BLYTHE RIVER
IRON ORE DEPOSITS
NEAR
BURNIE TASMANIA
FOR
KATHLEEN INVESTMENTS

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KATHLEEN INVESTMENTS (AUST.) LIMITED

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by

B. H. MACDONALD.

INTRODUCTION

The Blythe River iron ore deposits are located approximately 10.5 miles south from Burnie in Tasmania. They are the subject of a number of reports by Chaplin (1901), Boyd Gibson and Young (1919), Dickenson (1961), and Ridgway (1964). Various estimates of tonnage and grade have been given and this report is based upon the assumption that 1,250,000 tons of hematite ore averaging 52% Fe are readily available.

Subject to proving this amount, the feasibility of mining 250,000 tons of ore per annum over a period of 5 years is discussed. The deposit is owned partly by Industrial and Mining Investigations Pty. Ltd. and partly by H. Jones & Co. Pty. Ltd. subsidiary.

SUMMARY AND CONCLUSIONS

The success of this operation depends upon a number of factors.

(a) The proving of a minimum of 1,250,000 tons of recoverable hematite ore of an average grade of 52% Fe.

(b) The possibility of constructing a "hydro-lift" station on the shore at Burnie and connecting it with a bulk loading installation on the break water, approximately 1,500 feet off shore.

(c) The availability of firm contracts for the shipping and purchase of the hematite ore at the prices quoted in this report.

(d) Concluding a satisfactory agreement with the Joint Owners of the deposit to enable the whole ore body to be mined.

From current information points (b), (c) and (d) are believed to be reasonably assured and it remains for the assessment of ore reserves to be finalized by further surface sampling and diamond drilling.

The estimate of costs and profit expectancy is necessarily a preliminary one. However it is considered that the contingent allowances made will be found adequate in a final evaluation.

The project shows an estimated nett profit of £637,000. on an initial outlay of £400,000. equivalent to an average annual return of 32% after tax and redemption.

RECOMMENDATIONS

The examination of this prospect should be undertaken in two stages. Initially it will be necessary to prove a minimum of 1,250,000 tons of saleable hematite ore. This can be done by a combination of Geological mapping, surface sampling and diamond drilling and may cost from £5,000. to £20,000. depending upon results. If the ore body is not of sufficient size or is too low in grade the project may be abandoned after spending a few thousand pounds.

If the ore reserves are proved sufficient for the undertaking a detailed study of the bulk loading installation will be necessary. This should not be at the Company's expense entirely and its liability should not exceed £5,000. A number of firms have expressed their willingness to quote in this matter.

ORE RESERVES

All that is positively known of these reserves is that they have been severally estimated at from a few hundred thousand to twenty-four million tons of ore averaging from 50 percent to 63 percent of metallic iron. Ridgway's estimate, the most recent assessment, is for a probable total of 1.9 million tons of ore around 50% Fe grade for open cut mining.

From the topography of the area it is probable that 200 feet is the greatest depth that can be considered for these operations. Whether or not payable ore exists to this depth is not known.

Following a detailed study of the deposit with surface mapping and sampling a minimum of 5 diamond drill holes should be drilled to a depth of 200 feet. The results of these drill holes will determine what additional work is needed to prove the deposit.

PROPOSED MINING OPERATIONS

The main ore body outcrops on the crest of a hill over a width of 88 feet (maximum) and a length of some 1,100 feet. The geology has been described by Ridgway and others and it is known that parts of the deposit are more silicious, and hence of lower grade, than others. For the purpose of this exercise it is assumed that a block of ore approximately 700 feet long by 88 feet wide by 200 feet deep is available and that a total of 620,000 tons of overburden is to be removed.

A heavy crawler type drill with a 4¼" piston diameter drifter capable of putting 1,500 tons per day on the floor of the quarry is recommended. Benches will be 45 feet deep for the length of the quarry with the spacing and burden of the 3" diameter holes 9 feet and 10 feet respectively.

A transloader is recommended for loading and transporting the broken ore to the crushing plant hopper and the overburden to the tailings elevator. The transloader has a 5.5 cubic yard capacity and is ruggedly built for the particular requirements of this type of job.

Crushing to - 1¼ inch size is provided for by two stage crushing and screening. In this form the ore is suitable for hydraulic transport using the hydro-lift installation.

BULK HANDLING FACILITIES

The existing wharves at Burnie are unsuitable for the bulk handling of crushed hematite ore for the following reasons:

(a) The volume of shipping is such that a ship could seldom be berthed for long enough to take on a full load without interruption.

