPPLY

Using as much up-to-date information as is now available, the current estimated mineable ore reserves appear to be capable of supporting production at the assumed rate for approximately twelve months.

It is suggested that sufficient exploration work should be carried out prior to or during this production period to outline further mineable ore reserves, and that additional sources of ore supply will therefore result.

It will be noted that in the Sunset section of the property, which has been subjected to the most recent successful exploration work, about 20% of the vein has contained mineralization of ore grade. It is anticipated in this report that this ratio will continue, and would form the basis for the amount of exploration required.

(3) METAL PRICES & MARKETING

In this report the estimated mine operating profit, or cash flow, is calculated by using a price of \$35 U.S. per ounce for gold, \$2.00 U.S. per ounce for silver, 16.00¢ U.S. per lb. for lead and 15.5¢ U.S. per lb. for zinc.

It has been assumed that the calculations used by Mr. Sharp in his February 1969 report will apply as related to concentrate purchase agreements as negotiated by the British Metal Corporation Ltd.

(4) METALLURGY & CONCENTRATOR TAILINGS

No representative metallurgical test work has been conducted to date on the Sunset ore, and very incomplete results from current concentrator operation are presently available.

Test work was carried out, however, in 1952 by the Denver Equipment Company on large representative samples of ore from the Pontiac workings; these results are summarized in Mr. Sharp's February 1969 report, pages 30, 31 and 32.

In the absence of any other information it is assumed the Sunset ore is comparable in character to the Pontiac ore and therefore concentrator recoveries of 90.2% for gold, 96.4% for silver,

92.1% for lead and 90% for zinc, as indicated by figures in Mr. Sharp's report, have been used.

It is felt, however, that these are probably too optimistic to expect in practice, and even if certain alterations or additions to the present concentrator are made, recoveries lower than these quoted will probably result.

SUMMARY & CONCLUSIONS

A financial estimate of operating profit which might be realized under the most favourable conditions, as related to the tons of "mineable" ore now in sight, shows that a cash throw-off amounting to \$412,644 might result.

It must be noted this estimate contemplates the extraction and treatment of 120 tons of ore per day, or 2496 tons per month, and mill recoveries in excess of 90% for each of the valuable metals.

In Bacon & Crowhurst's opinion, the mine is not ready to sustain such an extraction rate and insufficient results are now available on which such mill recoveries might be predicated. This estimate must therefore be considered as a possibility only at the present time.

Alternatively, operating the mine and mill at lower than 2496 tons per month average will result in a reduced cash throw-off. Operating costs per ton milled will be higher and would preclude the treatment of part of the ore reserves in question because insufficient metal values are present to permit extraction at a profit.

The operating profit estimate quoted does not include the cost of long range exploration as recommended in this report, and would therefore be reduced by such expenditures.

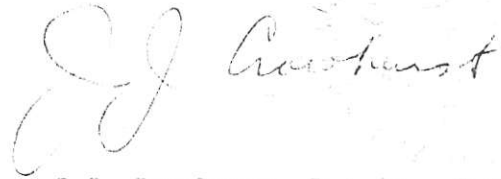
Neither have any costs related to head office costs, financing charges, provincial mining tax, or local taxes, been considered

in the estimate. No allowances are made for depreciation, depletion, or Government of Canada taxes. It must be noted that since Silver Star has announced it has commenced production, it would seem to be very likely that the mine will be deemed by the Government of Canada to have commenced the three year taxation free period.

The property possesses excellent exploration potential and it is considered that the chances of discovery of additional shoots of mineralization of tenor comparable to that already outlined are good.

Respectfully submitted,

BACON & CROWHURST LTD.



J.J. Crowhurst, B.A.Sc., P.Eng.

EXPLORATION POTENTIAL & RECOMMENDATIONS

(see accompanying Longitudinal Vertical Section by W.M. Sharp)

The potential of the property is in the Scranton lode. Whereas here and there in detail this lode may take the form of a composite shear zone containing more than one vein strand, viewed on a broader, more practical scale it is essentially a single vein structure.

