

7 HIGHCLERE IRON DEPOSIT

by R. Jack

Abstract

A detailed magnetometer survey of the Highclere Iron Deposit was completed and several areas of high magnetic intensity delineated. Diamond drilling of these larger anomalies has shown that small reserves of high grade ore are present with larger reserves of medium to low grade ore.

Location and Access.

The iron deposit is approximately $1\frac{1}{2}$ miles east of Highclere, a small settlement on the Emu Bay Railway Line 15 miles from the port of Burnie. The main Burnie to Hampshire road passes within $1\frac{1}{4}$ miles of the deposit which is reached from this sealed road by a fair gravel road. Transportation cost of the ore to Burnie would be low in view of this ready accessibility.

Geology

The oldest rocks in this area are greywacke and shale probably of Cambrian or Precambrian age. These sediments have been intruded by Devonian granite and highly altered in the contact zone. Weathering from the Devonian until the Tertiary progressed as far as exposing the higher parts of the underlying granite. Basalt flows in the Tertiary covered much of the area and these have been partly eroded away during the late Tertiary and Quaternary to once again expose the underlying rocks.

The geology in the immediate vicinity of the iron outcrops is very difficult to determine owing to the very deep weathering where practically all of the sedimentary rocks near the granite contact have been altered to clay to a depth of over 100 feet below the present surface. Medium-grained granite consisting mainly of quartz and feldspar with a small amount of biotite and muscovite occurs in a small creek valley 350 feet east of the main iron outcrop. A small remnant of basalt persists on the highest part of the area surveyed and much basalt scree occurs over the hillside. This scree is probably the more resistant kernals of basalt remaining after erosion of the basalt flows which covered the area. Small deposits of fine dominantly quartzose gravel occur near the granite contact on the eastern side of the area surveyed. These are probably of Pleistocene to Recent age and have been derived from the granite and deposited by the creeks.

The Iron Deposits

The deposits are thought to occur in the metamorphosed Cambrian-Precambrian sedimentary rocks on the margin of the granite intrusion. Deep weathering of the metamorphosed rocks has broken down the minerals to clay and no rock types could be identified in thin sections from any of the drill cores. The occurrence of these ores is similar to those at Hampshire where the iron occurs as metasomatic replacement bodies in the contact metamorphic zone of the granite. The ores were originally magnetite but weathering has produced considerable amounts of limonite and

hematite in the upper parts of the ore bodies. The surface outcrop of the orebodies is poor, only low scattered boulders occurring except on traverses 0-150 north on the eastern side of the baseline where iron outcrop occurs up to 6 feet above the general surface level.

Magnetometer Survey

A detailed magnetometer survey was completed over the area using a Jalander Model 1957 portable magnetometer. The base line used for these traverses was the same as that used by the Bureau of Mineral Resources in their reconnaissance of the area in 1955-56 (Keunecke, 1959). An area 1800 feet by 1000 feet was covered in detail, magnetometer readings being taken at 25 feet intervals along the traverse lines which were spaced 50 feet apart. This gave a more detailed magnetic map of the area and it was found that some of the larger anomalies shown in the Bureau of Mineral Resources maps could be separated into several small anomalous areas. Drilling of the area was then undertaken using the magnetometer work as a basis for siting the holes.

Drilling

Four diamond drill holes were completed on the three highest anomalies located by the magnetometer survey. Diamond drill holes Nos. 1 and 4 were designed to test the large iron outcrop and anomaly to the east of the baseline on traverses 0-150 north. Holes Nos. 2 and 3 were to test the concealed orebodies located to the west of the baseline on traverses 450 south and 600 south. Drilling conditions were poor with soft clay alternating with harder iron-rich bands, and generally core recovery was below average.

Drilling confirmed that the high anomalies were due to smallish bodies of high grade iron ore, and that the larger, less intense anomalies were due to a lower concentration of magnetic material throughout the rocks and not due to high grade deeply buried ore bodies. D.D.H. No. 4 intersected the downward continuation of the largest surface iron outcrop. This orebody dips almost vertically and decreases slightly in width at depth. A brief summary of the drill holes is as follows:—

D.D.H. No. 1 Vertical—

- 0'-19' Limonite clay
- 19'-50' Limonite clay containing nodules of hematite and magnetite.
- 50'-93' 6" Highly weathered rock containing narrow bands and small crystals of magnetite.
- Average assay: 45% Fe from 0'-93' 6".

