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HILL & ASSOCIATES LTD.

VANCOUVER, B. C.

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125 58 20 W  
for MINERALS  
accuracy 500 m  
200 m

May 15th, 1965.

Mr. A. E. Upton, Chairman,  
Inter-Can Development Ltd.,  
Vancouver, B. C.

Dear Sir:

This report presents, in three parts,  
up to date information on the Hartt  
Iron property at Kelsey Bay, which is  
currently being prepared for production  
by Orcan Mines Ltd.,

GENERAL

The Hartt Iron property is located ten and one half miles west of Kelsey Bay, a village on the eastern coast of Vancouver Island, 50 miles by good road north of Campbell River.

Inter-Can Development Ltd. optioned the property during 1963, at which time proven ore reserves were estimated at less than 500,000 tons. As a result of an extensive diamond drilling program, reasonably assured ore reserves now stand at slightly over 1,000,000 tons and there are excellent possibilities of developing additional ore particularly on the main ore zone to the northwest. In the Fall of 1964 Inter-Can Development Ltd. optioned the property to Orcan Mines Ltd. and, at the present time, in addition to diamond drilling, a beneficiation plant capable of producing 15,000 tons of iron ore concentrate is being erected.

The three parts comprising this report are -

- PART A - Ore Reserves. Estimate of proven and indicated reserves and comments on possible reserves.
- PART B - Operating Costs: Mining, Beneficiation and Overhead  
- Operating Profit.
- PART C - Capital Cost of bringing the mine and mill into production.

Yours very truly,

H. L. HILL & ASSOCIATES LTD.

*H. Hill*

PART A

PROVEN ORE RESERVES - 758,700 Short Tons @ 43.5% Fe

The above proven ore reserves have been developed to-date on the main ore zone by four inclined holes and 48 vertical drill holes aggregating 5,512 feet. The diamond drill core from these holes has been inspected by the writer and the core split under his supervision. Core recovery was excellent on all holes with the exception of Hole No. 7. The split section of the diamond drill cores are stored on the property and are available for inspection.

The proven ore reserves have been developed entirely by diamond drilling on 12 section lines 100 feet apart. On each section the holes are spaced at 50 foot centers, as shown by the accompanying plan and section. The core was split over a distance the writer felt would be mined, thus allowance has been made for all internal dilution. Ore reserves on each section are tabulated below:

*Handwritten notes:*  
 (PRO) PROVEN ORE RESERVES  
 71,300  
 14,000  
 24,400  
 30,000  
 40,000  
 126 KTONS  
 190 KTONS  
 340 KTONS

<u>Section No.</u>	<u>Short Tons</u>	<u>% Fe.</u>
950	124,900	45.8
1050	130,000	51.2
1150	71,300	47.4
1250	105,200	39.6
1350	24,400	44.0
1450	55,300	44.7
1550	16,000	23.3
1650	61,600	36.6
1750	65,000	40.9
1850	57,000	39.9
1950	31,000	38.8
2050	17,000	39.9
<b>Total</b>	<b>758,700</b>	<b>43.5</b>

*Handwritten note:* weighted average 43.5% Fe.

The tonnage of ore has been calculated on each section by allowing 50 feet on either side of the section lines and 25 ft. to the northwest and southeast of the end drill holes and dividing by a factor of 9.

INDICATED ORE RESERVES - 294,300 Short Tons @ 43.5% Fe

The proven ore reserves were expanded by an additional 50 feet in areas of good diamond drill intersections, as shown on the plan accompanying this report. In view of the excellent results obtained during the past few months drilling to the northwest, the writer feels the indicated reserves taken on the above basis are very conservative.

PART A (Continued)

Indicated reserves on each section are tabulated below:

<u>Section No.</u>	<u>Short Tons</u>
950	12,000
1050	65,000
1150	21,000
1250	28,000
1350	53,000
1450	36,200
1550	2,000
1650	37,000
1750	15,000
1850	10,000
1950	-
2050	14,500
<b>Total</b>	<b>294,300</b>

*Handwritten notes:*  
 A bracket groups sections 1150 through 1950.  
 Next to the bracket is the number "294,300".  
 To the right of the table is the fraction "2/3".

SUMMARY

	<u>Short Tons</u>	<u>% Fe</u>
Proven Ore	758,700	43.5
Indicated Ore	294,300	43.5
<b>Total</b>	<b>1,053,000</b>	<b>43.5</b>

The proven and indicated reserves totalling 1,053,000 tons are, in the writer's opinion, reasonably assured ore reserves.

POSSIBLE ORE

*SW?*

The writer is reluctant to place a figure on possible ore reserves. However, due to the strength of the ore zone going into the hill to the northwest there is every reason to expect that ore reserves will be substantially increased. Assuming the 800 foot length of the zone on the northwest side of the ore zone, in which there are six ore holes averaging 44% Fe over 34 feet and no negative holes, extends for 400 feet, or half the length, an additional 1,100,000 tons of ore will be developed. There is no obvious structural or geological condition to hinder this development.

