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Progress Report on the Exploration of the Savage River Iron Ore Deposits

by J. G. Symons

Summary

The first stage of the programme to develop the iron ore deposits in the Savage River district has now been completed. This programme culminated with the drilling of two diamond drill bore holes and these two bore holes alone have indicated the presence of 8½ million tons of iron ore, the unaltered ore averaging 44.9% iron in the short distance of 600 feet of strike length and to a depth of 550 feet below the surface outcrop. The only impurity of consequence is titanium—which averages 1.70% TiO₂. Preliminary ore dressing investigations on the material obtained from drill cores indicate that the ore can be easily concentrated by magnetic methods. A concentrate grade of 64.9% Fe was easily achieved with an overall recovery of 97.6%. Higher grade concentrates and better recoveries can be achieved by finer grinding. Most impurities are reduced considerably by magnetic concentration but the titanium content was reduced from 1.8% to 1.51% TiO₂ in the bulk sample tested. Preliminary enquiries indicate that a TiO₂ content up to approximately 2% can be smelted without much difficulty but some difficulty is experienced above 2%.

Recommendation

It is now recommended that additional funds be allocated to the Department of Mines to enable the drilling programme to be continued until an accurate assessment of the tonnage of ore at the Savage River can be made, or an interested Company is prepared to commence operations. The anticipated cost to complete the drilling is £175,000 and would be extended over a period of some six years or more.

Location and Access

The Savage River iron ore deposits (previously known as the Rio Tinto Iron Deposit) occur on both sides of the Savage River some five miles distant by air from the 19 mile peg on the Corinna—Waratah Road. The old Specimen Reef track commences from this mile post and passes through the Savage River deposits from 5 to 8 miles from the road. This track was cleared by the Department of Mines prior to the recent geophysical surveys and drilling, and now provides good walking although it may be rather wet in the winter. The track grades are comparatively easy until the track drops some 800 feet to the Savage River where a cage is situated, and thence rises steeply some 800 feet to the top of the ridge.

An area was cleared as a landing ground for a helicopter on the top of this ridge where the camp site was situated and all diamond drilling gear and other equipment was carried from the Corinna Road to this point by helicopter. The camp servicing from Zeehan was also done by helicopter to this point.