The Scranton lode has been traced for 8000 feet from the west boundary to the east boundary of the property. The valley of Pontiac Creek effectively bisects the lode into western and eastern segments of approximately equal lengths (on the property).

The eastern segment of the lode does not appear to be as promising as the western but this could be merely a matter of unequal efforts. In two locations on the eastern segment, near the valley bottom and on top of Pontiac Peak, there has been sufficient encouragement on surface to proceed underground. In the former case, on the lower Pontiac, the vein structure is flattish, the practical effect of a large sedimentary inclusion in the granite.

Much more of a factual nature is known of the western segment which is presently the scene of mining on the 5700 and 5900 adit levels. There are data on five (5) shoots, the best of which is the Inner (West Sunset) shoot (b-2) that is being stoped.

If one assumes a potential area for the western segment to be that outlined in green on the accompanying Section, and a 4 foot

width for this area, a quantity of potential rock of the order of 575,000 tons is obtained. Moreover, one can speculate upon what fraction of this lode segment is likely to be sufficiently well mineralized to be classified as ore. Experience to date on the property suggests that a maximum of 20 per cent might be anticipated, i.e. 115,000 tons might prove to be economic. This amount, if developed, would provide sufficient mill feed for 3 years and 10 months at a rate of 2500 tons per month.

*potential
- not a
geol.-based
potential.*

In order to explore this potential area it is recommended that the plans presently proposed by Silver Star, i.e. drive the 6040 level southwestward along the lode, is a good one and should be completed.

Similarly, it can be seen from the Longitudinal Vertical Section that the next step should be driving the 6200 level southwestward.

No cost estimates have been made by Bacon & Crowhurst Ltd. relative to this work. It is understood by communications with Silver Star officials that construction of access by road to the portals of the 6040 and 6200 levels is very difficult, and that these level extensions therefore would probably be completed by raise access from the 5900 level.

FINANCIAL

CONCENTRATOR PERFORMANCE - ESTIMATE

(A) First Six Months - b-2 ore block - 15,600 tons

Heads - Au - 0.270 ozs./ton
Ag - 5.64 ozs./ton
Pb - 7.40%
Zn - 8.37%

Recovery - Au - 90.2%
Ag - 96.4%
Pb - 92.1%
Zn - 90.0%

Lead Concentrate

Pb content in 100 tons of ore = $100 \times 7.40\% \times 2000\# = 14,800\#$

Pb content recovered = $14,800 \times 92.1\% = 13,631\#$

Pb grade in concentrates = 65%

Lbs. lead concentrate = $\frac{13,631 \times 100}{65} = 20,970\#$ or 10.48 tons

Zinc Concentrate

Zn content in 100 tons of ore = $100 \times 8.37\% \times 2000\# = 16,740\#$

Zn content recovered = $16,740 \times 90\% = 15,066\#$

Zn grade in concentrates = 55%

Lbs. zinc concentrate = $\frac{15,066}{55} \times 100 = 27,393\#$ or 13.70 tons

Tons Ore Treated

Per operating day - 120 tons.

5 day week - mining & hauling or $\frac{250 \text{ days/year}}{12} = 20.8$ days/month average.

Tons treated per month = 20.8×120 or 2496.

(B) Second Six Months - a-1, a-2, a-3 and b-1 ore blocks - 14,250 tons

Heads - Au - 0.175 ozs./ton
Ag - 4.17 ozs./ton
Pb - 4.22%
Zn - 3.90%

Recovery - Au - 90.2%
Ag - 96.4%
Pb - 92.1%
Zn - 90.0%

Lead Concentrate

Pb content in 100 tons of ore = $100 \times 4.22\% \times 2000\# = 8,440\#$

Pb content recovered = $8,440 \times 92.1\% = 7,773\#$

Pb grade in concentrates = 65%

Lbs. lead concentrate = $\frac{7773}{.65} = 11,958\#$ or 5.97 tons

Zinc Concentrate

Zn content in 75 tons of ore = $100 \times 3.90\% \times 2000\# = 7,800\#$

Zn content recovered = $7,800 \times 90\% = 7,020\#$

Zn grade in concentrates = 55%

Lbs. zinc concentrate = $\frac{7020}{.55} = 12,764\#$ or 6.38 tons

PROPERTY OPERATING COSTS - ESTIMATE

Assume 2496 tons mined, hauled and treated per month

($20.8 \times 120 \text{ s.d.t.} = 2496$)