(b) Passenger ships now use these wharves and the Harbour Authorities will oppose any bulk loading facility giving rise to dusty conditions. Hematite dust is red and is particularly troublesome.

(c) The depth of water is insufficient for large ships to come alongside.

The most feasible method of handling the iron ore appears to be to pump the crushed material directly from a shore installation to an unfinished breakwater situated about 1,500 feet off shore. Bulk storage bins could be erected on this breakwater (which will eventually be made to connect with the land) and loading may then take place from a berth which can accommodate 30,000 ton vessels.

Unisearch Limited at the University of N.S.W. have been asked for a preliminary statement on the feasibility of pumping the crushed hematite from shore bins to the bulk loading installation. A copy of their report is attached in the appendix.

Upon proving the required volume of ore reserves a very close study must be made of the bulk loading proposal. While there is no doubt as to its feasibility the estimated cost of £250,000 may be understated.

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CAPITAL COSTS - PRELIMINARY ESTIMATE

Crawler type drill - Drifter 4½" piston Diam.	£8,500	
600 C.F.M. Compressor	6,250	
Hoses, Pipes, Fittings, Spares & Jackhammer	500	£15,250
Crushing Plant - Screens and Elevators	40,000	
Bins - Chutes	6,000	
Office Buildings and Store	2,500	
Road Construction	5,000	
Freight and Installation	5,000	
Power Supply - Electric Wiring	7,000	65,500
Vehicles		
1 only Holden Utility	1,250	
Stores	2,000	
Site preparation	200	
Preliminary Expenses	25,000	
Contingency 20%	21,740	50,190
		130,940
Bulk Loading Facilities plus transloader		270,000

Total (say) £401,000.

WORKING COSTS

Data

Production	1000 tons/8 hr. shift
Weight Factor	1 ton Weight = 11 cubic feet in situ
Height of Face	Maximum 45 feet
Length of Face	500 feet
Diameter of holes	3"
Spacing and Burden	9' and 10'
Explosives per ton	0.3 lb.
Drilling Depth 50' for 45 feet Face	50 feet
Drilling Rate	30' per hour.

Preliminary Calculation

1. Volume of rock broken/hole = 9 x 10 x 45
   = 4050 cubic feet
   = 370 tons say
2. Number of holes/500' Face = $\frac{500}{9}$ = 56 say
3. Total footage drilled = 56 x 50 = 2,800 feet
4. Number of tons/500 foot face = 20,000 say
5. Number of days to Consume = 20 days
6. Time to drill face = $\frac{2800}{30 \times 8}$ = 12 days
7. Number of Drills required = 1

Explosives

Use 3" Quarigel @ £8/50 lb. case

Cost/ton = $\frac{£0.3 \times 8}{50}$ = 11.5d./ton = £240/week.

Use Cordtex detonating fuse @ 3½d. foot

700 feet drilled/week plus 100'

800 feet @ 3½d. foot = £12/week

Use Millisic Delay Dets @ £70/1000

14 dets @ 16.8d./det = £1/week

Secondary Blasting

60 pops/day - 300/week

Say 2 cases of A/N 60/week @ £8. = £16/week

Dets and Fuse etc. 1/- / pop	= £15/week	£284.
Explosives and Blasting		£284/week

Overburden

Mining and blasting	1.1/- per ton
Stacking	.6/- per ton
Total	2.7/- per ton.

LABOUR COSTS (Per Week)

Drilling and Blasting

1 Driller @ £25/week	25	
1 Powder Monkey @ £25/week	25	
1 Labourer @ £20/week	20	
1 Compressor Attendants @ £25/week	25	£95

Quarry Labour

1 Loader Driver @ £25/week	25	
3 Labourers @ £20/week	60	
3 Crusher Attendant @ £25/week	75	
Foreman @ £35/week	35	
Maintenance Fitter @ £30/week	30	
Assistant to Fitter @ £20/week	20	245

Administration (Field and Head Office)

Manager	60	
Clerk-Storeman	25	
Labour on cost 18%	77	
Head Office	250	412
	Total	£752

FUEL AND MAINTENANCE

Fuel Assume Diesel Power - Average Consumption

0.4 lbs. / BHP / hr. for Rate of Mining 250,000 tons / annum

Units	H.P.		Hours/week		Horse Power hrs/Week
1 Transloader	125	x	40	=	5,000
1 Compressor	105	x	40	=	4,200
1 Crusher Unit	100	x	120	=	12,000
					21,200

Fuel Consumption = $\frac{21200 \times 0.4}{8}$ = 1,060 gals/week

With oils and greases allow 3/2$^{d.}$/ gallon

Fuel Cost = 1060 x 3/2$^{d.}$ = £168/week £168.