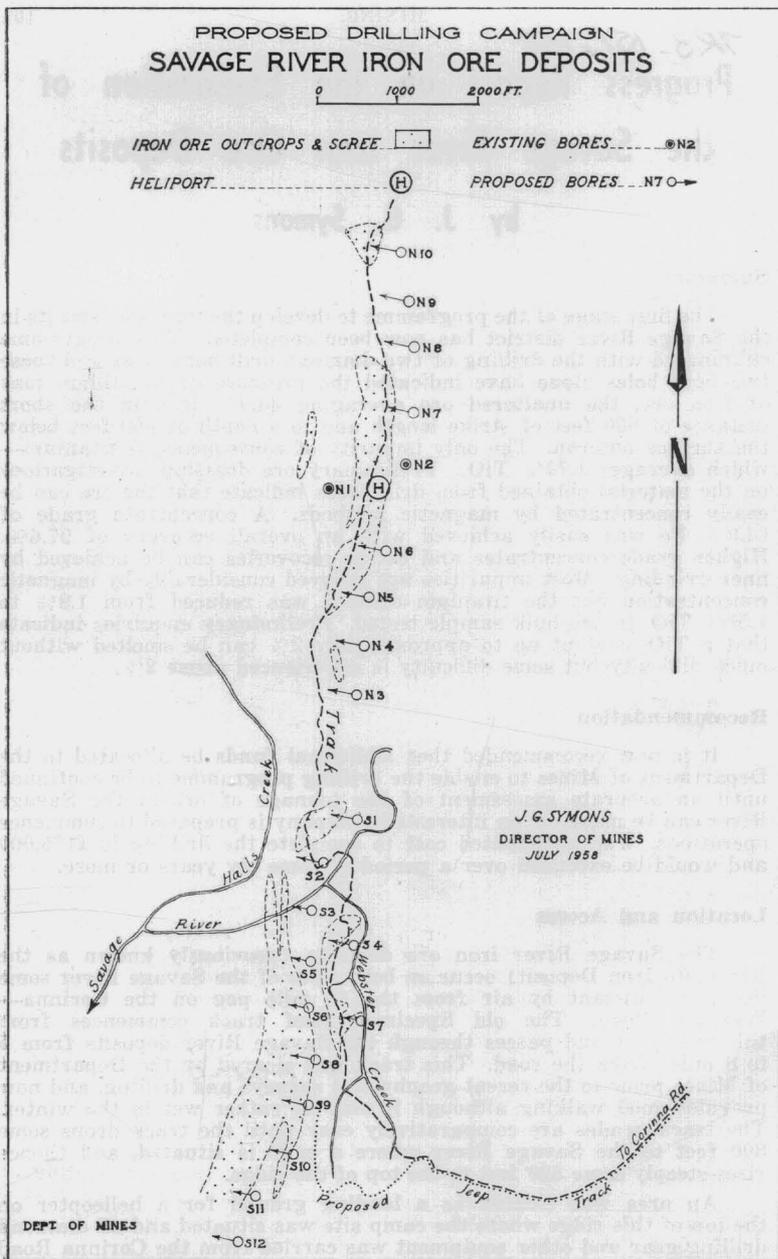
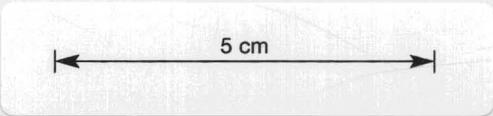


Figure 29



The existing road between Waratah and Corinna is suited for light traffic only, and the section between Waratah and the Savage River track is somewhat steep and tortuous.

The nearest railway connection is at Guildford on the Emu Bay Railway system, but if the Pieman River were used to establish a port on the West Coast it is felt that no great difficulty would be experienced in building a railway to this port. The establishment of port facilities on the Pieman would involve major harbour works and would necessitate a substantial break-water at the Pieman River mouth.

History

The first recorded reference to the Savage River iron deposit was made by Surveyor Sprent during his work on the West Coast in the seventies of last century. Some adits were driven in 1898, the Rio Tinto Company was formed and a large amount of driving in iron ore was done. Further shaft sinking and tunnelling was done in 1926 by the Hoskins Iron and Steel Company—later to become the Australian Iron and Steel Company and it was reported that the orebody was of a sulphide nature, and did not extend to any depth.

Following a renewed interest in iron ore deposits, the area was reserved from occupation under the Mining Act on 31st August, 1955, and the Tasmanian Department of Mines requested the Bureau of Mineral Resources to make an airborne magnetometer survey of the area. This was made during May, 1956, and the results were so encouraging that the Department of Mines cleared the track into the area and the Bureau of Mineral Resources agreed to make a comprehensive ground magnetometer survey in the following summer. A geological map of the area was also prepared by the Department of Mines.

As a result of this survey two preliminary diamond drill bore holes were selected to be drilled to test the deposit. It was important that the width of the deposit and the presence or otherwise of deleterious impurities be known. The holes were designed to test the orebody to a depth of at least 500 feet below the outcrop.

Rio Tinto Australian Exploration Pty. Ltd. who held large adjacent areas under a Special Prospecting Licence agreed to act as agent for the diamond drilling of the two selected bore holes, and kept a geologist on the site during the whole drilling programme. A clearing for a camp site and a helicopter landing area was made in the dense forest and all camping and diamond drilling equipment was transported from the Corinna Road to the area by helicopter in four days.

Diamond drilling commenced on 31st October, 1957, and was completed on 12th April, 1958. The drilling gear was ferried out by helicopter on June 2nd, 1958.