		<u>Amount</u> <u>Per Month</u>	<u>Per Ton</u> <u>of Ore</u>
1. <u>Ore Haulage</u> - mine to concentrator		\$7,488	\$3.00
2. <u>Mining</u> - 5 day week basis - 20.8 days/month average - <i>21 days</i> 5 stopping areas - 4 in use			
(a) <u>Labour</u> - incl. fringe benefits	<u>No. of</u> <u>Men</u>		
Machine men - 4 stopes x 2 men/day	8		
Exploration & development and/or diamond drilling 8-10' advance/day, 2 shifts x 2 men	4		
General underground & tramming	6		
Mechanical, electrical repair	3		
Timbermen	2		
Surveying & geology	1		
Supervision	<u>2</u>		
	26		
		26 x \$766 average/man	19,916
			7.98
(b) <u>Supplies</u>		11,065	4.43
3. <u>Cookhouse & Bunkhouse Operation</u>			
26 men x 20.8 days/month = 541 man-days @ \$6/md.		3,246	1.30
4. <u>Camp Operation - Transportation - Road Maintenance, etc.</u>		3,000	1.20
5. <u>Mine Office</u> - Bookkeeping - Accounting, etc. - 2 men and supplies		2,000	0.80
6. <u>Milling</u> - toll charge		17,472	7.00
	<u>Total</u>	\$64,187	\$25.71

$\frac{120}{8} = 15T/\text{machine shift (men)}$

$\frac{120}{10} = 12T/\text{man-sh.}$

NET SMELTER RETURNS - ESTIMATE

Lead Concentrates - Dry ton basis

<u>Payments</u>	<u>\$ Canadian</u>
Au - 1.37 ozs. x 90% = 1.233 ozs. x \$35.00 x 1.08 =	\$46.61
Ag - 48.0 ozs. x 95% = 45.6 ozs. x (2.00-0.01) x 1.08 =	98.00
Pb - (65.0-1.5)% = 1270# x 95% = 1206.5# 1206.5# x (16.00¢-1.75¢) x 1.08 =	185.68
Zn - (2.5-2.5)% = Nil	-
Gross	330.29
Less treatment charge = 25.55 x 1.08	<u>27.59</u>
Net value - F.O.B. Bradley Smelter	302.70
Less - Duty (65-2)% = 1240# x .0075 x 1.08 = 10.04	
Freight - Ainsworth-Bradley	<u>11.85</u>
Net Value per ton - Ainsworth	<u>\$280.81</u>

Zinc Concentrates - Dry ton basis

<u>Payments</u>	
Au - 0.283 ozs. x 80% = 0.226 ozs. x \$35 x 1.08 =	\$8.54
Ag - 4.5 ozs. x 80% = 3.6 ozs. x \$2.00 x 1.08 =	7.78
Pb - (3.0-1.0)% = 40# x 50% x 16¢ x 1.08 =	3.46
Zn - 55% or 1100# x 85% = 935# x 15.5¢ x 1.08 =	156.52
Cd - 1.22% or 24.4#-3.0# = 21.4# x 70% x (\$4.00-0.40) =	<u>53.93</u>
Gross	230.23
Less treatment charge = 56.88 x 1.08	<u>61.43</u>
	168.80
Less - Duty (55-6)% = 980# x \$.0067 x 1.08 = 7.09	
Freight - Ainsworth to Silver King	<u>15.00</u>
Net Value per ton - F.O.B. Ainsworth	\$146.71

OPERATING PROFIT - ESTIMATE

	<u>Per Month</u>
<u>(A) First 6 months</u>	
<u>Revenue</u>	
Lead concentrate = $24.96 \times 10.48 \times \$280.81/\text{ton} = \$73,455$	
Zinc concentrate = $24.96 \times 13.70 \times \$146.71/\text{ton} = \underline{50,168}$	\$123,623
<u>Operating Costs</u>	<u>60,027</u>
<u>Operating Profit</u>	\$63,596

<u>(B) Second 6 months</u>	
<u>Revenue</u>	
Lead concentrate = $24.96 \times 5.97 \times \$280.81/\text{ton} = \$41,844$	
Zinc concentrate = $24.96 \times 6.38 \times \$146.71/\text{ton} = \underline{23,361}$	\$65,205
<u>Operating Costs</u>	<u>60,027</u>
<u>Operating Profit</u>	5,178

Summary - Operating Profit - first 12 x 2,496 = 30,000 tons approx.

