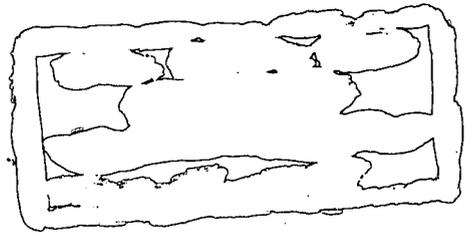


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DEPARTMENT OF SUPPLY AND DEVELOPMENT

COMMONWEALTH COPPER & BAUXITE COMMITTEE

SIXTH REPORT

Western Australia - Copper, Alunite and Bauxite

COMMONWEALTH OF AUSTRALIA

DEPARTMENT OF SUPPLY AND DEVELOPMENT
Copper and Bauxite Committee
Century Building,
129 Swanston Street,
MELBOURNE C.i.

20th October, 1941.

The Hon. J. A. Beasley, M.P.,
Minister for Supply and Development,
Parliament House,
CANBERRA, A.C.T.

Dear Sir,

SIXTH REPORT
WESTERN AUSTRALIA - COPPER, ALUNITE
AND BAUXITE

1. On Saturday, 20th September, we visited the Chemistry Department, Crawley, Western Australia, and saw the experimental plant erected for the treatment of the Lake Champion alunite. The process was discussed with Professor Bayliss and Mr. H. Bowley, Government Mineralogist and Assayer.

2. On the morning of Monday, 22nd September, we met the Minister for Mines, State Officials and Messrs. F. B. Norwood and L. Gibbons at the Mines Department, Perth. At this meeting the Whim Creek and Ravensthorpe (Phillips River) copper areas were discussed. On the afternoon of the 22nd we met the Aluminium Panel at the Department of Industry and discussed the Lake Champion proposals. On Tuesday, 23rd, lateritic bauxites were examined at several localities on the Darling Range and at Toodyay.

3. Following is a review of the matters discussed in Western Australia:-

(a) COPPER.

(i) Whim Creek.

The Committee was assured by the State Mining Engineer that the dumps at this mine have been properly sampled and that they contain about 80,000 tons of oxidised ore averaging about 3.5% copper.

Statements regarding ore reserves are not considered wholly satisfactory though they are evidently fairly large. This remark applies particularly to the length of the ore shoot. The stope plan suggests a restricted shoot, whereas it is stated that the end of the stopes are still in ore. This can only be decided by examination and/or sampling. Blatchford's figure of 60,000 tons of 4% to 5% ore in pillars can, however, be accepted as conservative, and diamond drilling has shown the persistence of the ore-body, at depth, with change to sulphides.

The low dip (25°) of the ore-body in the upper levels has resulted in the formation of an unusually large body in the oxidised zone. This zone gives place to sulphides at a point where the dip markedly steepens.

It is of interest to note that official assays show about 0.7% of cobalt present in both oxidised and sulphide ore.

The mine is dry, the stopes are standing well and are easily accessible. The mine buildings, producer gas plant and crushers are reported to be in good order. There are abundant mangrove thickets nearby which it is believed will supply satisfactory fuel. The mine is connected to the district telephone service and an aeroplane landing ground is available. There is said to be sufficient water in wells about 10 miles distant from the mine. A pilot of Goldfields Airways corroborates the statement that a water supply will not be difficult. Accommodation for 20 people is provided near the mine by a hotel built of steel and galvanised iron.

Mr. F. B. Norwood read a letter from Mineral Separations (London) stating that a 50 ton per day pilot plant and a 500 ton per day plant had successfully operated the segregation process at Katanga, Belgian Congo. Norwood also states that he knows the man who operated this plant and is satisfied from his own experiments that the process can be applied successfully to the Whim Creek ore.

Sir Colin Fraser is making further enquiries in regard to this process from Mineral Separations Ltd., Melbourne.

It is proposed that at least one member of the Committee and its technical consultant, Mr. M. A. Mawby, should inspect the property at an early date.

The property is held at present by a Syndicate with no financial resources. While the Committee is completing its investigations, the Syndicate should finalise the discussions it has been conducting with other companies and present a proposal for consideration.

(ii) Ravensthorpe (Phillips River).

Beryl Gold Mines Ltd. The evidence before the Committee was too indefinite to enable them to report thereon. Mr. L. Gibbons, representing the Company, was asked to prepare data and submit it to the Committee with a specific proposal for development.

