

REPORT ON MANGANESE DEPOSIT - DIAL RANGE1. Location and Access:

The Deposit is situated on the northern foothills of Mt. Duncan, a south-eastern outlier of Dial Range; at a height of 650' above sea level. It is located on the south-eastern fall to Dial Creek at a distance of 5½ miles south-south-west of the Township of Penguin.

Access is gained by means of a metalled road for 5 miles in a general southerly direction as far as Spinks farm, to the west of Leven River. From the latter a cart track continues for one mile to the crossing of Dial Creek. The stream valley is then followed south-westerly by pack track for 1½ miles to the deposit.

The Port of Burnie is eleven miles by road and rail from Penguin.

11 History:

A mining tenement was first granted as a Manganese Reward Lease for five years to R.O. Jones in 1908. In 1915 the area was again leased in the names of J. Payton and J. Revell and continued until the cancellation in 1922. During these periods little exploratory work was undertaken and small samples only removed for testing.

In 1919 an examination of the deposit was carried out by W.H. Twelvetrees, Government Geologist, and the report published in Mineral Resources No. 6, "The Iron Ore Deposits of Tasmania."

A lease of 10 acres in extent (71M/38) was granted to A.G. Black and J.F. Debbins in 1938 and this is still in existence. During 1939 prospecting in the form of open cuts, shafts and trenches was carried out on the deposit under the supervision of A.G. Black.

111 Topography:

Topographical features consist of steep hill slopes rising from the valley of Dial Creek. The latter is a small perennial stream from which water supplies for ore treatment can be conveyed by gravitation to suitable sites.

The deposit occurs between the 625 and 700 feet contours and is so situated that mining by open cut methods is practicable.

1V Geology:

The rocks in the vicinity consist of massive grey slates and quartz breccias of Lower Palaeozoic age. Exposures are few and the structure generally obscure. Where observed in track cutting near the mine, the strike is south-west and the dip high to the north-west.

V The Manganese Deposit:

This is situated in west-central part of the mineral lease. The deposit is of secondary origin caused by the decay of the underlying rocks and concentrated by the action of circulating ground water in residual clays.

The ore is usually contained in two layers of limited extent conforming to the surface contour and overlain by soil and clay to a depth of 18 to 30 inches. The manganese is principally concentrated in the upper layer which varies in thickness from one to seven feet. It consists of nodules, hard lumps and porous masses of psilomelane, together with minor amounts of magnetite and manganese wad, in association with limonite and gothite in ferruginous clays.

The lower layer immediately underlies the upper layer and varies from 5 feet to 18 feet in thickness. It consists principally of clay in which small pieces of psilomelane and limonite are irregularly distributed. Narrow bands of limonite and gothite are also intercalated with the clay.

(1) The Workings:

The workings (see accompanying plan), consisting of open cuts, trenches, pits and shafts, extend south-south-easterly over a distance of 220 feet and appear to cover the full length of the deposit. In a south-westerly direction openings occur over a distance of 60 feet only and no cross-cuts have been extended to prove the width of the deposit.

Surface indications of possible extensions of the deposit are few. Boulders and masses of limonite and gothite occur at surface for 75 feet to the south-west of the most southerly workings, but no prospecting has been undertaken to test this occurrence for any associated manganese below surface.

No. 1 Open-cut at north-western extremity of the workings extends south-easterly over a length of 81 feet and obtains a maximum depth of 14 feet. The excavation exposes dark-grey and brown coloured clays through which are distributed a few small pieces of psilomelane at intervals. Narrow bands of limonite also occur near floor of the opening. Several scattered boulders of ferruginous conglomerate are included in the clays near the bottom, but solid bedrock is not disclosed.

No. 2 Open-cut, 15 feet to the south-east of No. 1 Open-cut, extends in a similar direction for 50 feet and reaches a depth of 12 feet at south end. The principal exposure of manganese ore occurs in this opening. Below the sub-soil, lumps and boulders of psilomelane occur in association with manganese wad and limonitic clays in a layer varying from two to seven feet in thickness. An underlying layer, about six feet in thickness, is exposed in the cutting, and two shallow pits below the floor, in which a little manganese ore together with a considerable quantity of limonite is distributed in the clays.

A shallow trench extending 73 feet south of No. 2 open-cut exposures limonite with traces of manganese wad.

At 27 feet further south No. 3 Open-cut extends in that direction for 30 feet. The two layers are repeated in this locality but the demarcation is less distinct than in No. 2 Open-cut. The upper layer is much thinner (1½ - 3 feet) and contains minor quantities of manganese ore intercalated with limonite in clays. In north end of the opening a shaft, sunk to a depth of 27' from surface, shows occasional small pieces of psilomelane in ferruginous clays extending to approximately 18 feet from surface. Below this depth grey clays occur underlain by soft slates, the latter constituting the bedrock.