D.D.H. No. 2 Vertical—

- 0'-12' Limonite clay.
- 12'-42' Mixed limonite clay, magnetite crystals and bands of magnetite.
- 42'-87' Mainly magnetite.
- 87'-118' Limonite clay containing only scattered magnetite crystals.
- Average assay: 58% Fe from 0'-95'.

D.D.H. No. 3 Vertical—

- 0'-37' Limonite clay with some hematite nodules.
- 37'-61' Limonite clay with some hematite nodules and small crystals of magnetite.
- 61'-85' Highly weathered rock and clay with numerous hematite nodules and small crystals of magnetite.
- 85'-91' Limonitic clay.

Average assay: 43% Fe from 0'-85'.

D.D.H. No. 4 Bearing 105° Dip 52°—

- 0'-16' Limonitic clay containing small crystals of magnetite and nodules of hematite.
- 16'-36' Limonitic clay.
- 36'-65' Mixed hematite, limonite and magnetite.
- 65'-69' 6" Highly weathered rock and limonitic clay.

Average assay: 40% Fe from 0'-69' 6".

Detailed assays of the core for iron and impurities are shown in the accompanying tables.

Ore Reserves

From the assay results of the drill cores, and the magnetometer traverses there appear to be two types of ore bodies present:

- (a) small high grade highly magnetic bodies such as were found in drill holes No. 2 and No. 4;
- (b) larger but lower grade ore bodies of more disseminated magnetite as found in drill holes No. 1 and No. 3.

It is estimated that the orebody to the east of the base lines and between 0 and 150 north traverses is 120 feet by 25 feet at the surface and 120 feet by 16 feet in the drill hole intersection at a depth of 60 feet below the surface and contains approximately 14,000 tons of ore probably averaging 55% to 60% Fe. The other small high grade lens to the west of the baseline on traverse 600 south is considered to have a subsurface area of 100 feet by 30 feet and to extend to a depth of 90 feet. This orebody is estimated to contain approximately 13,000 tons of iron averaging 55% to 60%.

Lower grade material was found in D.D.H. No. 1 and D.D.H. No. 3; this lower grade material is expected to extend out to approximately the 5,000 gamma contour line, and several areas of this magnetic intensity are seen on the map. The areas of lower magnetic intensity are tentatively estimated to contain possible resources of 250,000 tons of ore averaging approximately 30% Fe.

Conclusions

Drilling has so far only indicated possible reserves of ore, and to obtain a more accurate estimation of the quantity of ore available it is considered that more drilling is necessary. This may possibly be done by cheaper wagon drilling and would indicate more positive ore reserves in the deposit.

References

- BLAKE, F., 1958.—Highclere iron area. *Tech. Rep. Dep. Min. Tas.* 2, 15-18.
- KEUNECKE, O., 1959.—Magnetic survey of the Natone, Blythe River-Cuprona and Highclere iron ore deposits, North Western Tasmania. *Rec. Bur. Miner. Resour. Aust.*, 1959/11. (Unpublished).
- THOMAS, D. E. and HENDERSON, Q. J., 1943.—Some iron deposits in the vicinity of Burnie. *Rep. Dep. Min. Tas.* (Unpublished).

TABLE: ASSAYS OF CORE SAMPLES

D.D. Hole No.	From Ft. In.	To Ft. in.	Recovery %	Total Fe %	Si %	Al %	Ti %	Mn %	P %	S %	V %	Calculated Fe %
1	6 0	22 0	15	58.3	..	..	..	..	..	..	..	..
	22 0	32 0	35	41.4	..	..	..	..	..	..	..	..
	32 0	42 0	23	33.9	..	..	..	..	..	..	..	..
	42 0	52 0	22	38.1	..	..	..	..	..	..	..	..
	52 0	62 0	37	30.6	..	..	..	..	..	..	..	..
	62 0	72 0	35	54.5	..	..	..	..	..	..	..	..
	72 0	82 0	40	31.3	..	..	..	..	..	..	..	..
	82 0	93 6	46	28.3	..	..	..	..	..	..	..	..
	50 0	53 0	Sludge	56.1	..	..	..	..	..	..	..	..
	53 0	72 0	Sludge	59.2	..	..	..	..	..	..	..	..
	72 0	87 0	Sludge	53.2	..	..	..	..	..	..	..	..
	87 0	93 6	Sludge	45.2	..	..	..	..	..	..	..	..
	6 0	93 6	Comb.	..	9.44	5.29	0.17	0.18	0.10	0.05	Nil	40.7
	2	0 0	10 0	80	52.0
10 0		21 0	68	54.8	..	..	..	..	..	..	..	..
21 0		31 0	52	55.8	..	..	..	..	..	..	..	..
31 0		38 6	93	55.7	..	..	..	..	..	..	..	..
38 6		43 0	72	58.7	..	..	..	..	..	..	..	..
43 0		52 0	20	60.3	..	..	..	..	..	..	..	..
52 0		62 0	35	62.5	..	..	..	..	..	..	..	..
62 0		72 0	76	61.2	..	..	..	..	..	..	..	..
72 0		82 0	17	64.7	..	..	..	..	..	..	..	..
82 0		87 0	25	62.2	..	..	..	..	..	..	..	..
0 0		8 0	Sludge	48.4	..	..	..	..	..	..	..	..
8 0		12 0	Sludge	62.8	..	..	..	..	..	..	..	..
12 0		17 0	Sludge	60.5	..	..	..	..	..	..	..	..
17 0		22 0	Sludge	62.0	..	..	..	..	..	..	..	..
22 0	27 0	Sludge	58.1	..	..	..	..	..	..	..	..