First six months - $6 \times 63,596 = 381,576$

Second six months - $6 \times 5,178 = \underline{31,068}$

\$412,644

"MINEABLE" ORE RESERVES

GENERAL

Five blocks of ore are considered to be in the "mineable" category at present. These are situated in the Sunset part of the property and are above the 5700 level as shown on the attached map.

Tonnages for each block have been computed by multiplying (a) the length in feet of the ore shoot as outlined by sampling on each level, (b) the vertical distances in feet above and below the levels as shown, (c) a mining width of 4.0 feet, and dividing the result by a factor of 10 cu. ft. per ton.

Grades of metals contained in each block have been determined by weighted averages of assays shown on Mr. Sharp's maps, which have been subsequently reduced in the proportion that the average width bears to the 4.0 mining width using wall rock dilution at zero grade. It is considered insufficient sampling evidence has been produced to date to assign metal values to the wall rock.

The grade of metal for Block b-2 was obtained by including such raise assays as were available in the weighted average.

CALCULATIONS

Tonnage

Block

(a)	5700 Level (halfway up to 5900 level)			
			<u>Tons</u>	
(1)	$\frac{35' \times 125' \times 4.00}{10}$		1,750	
(2)	$\frac{110 \times 125 \times 4.00}{10}$		5,500	
(3)	$\frac{37 \times 125 \times 4.00}{10}$		<u>1,850</u>	9,100
(b)	5900 Level (above & below)			
(1)	$\frac{110 \times (125 + 100) \times 4.00}{10}$		9,900	
(2)	$\frac{160 \times (125 + 200) \times 4.00}{10}$		<u>20,800</u>	<u>30,700</u>
		<u>Total</u>		39,800

It is considered that 75% of these rectangular blocks as outlined will contain material of ore grade, and tonnages are therefore combined and reduced as in the following table:

<u>Operating Period</u>	<u>Block</u>	<u>Tons</u>	<u>Factor</u>	<u>Net Tons Ore Expected</u>
First six months	b-2	20,800	75%	15,600
Second six months	a-1, a-2, a-3 & b-1	<u>19,000</u>	75%	<u>14,250</u>
Totals		39,800	75%	29,850

Grade

In Place - Before Mining Dilution

<u>Block</u>	<u>Average Width- Ft.</u>	<u>Au Ozs./ton</u>	<u>Ag Ozs./ton</u>	<u>Pb - %</u>	<u>Zn - %</u>
a-(1)	2.00	0.17	4.50	4.30	5.70
(2)	3.03	0.09	7.88	8.32	6.32
(3)	2.10	0.33	5.50	4.73	5.80
b-(1)	2.50	0.40	6.00	6.00	6.00
(2)	2.38	0.453	9.48	12.44	14.07