Geology

The iron ore occurs as a massive series of lenses extending in a northerly direction over a distance of nearly 2½ miles. The iron ore consists chiefly of magnetite and is regarded as a magmatic segregation in a belt of basic igneous intrusive rocks and their derivatives of Precambrian age. The country rocks have been extensively mineralised by pyrite.

The iron deposits form a strong ridge and the lenses appear to dip steeply to the east. Full geological details are included in a report by Mr. T. D. Hughes, Senior Geologist, in the Department of Mines Technical Reports No. 2, 1957, pp. 33-41.

Other outcrops of a similar nature occur some four miles south at Long Plains, and at Rocky River about 14 miles south of the Savage River. These are apparently the outcropping deposits, in a long belt of geologically favourable country.

RESULTS OF FIRST STAGE OF PROGRAMME.

Diamond Drilling

BORE HOLE No. 1.

Location 300' West on Traverse E.00

R.L. 1515'

Bearing 103 degrees

Dip of hole 41 degrees

Depth 668 feet.

| From ft. | To ft. | HCl Sol. Fe % | SiO ₂ % | TiO ₂ % | Mn % | P ₂ O ₅ % | S % | |
|--|-----------|---------------------|--|-----------------------|---------|------------------------------------|--------|--|
| Ore Core Samples (Core recovery 43.5%) | | | | | | | | |
| 401 | 421 | 52.2 | 11.2 | 2.31 | 0.12 | Trace | 0.98 | |
| 421 | 440 | 58.1 | 6.9 | 1.86 | 0.12 | 0.05 | 0.23 | |
| 440 | 471 | 51.9 | 12.2 | 1.82 | 0.12 | 0.05 | 0.18 | |
| 471 | 487 | 28.3 | 29.5 | 1.26 | 0.13 | 0.07 | 1.61 | |
| 487 | 508 | 59.3 | 14.1 | 1.88 | 0.12 | Trace | 0.43 | |
| 508 | 515 | 13.6 | Individual sample. Impurities not determined | | | | | |
| 515 | 520 | 20.5 | 29.6 | 0.72 | 0.08 | 0.02 | 0.84 | |
| 520 | 540 | 43.1 | 15.4 | 1.32 | 0.11 | 0.02 | 0.83 | |
| 540 | 663 | 41.3 | 16.5 | 1.37 | 0.11 | 0.02 | 0.69 | |
| 563 | 572 | 28.3 | 23.0 | 1.30 | 0.09 | 0.11 | 1.31 | |
| 572 | 595 | 51.1 | 10.3 | 1.89 | 0.13 | 0.07 | 0.92 | |
| 595 | 611 | 46.9 | 12.6 | 1.60 | 0.14 | 0.25 | 1.21 | |
| 611 | 631 | 44.5 | 14.4 | 0.74 | 0.14 | 0.14 | 0.98 | |

| | | | | | | | |
|---------------|-----|------|------|------|------|------|------|
| Core | | | | | | | |
| 401 | 631 | | | | | | |
| Average Value | | 45.8 | 14.7 | 1.59 | 0.12 | 0.06 | 0.78 |
| Sludge | | | | | | | |
| 400 | 631 | | | | | | |
| Average Value | | 50.6 | 11.3 | 1.38 | 0.11 | 0.06 | 1.07 |

BORE HOLE No. 2

Location—241' East of E.5.

R.L. 1630'