In addition, there is the possibility of developing commercial ore on the two anomalies further to the northwest and on other reported dip needle anomalies on the property.

*SW?*

PART 8

ECONOMICS OF THE OPERATION

Development work to date on the main ore zone has indicated 1,053,000 tons of reasonably assured ore averaging 43.5% Fe. After allowing for a 10% mining dilution and also a 10% underground pillar loss, this tonnage of ore would produce 555,000 metric tons of 62% Fe concentrate.

Costs are based on producing 15,000 metric tons of concentrates per month by beneficiation. This production would require mining 29,000 short tons of ore per month, or 1,250 tons per day over a 23 day work month. The mill now being constructed is designed to produce 500 tons of 62% Fe concentrates per day by both dry and wet magnetic separation.

After allowing for mine dilution and a 90% mill recovery, 1.94 short tons of ore would produce one metric ton of 62% Fe concentrates.

A) Operating Costs

(1) Mine

(a) Plan

Three hundred eighty thousand tons of crude ore can be obtained from two surface pits, one on each end of the main ore zone. The ore to waste ratio for the pits would average only 1 to 0.4. The remaining 700,000 tons of ore would be mined by a simple room and pillar method. The ore zone going into the hill lies nearly horizontal and varies from 20 to 40 feet in thickness.

The writer feels that the <sup>andesite?</sup> andesite hanging wall will be competent and stand up over a fairly large area. Thus underground costs, lower than those used in this report, are anticipated. The following table shows the tonnage of ore, waste and concentrates anticipated from both pits and the underground:

	<u>Short Tons</u>		<u>Metric tons 62% Concentrate</u>
	<u>Ore</u>	<u>Waste</u>	
#1 Pit	212,000	58,000	109,000
#2 Pit	168,000	90,000	86,000
Underground	700,000	-	360,000
Totals	1,080,000	148,000	555,000

PART B (Continued)

(b) Costs

Both surface and underground costs used in this report are based on a contractor's estimate. The costs do not include equipment write-off. There is the possibility that underground costs will be reduced by further negotiations.

Following is a summary of the direct mining costs which include all mining overhead:

	<u>Per Short Ton Ore</u>	<u>Per Metric Ton 62% Fe Conc.</u>
#1 Pit	\$ .89	\$1.71
#2 Pit	1.07	2.08
Underground	<u>1.39</u>	<u>2.70</u>
Weighted Averages	\$1.24	\$2.40

(2) Beneficiation Plant

(a) General

Crude ore from the mine will be first crushed in a 24" by 36" jaw crusher to minus 2 inches, and the product conveyed over a magnetic pulley through an 8' by 4' double deck screen, then crushed to 5/8" in a 3 foot cone crusher. This product will then be conveyed to a 3,000 ton open stockpile. The ore will then be fed through a gravity wet screen into a rod mill 6 feet in diameter and 12 feet long. The product from the rod mill will be fed through a 3 drum wet magnetic separator, over a magnetic filter, and conveyed to a 4,000 ton ore stockpile. The material will then be loaded in trucks by a conveyor below the stockpile.

This plant would be located at the mine and the concentrates trucked 38 miles to the proposed dock at Menzies Bay.

(b) Proforma Metallurgical Balance

Following are the Hartt property recovery calculations based on test work by Indiana General Corporation and assays by Coast Eldridge:

SAMPLE 'A' - Pit Run, But Not Including Mining Dilution

Test No. 1 (Cobbing Pit Run at -1/4")

<u>Product</u>	<u>% Wt.</u>	<u>% Fe.</u>	<u>% Rec.</u>
Heads	100.0	48.34	100.0
Conc.	80.72	56.3(est)	95.2
Non-mag.	19.28	12.27	4.8

PART B (Continued)

Proforma Metallurgical Balance (Continued)

Test No. 2 (Pit run crushed to -10 mesh and then up-graded twice and the 2nd conc. crushed to -20 mesh and upgraded twice)

	Product	% Wt.	% Fe.	% Rec.
	Pit Run	100.0	48.34	100.0
1st pass	Conc.	78.9	(58.2 est)	95.0
-10 mesh	Non-mag.	21.1	12.17	
2nd pass	Conc.	76.81	59.45	94.5
-10 mesh	Non-mag.	2.09	13.28	
3rd pass	Conc.	72.39	62.28	90.8
-20 mesh	Non-mag.	4.42	13.16	
4th pass	Conc.	71.96	64.47	92.8
-20 mesh	Non-mag.	1.33	15.44	

The concentrates produced from a bulk sample from all the diamond drill ore sections showed the following negligible impurities:

Sulphur	-	0.05
Phosphorus	-	0.03
Copper	-	0.004
Titanium oxide	-	0.04

? Question  
325 mesh

(c) Beneficiation Costs

Beneficiation or milling costs used in this report are based on costs obtained, over a 12 month period, by a former B.C. iron ore producing company treating similar crude ore and corrected for the different tonnage rate. On this basis crushing costs are estimated for the Urecon operation at 30¢ and milling costs at 54¢ per ton of 62% concentrates.

