

RIO TINTO AUSTRALIAN EXPLORATION PTY LIMITED
MELBOURNE AUSTRALIA

REVIEW OF PROSPECTS

RINGAROOMA PERMITS

N.E. TASMANIA

by

J H Rattigan

10 October 1958

58_247

RIO TINTO AUSTRALIAN EXPLORATION PTY. LIMITEDREVIEW OF PROSPECTS RINGAROOMA PERMITSN.E. TASMANIA.

by

J.H. Rattigan

C O N T E N T S

	<u>Page</u>
INTRODUCTION	1
PAST BORING AND BORING PRACTICE	1
COMMENTS ON PRODUCTION AND MINING METHODS	3
COMMENTS ON PROSPECTS	3
1. Dredgeable Flats	
2. Deep Leads	
3. Estuarine gravels and terrace deposits	
GENERAL CONCLUSIONS	7

MICROFILMED

INTRODUCTION

This review is intended purely as a summary of prospects and suggestions concerning exploration of alluvial tin deposits which may exist in the R.T.A.E. permits. This review follows a limited programme of scouting and check boring by R.T.A.E. and an analysis of results.

The geological and economic background within our permits is given fairly fully in the following R.T.A.E. reports by the writer.

- (1) No. 6/1958 - The Prospects for alluvial and other Secondary Tin Deposits within SPL 323, N.E. Tasmania.
- (2) No. 14/1958 - Report on Bedrock Studies in Relation to tin prospects of the Tertiary Basins of SPL 323, Ringarooma District N.E. Tasmania.
- (3) No. 15/1958 - Report on Alluvial Boring Ringarooma District, N.E. Tasmania, May-Sept. 1958.

These reports are taken as read for the purpose of this review.

PAST BORING AND BORING PRACTICE

Tin deposits in N.E. Tasmania have been known for more than 80 years and over this period there has been a considerable amount of boring done in many parts of the area, but huge areas of untested ground remains. This is well shown by the fact that the presently operating Endurance Co's leases, until recently, did not cover the extensions along strike of the Endurance Lead and untested open ground existed ahead of the workings. When tested, in April 1958, by a bore line of 6 holes reserves of 3,000,000 yards of better than $\frac{1}{2}$ lb/c.yd. cassiterite were indicated, several holes giving values of better than 1 lb/c.yd. to depths of about 130'.

Recorded values of past boring programmes must in many cases be regarded as suspect, except when efficient supervision was exercised by qualified personnel. Bore values may be suspect for two reasons, (1) natural vagaries of alluvial ground e.g. patchiness or localisation of rich tin in narrow pockets, (2) poor boring and evaluation practice e.g. estimates of pebbly ground from small diameter holes, or inefficient boring and sampling.

In this regard we can say that boring by Dorset Tin (post 1945), Endurance, Pioneer and Briseis Companies (generally supervised by qualified managers) and Austral-Malay boring (carried out under supervision of Briseis Co. managers) can be expected to be fairly reliable. Poorly supervised Government boring is suspect.

Boring programmes of which records are known to exist include the following:-

Arba Lead, Branhholm. Ringarooma Flats, Arba Area.	Austral Malay	Reliable
Ringarooma Flats, Arba Area.	Govt. 1933 Shallow boring by unknown party possibly Govt.	Reliable Not known
Valley Lead, Derby Area.	Briseis Co. & Austral Malay	Reliable
Briseis Mine, Derby	Briseis Co.	Reliable
Weld Frome Lead, Moorina.	Tas. Govt.	Not known
Pioneer Mine, Pioneer	{ Pioneer Co. Austral Malay	Reliable
Dorset Flats	4" { pre 1945 5" {	Unreliable (unsuitable bore diameter)
	5" & 16" Dorset Tin post 1945	Reliable in boring practice.
Flats between Pio- neer & Endurance Mines.	{ (1) Endurance Co. (2) Dorset Tin (3) Tas. Govt.	Reliable Reliable No values so can be taken as reliable.
Endurance Mine Leases	Endurance Co.	Reliable
Amber Hill Area Mussel. Roe District	Govt. Govt.	Unreliable Unreliable
Scotia-Lochaber Leads Great Northern Plain.	Govt.	Unreliable
McGregor Mine Area	Dorset Tin	Reliable
Foster's Marshes	Dorset Tin 16"	Reliable
Foster's Marshes	Austral Malay	Reliable
Foster's Marshes	Delta Tin Mines	Unreliable
Great Northern Plain	Miscellaneous Govt. boring	Reliability not known.
Delta Mine Area	Delta Tin Mines	Unreliable