Bearing 260 degrees

Dip of hole 45 degrees

Depth 863 feet

Ore intersected

Core samples—Core recovery 93.7%

| From ft. | To ft. | Inters. ft. | Fe HCl Sol. % | SiO ₂ % | TiO ₂ % | Mn % | P ₂ O ₅ % | S % |
|-------------|-----------|----------------|---------------------|-----------------------|-----------------------|---------|------------------------------------|--------|
| ft. ins. | ft. ins. | | | | | | | |
| 313 0 | 337 0 | 24 0 | 46.6 | 13.8 | 1.65 | 0.10 | 0.04 | 0.27 |
| 337 0 | 370 0 | 33 0 | 43.0 | 16.7 | 1.68 | 0.10 | 0.03 | 0.40 |
| 370 0 | 388 0 | 18 0 | 56.3 | 8.1 | 1.86 | 0.11 | 0.11 | 0.57 |
| (372 0) | (388 0) | Sludge Spl. | 49.4 | 13.9 | 1.40 | 0.09 | 0.06 | 0.94 |
| 388 0 | 408 6 | 20 6 | 45.2 | 12.4 | 1.63 | 0.13 | 0.21 | 0.94 |
| 408 6 | 430 6 | 22 0 | 24.9 | 25.1 | 1.44 | 0.11 | 0.18 | 0.95 |
| 430 6 | 457 0 | 26 6 | 53.8 | 9.6 | 1.88 | 0.12 | 0.08 | 0.38 |
| 457 0 | 479 0 | 22 0 | 42.2 | 16.2 | 1.68 | 0.11 | 0.11 | 0.44 |
| 479 0 | 502 0 | 23 0 | 45.1 | 13.3 | 1.45 | 0.10 | 0.06 | 0.14 |
| 502 0 | 512 0 | 10 0 | 21.8 | 29.8 | 0.96 | 0.08 | 0.05 | 0.96 |
| 512 0 | 538 0 | 26 0 | 50.1 | 11.4 | 0.87 | 0.15 | 0.05 | 0.45 |
| 538 0 | 560 0 | 22 0 | 50.3 | 11.0 | 1.69 | 0.10 | 0.05 | 0.21 |
| 560 0 | 581 0 | 21 0 | 53.1 | 9.3 | 2.03 | 0.10 | 0.04 | 0.11 |
| 581 0 | 605 0 | 24 0 | 46.9 | 13.1 | 2.07 | 0.14 | 0.09 | 0.27 |
| 605 0 | 617 0 | 12 0 | 9.1 | 41.6 | 1.55 | 0.14 | 0.13 | 0.46 |
| 617 0 | 637 0 | 20 0 | 50.2 | 10.7 | 2.17 | 0.17 | 0.07 | 0.18 |
| 637 0 | 651 0 | 14 0 | 54.7 | 8.1 | 2.32 | 0.17 | 0.04 | 0.17 |
| 651 0 | 669 0 | 18 0 | 27.1 | 24.5 | 1.47 | 0.09 | 0.05 | 0.28 |
| 669 0 | 696 0 | 27 0 | 46.3 | 13.0 | 1.96 | 0.14 | 0.09 | 0.63 |
| 696 0 | 718 6 | 22 6 | 44.5 | 14.1 | 2.11 | 0.16 | 0.08 | 0.43 |

Core only

313 0 718 6 405 6 44.15 14.88 1.78 0.12 0.08 0.48

Tonnage and Grade

Bore Hole No. 1

True Width 200'

Depth below outcrop 600'

Average Assay 45.8% HCl Sol. Fe

Bore Hole No. 2

True Width 330'

Depth below outcrop 500'

Average Assay 44.2 % HCl Sol. Fe

Distance between holes—600 feet

Tonnage available 8,500,000 tons

Average Assay 44.87% HCl. Sol. Fe

The Savage River ore body has a total length of outcrop of approximately 12,600 feet. Using this as a basis, a total tonnage exceeding 100 million could be expected to a depth of 600 feet. It is reasonable to assume that the ore extends below this depth.

Concentration

The ore recovered from diamond drill bore holes contained some 44.9% HCl Sol. iron as magnetite together with some impurities. Ore dressing research was done to determine whether the grade of ore could be improved and what recovery could be anticipated. It was also necessary to know whether the known impurities could be reduced.

Ore testing indicated that the grade of the concentrate could be raised to 64.9% Fe by crushing to minus 60 mesh, and using magnetic concentration. The recovery of iron was 97.6%. The percentage of impurities was drastically reduced in all cases, excepting titanium.