A shallow southern continuation of No. 3 Open-cut over a distance of 40 feet, and a shaft sunk in the bottom to a total depth of 19 feet from surface, expose clay, limonite and slate fragments overlying slate bedrock. Manganese ore is absent in this locality.

On south side of the track at 30 feet east of No. 2 Open-cut an old, partly caved cutting discloses a loosely compact mass of psilomelane and wad in feruginous clays.

(2) Quality of the Ore:

Channel samples taken from upper layer of the Deposit in the workings, where the manganese ore is best exposed, were assayed with the following results:-

NO. 2 OPEN CUT (Horizontal Channels)

Constituents	Sample No. E1. Width 10 feet	Sample No. E2 Width 10 feet	Sample No. E3 Width 10 feet	Sample No. E4 Width 8 feet
	Per Cent	Per Cent	Per Cent	Per Cent
Manganese	17.16	19.70	14.06	25.88
Iron	29.70	26.84	32.36	26.80
Silica	8.08	10.48	10.40	8.68
Phosphoric Acid	0.12	0.12	0.10	0.08
Alumina	9.32	6.45	9.06	9.06
Titanic oxide	0.37	0.24	0.29	0.24
Sulphur	0.31	0.44	0.20	0.15
Lime	0.06	0.08	Trace	Trace
Magnesium oxide	0.11	0.02	0.10	0.05
Barium Oxide	0.38	0.97	1.26	2.09
Moisture at 105°C	2.74	2.48	2.88	2.14
Loss on ignition	11.54	10.70	10.32	12.86

Nos. 2 & 3 OPEN CUTS (Channels Perpendicular)

Constituents	Sample No. E5 Width 5 feet	Sample No. E6 Width 2½ feet
	Per Cent	Per Cent
Manganese	19.82	20.00
Iron	26.80	17.66
Silica	9.08	17.12
Phosphoric acid	0.10	0.05
Alumina	8.55	12.21
Titanic oxide	0.23	0.42
Sulphur	0.27	0.34
Lime	Nil	0.10
Magnesium oxide	0.13	0.07
Barium oxide	1.26	0.46
Moisture at 105°C	2.24	3.10
Loss on ignition	11.22	12.64

It will be seen from the assays above that the ore consists essentially of iron (18 - 32%) and manganese (14 - 26%) with lesser amounts of silica (8 - 17%) and alumina (6 - 12%). The remaining constituents are present in small amounts viz. barium oxide (0.38 - 2.09%), sulphur (0.15 - 0.44%), titanic oxide (0.23 - 0.42%), phosphoric acid (0.05 - 0.12%), magnesium oxide (0.02 - 0.13%) and lime (trace - 0.10%).

As the iron occurs in the form of limonite and gothite it is obvious that the only constituent likely to be of economic importance is that of manganese. With regard to the latter, requirements of the Australina market call for ores of 48% manganese. For this grade, £4 per ton, c.i.f. Newcastle, is paid with an allowance of 2/- for each additional unit. Penalties consist of 2/- per unit below 48% manganese, 3/6 per unit for iron over 4%, 4d. per unit over 8% silica, and 1/- per 0.01% phosphorous over .1%.

For the purpose of obtaining a marketable product from the Dial Range deposit it would be necessary to concentrate the ore by a system of crushing, washing, jigging and screening or other treatment to make it acceptable to the buyers and to reduce freight charges. As an indication of the probable grade of ore procurable by such treatment, a picked sample from the deposit consisting principally of psilomelane was assayed with the following result:-

NO. 2 OPEN CUT (Picked Sample)

Sample No.	Constituents											
	Mang- anese	Iron	Sil- ica	Phos- phoric Acid	Alum- ina	Tit- anic oxide	Sul- phur	Lime	Mag- nes- ium oxide	Bar- ium oxide	Moi- sture at 105° C.	Loss o ignit- ion.
E7	43.80	10.04	2.80	0.05	6.64	0.10	0.10	0.08	0.04	0.21	1.26	12.94

From this example it seems probable that, with careful treatment for the reduction of the iron, silica, and alumina contents, a concentrate conforming to market requirements could be obtained.

(2) Quantity of Ore:

The quantity of manganese ore as exposed by the workings is small. In the north near No. 2 Open-cut the deposit has been proved to extend over a distance of 60 feet from east to west and 100 feet from north to south. At the south end in the vicinity of No. 3 Open-cut it is opened along a north-south length of 30 feet and 10 feet in an east-west direction.

The average thickness of the deposit including both layers is not more than 15 feet.

For the purpose of testing possible continuations of the known deposit it is recommended that further cuts be excavated easterly and westerly from the deepest parts of Nos. 2 and 3 Open-cuts respectively.

V1 Conclusions:

A superficial deposit, of small extent, containing manganese minerals in association with hydrated oxides of iron, clay, etc., has been partly exposed by surface workings. The deposit constitutes a low grade manganese ore which would probably be concentrated to a marketable product by ore-dressing.

Although only minor quantities of ore have been proved to exist, further exploratory work is warranted to test the full extent of the deposit.

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