Maintenance

Drilling Machine 4$^{d.}$/foot drilled	£12	
Bits 500' life/bit @ £26	36	
Shank Adaptors 4,000' life @ £23	4	
Rods 3000' life @ £118	28	
Couplings 3000' life @ £24	6	
Jack Hammer, Stones, etc.	5	£ 91.

Compressor

Spares	20	

Transloader

Spares	50	

Crushing Section

Spares	50	

Bins

Spares	10	£130
	Total	£389.

ESTIMATED OPERATING BUDGET

229014

		1956	1957	1958	1959	1960
Mining by Open Cut Methods - ore		250,000	250,000	250,000	250,000	250,000
overburden		50,000	100,000	120,000	150,000	200,000
Totals		300,000	350,000	370,000	400,000	450,000
Costs Mining and Crushing Ore	3.16/- / ton	39,500	39,500	39,500	39,500	39,500
Mining and handling overburden	2.7/- / ton overburden	6,750	13,500	16,200	20,250	27,000
Contingency for Mining	0.4/- / ton of ore	5,000	5,000	5,000	5,000	5,000
Head Office and Company Charges	1.0/- / ton of ore	12,500	12,500	12,500	12,500	12,500
Fuels, Oil and Maintenance	1.87/- / ton overburden plus ore	23,400	27,200	28,800	31,200	35,000
Testing and Exploration	0.4/- / ton of ore	5,000	5,000	5,000	5,000	5,000
Carting to ship	6.13/- / ton of ore	76,625	76,625	76,625	76,625	76,625
Wharfage and handling onto ship	7.5/- / ton of ore	93,750	93,750	93,750	93,750	93,750
Freight to Japan	32.6/- / ton of ore	407,500	407,500	407,500	407,500	407,500
Royalties	5.5/- / ton of ore	68,750	68,750	68,750	68,750	68,750
Totals		738,775	749,325	753,625	760,075	770,625

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TAXATION FORECAST

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	1966	1967	1968	1969	1970	1971
Sales @ 18C./ unit of fe. - say £4.18 / ton	1,045,000	1,045,000	1,045,000	1,045,000	1,045,000	
Total Operating Expenditure	739,000	749,000	754,000	760,000	771,000	
Surplus before depreciation and Tax	306,000	296,000	291,000	285,000	274,000	
Interest on £250,000 Bank Loan - 4 years		18,000	13,000	8,000	4,000	
Capital Redemption Fund less residual value estimated £100,000 in 1970	60,000	60,000	60,000	60,000	60,000	
Total Deductions	60,000	78,000	73,000	68,000	64,000	
Nett Taxable Income	246,000	218,000	218,000	217,000	210,000	
Tax (8/6d.) £1	105,000	93,000	93,000	92,000	89,000	
Nett Profit after Tax and Redemption	141,000	125,000	125,000	125,000	121,000	

From Disposal and Residue £100,000

BLYTHE RIVER IRON DEPOSIT.

(A) Reserves N. Block

Assumptions Length - 900ft.
Average width (surface) 85ft.
Composite Ore grade ~~52%~~ >51%
Conversion 12 cubic feet = 1 ton

Depth	Reserve
0 - 100'	615,000 tons.
0 - 200'	1,170,000 tons.
0 - 300'	1,642,500 tons.
0 - 400'	2,040,000 tons.
0 - 500'	2,362,500 tons.
0 - 600'	2,700,000 tons.

(B) Reserves N. Block

Assumptions Length - 900ft.
Average width (surface) 75ft.
Grade ~~52%~~ >51%
Conversion 10 cubic ft = 1 ton.

0 - 100'	648,000 tons.
0 - 200'	1,260,000 tons.
0 - 300'	1,755,000 tons.
0 - 400'	2,196,000 tons.
0 - 500'	2,610,000 tons.
0 - 600'	2,970,000 tons.

055

80'-90' Nth West — S E

65'-90'? Nth West — S E

70'-80' Nth West — S E

53-54 incl. 49.17% Fe - 28.13% SiO_2

80' Nth West — S E

35' Nth West — S E

10'-35' Nth West — S E

94-97 incl. Fe 46.84%. SiO_2 33.48%.