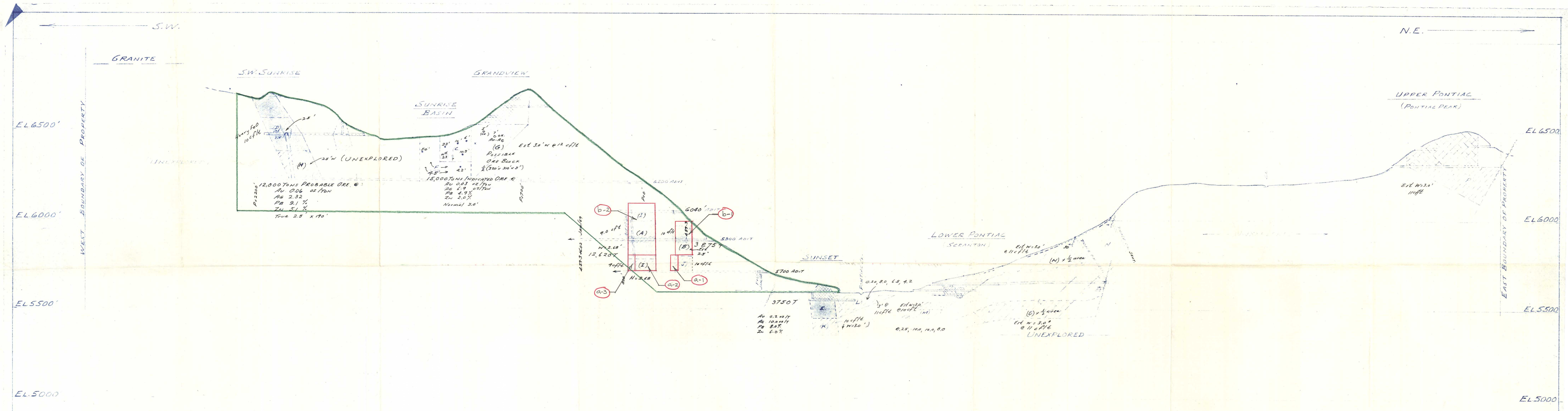
As Mined - After Mining Dilution

<u>Block</u>	<u>Dilution Factor %</u>	<u>Tons</u>	<u>Au Ozs./ton</u>	<u>Ag Ozs./ton</u>	<u>Pb -%</u>	<u>Zn -%</u>
a-(1)	$\frac{2.00}{4.00} = 50.00$	1,315	0.085	2.25	2.15	2.85
(2)	$\frac{3.03}{4.00} = 75.75$	4,125	0.068	5.97	6.30	4.79
(3)	$\frac{2.10}{4.00} = 52.50$	1,385	0.173	2.89	2.48	3.04
b-(1)	$\frac{2.50}{4.00} = 62.50$	7,425	0.250	3.75	3.75	3.75
(2)	$\frac{2.38}{4.00} = 59.50$	<u>15,600</u>	0.270	5.64	7.40	8.37
Total		29,850				

ADDITIONAL CONSIDERATIONS

It will be noted that the other potential blocks of ore shown on the vertical longitudinal section have not been included as "mineable" since there is no access at the present time to these zones.

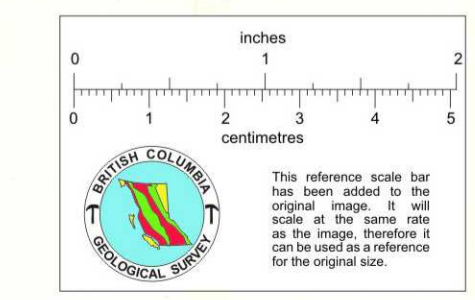
Future exploration work if completed will no doubt elevate some of these other blocks into the "mineable" category; this represents a definite plus factor in relation to ore reserve calculations.



EL 6500'
EL 6000'
EL 5500'
EL 5000'

EL 6500'
EL 6000'
EL 5500'
EL 5000'

LONGITUDINAL VERTICAL SECTION
ALONG THE
SCRANTON LODGE
SHOWING
WORKINGS, INDICATED ORE SHOOT & INITIAL EXPLORATION
SCALE: 1 INCH = 200 FT. COMPILED JUNE, 1957



- LEGEND**
- INDICATED ORE SHOOT
 - FIRMLY INFERRED ORE -- RE. DIRECT EXTENSIONS
 - BROADLY INFERRED MINERALIZATION AND/OR ORE -- FR. INDICATED MINERALIZATION & GEOLOGY
 - STORED AREAS -- LIMITS KNOWN
 - GENERALLY STORED AREAS -- DETAIL NOT KNOWN
 - DRIFT & RAISE, ALSO SHOWING FAULT
 - DIAMOND DRILL INTERSECTIONS:
 (1) - ORE; (2) - SUB-MARGINAL; (3) - BARREN OR INDEFINITE