TABLE: ASSAYS OF CORE SAMPLES

<i>D.D. Hole No.</i>	<i>From Ft. In.</i>	<i>To Ft. In.</i>	<i>Recovery %</i>	<i>Total Fe %</i>	<i>Si %</i>	<i>Al %</i>	<i>Ti %</i>	<i>Mn %</i>	<i>P %</i>	<i>S %</i>	<i>V %</i>	<i>Calculated Fe %</i>
	30 0	37 0	Sludge	55.6	..	..	..	..	..	..	..	..
	37 0	47 0	Sludge	58.8	..	..	..	..	..	..	..	..
	47 0	52 0	Sludge	61.5	..	..	..	..	..	..	..	..
	52 0	54 0	Sludge	61.0	..	..	..	..	..	..	..	..
	54 0	62 0	Sludge	59.9	..	..	..	..	..	..	..	..
	62 0	67 0	Sludge	60.0	..	..	..	..	..	..	..	..
	67 0	77 0	Sludge	58.1	..	..	..	..	..	..	..	..
	77 0	82 0	Sludge	60.9	..	..	..	..	..	..	..	..
	82 0	95 0	Sludge	58.5	..	..	..	..	..	..	..	..
	95 0	100 0	Sludge	38.3	..	..	..	..	..	..	..	..
	0 0	87 0	Comb.	..	3.69	1.22	0.05	0.12	0.10	0.05	Nil	59.2
	0 0	110 0	Comb.	..	4.94	1.69	0.05	0.16	0.09	0.05	Nil	55.6
3	0 0	6 0	75	25.5	..	..	..	..	..	..	..	..
	6 0	13 0	68	40.6	..	..	..	..	..	..	..	..
	13 0	19 6	69	35.4	..	..	..	..	..	..	..	..
	19 6	29 6	65	44.1	..	..	..	..	..	..	..	..
	29 6	39 6	70	37.6	..	..	..	..	..	..	..	..
	39 6	47 0	27	55.6	..	..	..	..	..	..	..	..
	47 0	56 0	55	49.4	..	..	..	..	..	..	..	..
	56 0	66 0	35	54.5	..	..	..	..	..	..	..	..
	66 0	76 6	38	52.0	..	..	..	..	..	..	..	..
	76 6	85 6	61	40.9	..	..	..	..	..	..	..	..
	85 6	91 0	27	28.4	..	..	..	..	..	..	..	..
	0 0	91 0	Comb.	..	8.52	4.91	0.10	0.09	0.12	0.07	Nil	43.5
4	0 0	10 0	100	51.9	..	..	..	..	..	..	..	..
	10 0	16 0	66	58.8	..	..	..	..	..	..	..	..
	16 0	26 0	80	29.3	..	..	..	..	..	..	..	..
	26 0	36 0	95	31.8	..	..	..	..	..	..	..	..
	36 0	45 0	90	38.3	..	..	..	..	..	..	..	..
	45 0	54 0	39	57.6	..	..	..	..	..	..	..	..
	54 0	65 0	38	46.2	..	..	..	..	..	..	..	..
	65 0	69 6	90	32.2	..	..	..	..	..	..	..	..
	0 0	69 6	Comb.	..	7.7	5.4	0.24	0.11	0.21	0.06	Nil	..