25'-80' Nth West

Crosscut at 221 ft

Crosscut at 166 ft

Crosscut at 142 ft

Crosscut at 77 ft

Crosscut at 32 ft

Cut A
SAMPLE AVERAGES.
1-20 incl. Fe 51.81% - SiO_2 25.50%.
3-20 " " 52.61% - " 23.15%
5-20 " " 54.73% - " 21.58%
1-4 " " 40.11% - " 41.20%
3-4 " " 44.61% - " 35.73%

Cut B
SAMPLE AVERAGE.
21-38 incl Fe 52.10% - SiO_2 18.69%
21-23 " " 45.35% - " 33.52%
24-36 " " 54.11% - " 13.65%
37-38 " " 49.19% - " 20.20%

Cut C
SAMPLE AVERAGE.
39-54 incl. Fe 57.19%
- SiO_2 16.46%
39-52 incl Fe 58.34%
- SiO_2 14.80%

Cut D
SAMPLE AVERAGE.
55-70 incl. Fe. 61.81%
SiO_2. 10.44%

Cut E
AVERAGE.
71-75 incl. Fe. 60.58%. - SiO_2 13.16%

Cut F
AVERAGE.
94-99 incl. Fe-52.73% - SiO_2 24.77%

Upper Tunnel AVERAGE.
77-92 incl. Fe 53.05% - SiO_2 23.88%
85-89 " " 59.35% - " 13.71%
77-84 " " 49.90% - " 26.87%
90-92 " " 50.98% - " 26.45%

River Tunnel

1081
91 M

50M
42 abandoned

Outcrop hidden beneath surface soil

Cut A
Small patch of good ore
Bulk of outcrop very siliceous
Whole outcrop about here very siliceous and jaspery
Cut A
Siliceous here
Cut C
Mostly siliceous about here
Cut D
General average of outcrop about here is siliceous
Very jaspery ore this side
Quarry
Cut E
Good ore showing about here mostly siliceous
Quarry
Cut F
Very jaspery ore showing on this side
Edge of Basalt Capping

50 ac
O'Keefe Pur.

Barbed bay

ANG
419010mE
5445080mN

1009
91 M

Cut K
AVERAGE.
117-122. Fe 54.31% - SiO_2 20.15%
117-121. " 55.50% - " 17.98%.

Cut G
AVERAGE.
100-125 Fe. 43.39% - SiO_2 35.80%

Middle Tunnel
AVERAGE
159-167. Fe. 28.95% - SiO_2 60.47%.

Cut H
AVERAGE.
106-111 Fe. 46.05% - SiO_2 31.48%.

Cut J
AVERAGE.
112-116. Fe. 50.22. - SiO_2 27.12%.

Cut L

Cut M
AVERAGE
126-131. Fe. 64.28%- SiO_2 5.23%

Cut N
AVERAGE.
134-143. Fe. 47.20%- SiO_2 30.79%

Cut O
AVERAGE.
146-150. Fe. 63.17%. - SiO_2 6.18%

Detail hidden by debris and surface covering
Whole of outcrop about here very jaspery little or no clean ore showing anywhere
Edge of Basalt capping
Apparently in Situ
Trap
Large irregular outcrop mostly jasper no ore
Details obscured by talus and debris
Cut crops very jaspery
Soft sandstones and slates in Tunnel
Middle Tunnel
Cut K
Lode mostly very jaspery
Cut G
Vertical Faces
Much surface debris, details hidden
Cut H
Soft slates and sandstones
Cut J
River
Much talus and surface debris all details hidden
Alluvium thick scrub
Cut N
Soft sandstone in trench
Large irregular jasper Outcrop No Ore
Cut M
Detail obstructed by surface debris
Good ore
Cut O
Cut L
Very jaspery No ore showing
Trench
No details visible
Trench

4166
9 M

851
91 M

91 M
856

4185
93 M

AMG
411030mE
5444060mN

120 ac
Atkinson Pur

KEY.
> 52% Fe.
< 52% Fe
composite > 52% Fe.
country.

5 cm

ASSAY PLAN

BLYTHE RIVER IRON MINES

— Scale, ~~400~~ 400 feet to 1 inch —

— To accompany Report on the Blythe River Iron Deposit Dated 15th July 1919 —

AMG REFERENCE POINTS ADDED

229017