In addition to this boring we have the recent R.T.A.E. boring and verbal reports of boring by private individuals and companies for which records are no longer available. The boring or mineral leases currently held by the Endurance and Pioneer Companies is not readily available to us, but has been sighted by the writer unofficially at the Endurance Office. No copies of records or plans however, are in R.T.A.E. files.

COMMENTS ON PRODUCTION AND MINING METHODS

Tin ore has been won from several types of alluvial ground within the area of our permits and in total, despite imperfect records of early production when more intensive working occurred, recorded production is of the order of 40,000 tons cassiterite concentrate.

At no time in the history of the field has intensive testing been carried out, even on operating mines. This is well shown by the above mentioned case of the Endurance Co., which if their leases had been properly tested when operations commenced would have been in a sound position to set up a larger scale operation and have cheaper operating costs. Here, after twenty years operations, the company have, by reason of recent boring, indicated a further twenty year life on the scale of present production (300,000 yards of $\frac{1}{2}$ lb. ground per year). If initially the whole lease area had been tested the company should have been able to capitalise and equip the mine to allow of an annual throughput of 100,000,000 yards per annum with a twenty year life for an annual production of better than 300 tons of metallic tin per year.

In the Star Hill Company's leases something similar has occurred, production still being strongly maintained from the small sluicing operations of a syndicate after earlier mines had been long abandoned.

The methods of working used in the past and at present include:-

- (1) Shallow dredging of river flats e.g. Dorset (to 40' depth).
- (2) Sluicing and gravitation.
- (3) Sluicing and elevation of ground by
 - (a) gravel pump
 - (b) blower (hydraulic elevator).

Other methods of working alluvials but not practiced in the district are mechanical excavation and underground mining.

Sluicing operations have been the most common methods and especially by small operators for if the fall of the country is suitable for gravitation they are not faced with high establishment and operating costs. Where elevation is necessary costs are higher and in the case of the Briseis Mine the presence of large basalt boulders in the overburden has always caused problems.

Electricity and water supply in the area should be adequate for any large scale operation which could allow of pumping costs being met, if sluicing or dredging were the mining method employed.

COMMENTS ON PROSPECTS

Prospects for alluvial deposits may be considered as lying in the following types of deposits:-

- (1) Dredgeable flats.

- (2) Deep leads
 - (a) extensions of known and partially worked leads.
 - (b) undiscovered or untested.
- (3) Estuarine gravels, alluvial and marine terraces.

Dredgeable flats

The two major rivers of the area (Ringarooma and Boobyalla) have some wider sections of flats along their courses. Also wide areas of fairly even terrain occur as plains and swampy flats. These type of ground could conceivably be dredged, were tin deposits of sufficient yardage to be proved. At present only one dredging operation (Dorset) is being carried out and this is along the Ringarooma Flats, near South Mount Cameron, where tin deposits of low grade occur and have allowed of an operating profit by a Government controlled concern which is in effect subsidised.

Present Ringarooma River Course

Along the Ringarooma River within our permits are only two wide areas of flats (apart from the Dorset area) which would allow of sufficient yardage for dredging to be considered. These are:-

- (1) The flats between Branxholm and Derby.
- (2) Fosters Marshes.

Both of these areas have been partially tested by boring and while cassiterite does occur, all reliable bore records suggest that average values of ground are low (less than 0.15 lbs/yard). Total ground which might be dredged in these areas is very large (exceeding 200,000,000 yards) but while it is possible smaller blocks of ground with values better than shown by past scouting might exist, there is no reasonable grounds for saying that this is a strong possibility on the basis of boring carried out.