(3) Trucking, Loading, Etc. - \$1.65 per Metric Ton Conc.

The trucking costs included above are based on a firm contract price, ship loading at an established rate and the figure of \$1.65 includes the cost of using a short section of private road.

to 30 miles  
away  
MAD #185 BAY  
WICK COG. 2007  
SALE #200

(4) Power Costs - 32¢ per Metric Ton of Concentrates

This estimate includes the rental cost of a new power unit together with maintenance and operating costs.

*\$60 / ton delivered*

PART B (Continued)

✓ (5) Overhead - 40¢ per Metric Ton of Concentrates

Included in the overhead estimate is the cost of all administration including insurance, engineering, etc.

✓ (6) Royalty - 65¢ per Ton

The royalty payable to the owners of the property is 40¢ per ton and to the Government 25¢ per ton.

Summary of Operating Costs - Per Metric Ton of 62% Fe. Conc.

	<u>Pit No. 1</u>	<u>Pit No. 2</u>	<u>Underground</u>	<u>Weighted Average</u>
Mining	\$1.71	\$2.08	\$2.70	\$2.40
Crushing	.30	.30	.30	.30
Milling	.54	.54	.54	.54
Trucking, Loading, etc.	1.65	1.65	1.65	1.65
Power	.32	.32	.32	.32
Overhead	.40	.40	.40	.40
Royalty	.65	.65	.65	.65
	\$5.57	\$5.94	\$6.56	\$6.26

✓ (5) Value of Concentrates - \$8.75 U.S. Funds, 62% Fe Conc.

The Company has a contract with C. T. Takahashi & Co. for the sale of concentrates to Japan at \$8.75 U.S. funds. Assuming a 7% exchange rate, the value would be \$9.36 Canadian funds.

c) Operating Profit - Per Ton of 62% Fe Concentrates

	<u>Pit No. 1</u>	<u>Pit No. 2</u>	<u>Underground</u>	<u>Weighted Average</u>
Value of Ore	\$9.36	\$9.36	\$9.36	\$9.36
Operating Costs	5.57	5.94	6.56	6.26
Operating Profit	\$3.79	\$3.42	\$2.80	\$3.10

Based on the above calculations the total operating profit on the reasonably assured ore reserves, which will produce 555,000 tons of concentrates, is as follows:

*120 lb per concentrate  
= 14 / ton  
40¢ / ton  
2 x 14 = 28  
140¢  
10  
32¢*

PART B (Continued)Operating Profit (Continued)

	<u>Tons Conc.</u>	<u>Per Ton</u>	<u>Total</u>
Pit No. 1	109,000	\$3.79	\$ 413,000
Pit No. 2	86,000	3.42	294,000
Underground	<u>360,000</u>	<u>2.80</u>	<u>1,005,000</u>
Total	555,000	\$3.10	\$1,715,000

D) Operating Cash Flow

The present plan is to first mine all ore from the No. 1 Pit, which will produce 109,000 tons of concentrate in the first seven and one quarter months of operation, or an operating profit of \$413,000, or \$57,000 per month. The No. 2 Pit would then be mined and, at the same time, preparations would be made to start underground mining.

Following is the anticipated operating cash flow, providing the mill will efficiently produce up to its designed capacity:

	<u>1st Year</u>	<u>2nd Year</u>	<u>3rd Year</u>	<u>Total</u>
Conc. Production - metric tons	180,000	180,000	180,000	540,000
Operating profit	\$656,000	\$515,000	\$504,000	\$1,675,000



PART C

CAPITAL EXPENDITURES

(a) General

The Orecan Iron Mine at Kelsey Bay is now being prepared for production. Stripping waste, preparatory to mining ore, is now underway on No. 1 Pit, and clearing the No. 2 Pit area is partially completed. Ore will be available to the mill during the month of June.

Mill construction work is now well underway. The crushing circuit should be completed between July 1st and 15th, at which time crude ore can be crushed and stockpiled for final treatment. The grinding circuit is scheduled for completion between August 1st and 15th. Concentrate production should commence immediately thereafter, and by the end of August the mill should be operating at full capacity.

The mill is being built under contract by Flanders Installations Ltd. and Stephens-Adair Manufacturing Co. of Canada Ltd.

(b) Cost Summary

The capital requirements, as of June 1st, 1965, to bring the mine into production are estimated at \$1,187,785, as shown below:

→ Mine - Equipment	\$ 200,850
Preparation	<u>106,435</u>
	\$ 307,285
→ Mill - Equipment, etc.	480,500
→ Dock <i>incl. 2 pits</i>	<u>400,000</u>
<b>Total</b>	<b><u>\$1,187,785</u></b>

Arrangements have been made by the Directors of Orecan to finance a large percentage of the equipment costs shown above over a period of three years.

The Directors have under consideration the formation of a separate company to finance and operate a dock at Henzies Bay as a bulk loading terminal. At this time the extent of participation to be undertaken by Orecan is not known. The total cost of the dock is included in the above cost summary.