Elverdton Mines. Apparently all the figures which have been quoted about this group of mines come from an old report by Mr. Danvers Power and before the potentialities of the various mines can be properly assessed it will

be necessary to study the text of this report. In regard to the Elverdton Mine itself, although the longitudinal section of this mine shows several lettered blocks of ore, the tonnage and grade of each of the blocks does not appear to be stated in the report.

Apparently Mr. Percy R. Middleton submitted two separate proposals, one to the Committee and one to the Western Australian Government. The proposal made to the Committee involves an estimated expenditure of £50,000 of which the Commonwealth is asked to subscribe £30,000 - £40,000. The proposal made to the Western Australian Government is a much more modest one. The State Government has already signified its willingness to support this proposal, and we consider this is the one which should be proceeded with.

(b) LAKE CAMPION ALUNITE.

As the successful development of this deposit is largely a matter of treatment, it is proposed that Mr. M. J. Martin should present a report after he has received the necessary data from Western Australia.

In general, however, the Committee is satisfied that there is a very large tonnage of lake mud available containing about 50% alunite at Lake Campion and it is understood that there are several other similar deposits in the vicinity. The process suggested gives three main products - potash, sulphur trioxide and alumina residue. On the evidence submitted, it appears that the deposit could be exploited profitably on a commercial basis for potash at present prices, and we consider that the project should be pushed forward on this basis leaving the possible use of other products to be considered later.

The alumina residue is a finely granular product which does not slime in water and of which 90% alumina is readily soluble in dilute acid. It is still a matter for research, however, to decide whether this alumina is suitable for the production of aluminium, in competition with alumina derived from treatment of bauxite.

(c) BAUXITE.

We examined several bauxite localities in the Darling Range including Savyers Valley, Beechina Hill, Werribee and Toodyay Rifle Range.

It is evident that in this area there are very large reserves of gibbsitic bauxite available, but most of the deposits so far examined contain upwards of 10% of silica. However, chemical analysis and examination of hand specimens indicates that in nearly all the deposits this silica is present mainly as quartz. If this

quartz could be removed cheaply, a relatively high-grade bauxite would be available, as reference to the following analyses will show:-

Lab. No.	6534/40	452/38
Locality	Toodyay	Sawyers Valley
	%	%
Al ₂ O ₃ NaOH soluble	43.48	44.47
Al ₂ O ₃ acid soluble	46.01	45.78
Fe ₂ O ₃ acid soluble	10.14	8.06
SiO ₂ free (quartz)	10.39	16.65
SiO ₂ combined	2.70	2.46
H ₂ O above 100°		25.12
H ₂ O at 100°		.75
TiO ₂ acid soluble	2.46	.91

There are many shallow sections of deposits provided by road and rail cuttings and by pits and road gravels but there has been no systematic prospecting by shaft sinking. Until this has been done it will not be known whether the bedrock contour is approximately parallel to the present surface or whether it is relatively flat, giving in some places considerable thicknesses of bauxite. It is possible that shaft sinking might reveal zones of bauxite, free from quartz.

It is possible, too, that quartz-free bauxites may be present overlying a suitable bedrock and that higher grade material may be found at the head of, and adjacent to, modern drainage.

The production of a high grade bauxite from the Darling Range area therefore depends upon:-

- (i) A cheap process of beneficiation of high free-silica bauxites;
- (ii) The chance that in a thick section high-grade zones may exist;
- (iii) The chance that high-grade bauxites may be found overlying a quartz-free bedrock.

4. RECOMMENDATIONS.

(No specific recommendation is made at this stage in regard to copper).

- (i) That beneficiation experiments on bauxite be put in hand at once.
- (ii) That a shaft be sunk at Werribee and at least one other locality selected by the Government Geologist of Western Australia designed to test a full section of the bauxite overlying granite bedrock.

- (iii) That the bedrock of the Darling Range area be studied in greater detail with the object of finding a rock type which may have given rise to a higher grade bauxite than is found overlying granite areas.
- (iv) That at least a reconnaissance survey be made of other lakes containing alunite mud.

Yours faithfully,

(Sgd.) Colin Fraser - Chairman
(Sgd.) H. G. Raggatt }
(Sgd.) M. J. Martin } - Members
(Sgd.) J. M. Newman }

COPPER AND BAUXITE COMMITTEE