A sample of about 100 pounds weight was obtained from the drill cores of No. 2 Bore Hole.

Magnetic separation was investigated from sizings ranging from minus $\frac{1}{2}$ inch size to minus 200 mesh. Preliminary crushing to minus $\frac{1}{2}$ inch was undertaken in a jaw crusher, and minus $\frac{1}{4}$, minus $\frac{1}{8}$ and minus 18 mesh B.S. were roll crushed. Finer sizings were produced by stage wet ball mill grinding of minus 18 mesh ore. These sizings were minus 60, 100 and 200 mesh B.S.

To obtain reasonable accuracy it was necessary to stage crush and magnetically separate at each sizing from minus $\frac{1}{2}$ inch to minus $\frac{1}{8}$ inch, and the first samples assayed were products from the minus $\frac{1}{8}$ inch separation. Results at coarser sizings were derived from these assays. A quantity of minus $\frac{1}{2}$ inch ore was roll crushed to minus 18 mesh B.S. and separate quantities of this were used for the remaining tests. Coarse separations were made with a permanent magnet to plus 44 mesh size, and the minus 44 mesh fractions were separated wet in a Dings-Crockett separator. The minus 18 mesh grind and all finer grinds were separated in the Crockett unit. The minus 18 mesh grind was sized into plus 60, plus 200, and minus 200 mesh fractions and each treated separately. The minus 60 mesh and minus 100 mesh grinds were sized to plus and minus 200 mesh and treated separately. All wet magnetic separations were cleaned, and recleaned, unless otherwise stated. B.S. Screens were used throughout except the $\frac{1}{2}$ and $\frac{1}{4}$, and $\frac{1}{8}$ inch screens which have apertures of 0.4375, 0.21 and 0.132 of an inch respectively.

The second stage of the investigation is now recommended. This would consist of:—

- A. The provision of an access track or road some five miles in length to be built to the southern ore deposits.
- B. A diamond drilling programme to determine the extent of the Savage River iron deposits. It is anticipated that some 15,000 feet of drilling would be required.

To deal with these in turn:

A. The establishment of a reasonable access road, suitable for lorries and utilities in fair weather, and capable of carrying at least a four wheel drive vehicle in all weathers. This track would possibly commence from the same point as the existing pack track and would be extended to a point where the outcrop exists on the southern side of the Savage River. A camp site would be established at this point. The road would allow a full diamond drilling programme to be continued on the southern deposits without using expensive airlift methods. It would also be used in the later drilling on the northern side of the river, but would have to be extended and some provision made to transfer drilling and camp gear across the river.

The approximate position of the road is shown on the attached plan. The cost of such an access road is estimated at £12,500.

B. The geophysical survey of the deposits indicates that the total length of outcrop is nearly $2\frac{1}{2}$ miles. To test such a length of outcrop and its possible extensions in length is vital, and no full assessment of the value of the ore body can be made without this drilling.

The required drill holes are outlined on the attached plan and the programme would involve some twenty holes averaging 750 feet in depth—a total of 15,000 feet of diamond drilling. Such a drilling programme would cost approximately £150,000.

The drilling programme could be extended over a period of some six years.

Exploration Cost

The total cost of the above programme allowing for some road improvement would be approximately £175,000 and it is anticipated that such a programme would allow an accurate estimation of ore reserves. It is the present policy of the Government of Tasmania that it will not allow the export of iron ore unless a steel industry is established within the State. Without an estimate of the tonnage and grade of the ore available, it is not prudent to expect the establishment of a steel industry. As drilling progresses, a more accurate assessment of the value of the deposit will emerge and it is possible that an interested company could make an offer to take over the deposit and establish an industry at any stage.

However, it is felt that the Government of Tasmania should not allow such a possibility to influence the overall planning.

The total cost of the exploration programme including what has been spent already could total £200,000 and such a programme may prove the existence of some 100 million or more tons of iron ore.