Besides these larger areas are smaller flats where tin is known but it is doubtful whether total yardage or values would be sufficient to support a large operation. Also problems such as rock bars in the river bed would prevent easy moving of any dredge from area to area so that they would not easily be worked by one dredge. Such flats are:-

- (1) McGregor Lagoon - Black Duck area.
- (2) Olgivies Flat, near Olgivies Bridge, Gladstone area.

Besides the wider flats cassiterite occurs in the present bed of the Ringarooma River throughout its course but the deposits are bouldery and shallow, rock gorges occur along the river course and the river is subject to flooding. It is doubtful whether any but small fossicking operations such as are at present carried out would be economic when all factors are considered.

Boobyalla River

Flats occur along the course of this perennial stream, but poor values or barren ground are reported to occur beneath them. However, small rich patches of ground occur nearby in the Mt. Honor district. If a future exploration programme in the district is planned it may be worthwhile to do some wildcat testing of some of the flats along this river course though no one area appeals on present information.

Plains Country

Fairly even terrain occurs over wide areas within our permits and would be suitable for dredging were tin bearing deposits proved. The best hope of economic deposits of this type lies in superficial wash bands such as occur in the McGregor area. As testing has shown values in this type of ground are patchy, and overall of low grade (< 0.2 lb/yard), it would appear to be essential to discover bottom deposits of deep leads etc. to boost values in such areas.

Areas outside our permits

The Mussel Roe River and its Eastern Branch is flanked in places by alluvial flats near river level and by low even terrain at a higher level. These areas carry some tin but ground is likely to be patchy and low grade and any testing must be in the nature of wildcatting.

Deep leadsUnworked extensions of known deposits

It would appear from bedrock studies (see R.T.A.E. Report 14/1958) that while cassiterite concentrations can be expected to occur beyond the working faces of abandoned mines along tributary leads of the Ringarooma system, it is doubtful, because of great depth of overburden, whether they could be worked profitably on a large scale. This is also the case with the Scotia-Lochaber lead system of the Great Northern Plain.

However, some smaller patches of ground may occur near the head of the Weld-Frome lead where the Echo Mine has not to date been proved to have been over the actual gutter of the deep lead. Also by selecting smaller areas along the extension of the Pioneer lead some ground approaching 0.5 lb/yard may be proved. However, yardage is not considered sufficient to justify re-equipping this mine which is in mineral leases held by the present Endurance Co..

The Briseis Mine at Derby showed stanniferous ground over 240' though richest concentrations were on, and within 100' of, bottom. There is little doubt that tin concentration occurs ahead of the old working face but the problems of testing and working ground to depths of 550-750' are great in view of the fact that it would be optimistic to expect values better than 0.4 lb/yard overall, ahead of the abandoned face.

The Arba Lead offers some hope of a moderate production, but it is difficult to see how an operation would be profitable despite the fact that better than $\frac{1}{2}$ lb. ground can be expected to more than 250' depth ahead of the abandoned face. The problem here would seem to be insufficient yardage and total tin content to justify a large sluicing project.

The Endurance Co. has indicated reserves of about 20 years life at the present scale of production (300,000 yards per annum) and as values are better than $\frac{1}{2}$ lb. the mine could be profitably operated if the present tin price were maintained.

Deep leads in the Mussel Roe area may be worth investigating. The Star Hill syndicate has been operating for many years, but for some time worked ground at the head of Tamar Creek which allowed of gravitation and did not always reach the bottom of the alluvials. There is some grounds for testing to prove a deep lead in this area.

Ringarooma Main Lead.

The report 14/1958 covers prospects of this target. It would appear that holes of more than 200' deep would be necessary to prove the gutter of this lead over the more interesting headwards sections of the inferred deep lead.

Undiscovered Leads

There remains chances for discovering virgin deep leads throughout the permit area, but it is considered that the best places to test are the marginal areas of the Tertiary basins where ground might be shallow and because of the natural stripping of barren overburden, values might be economic.

Exploration for such deposits must of necessity be of a wildcat nature by means of line boring.

Two possibilities present themselves on present knowledge of the morphology of bedrock. These are:-

(1) Between the Endurance and Pioneer Mines

A recent bore line 2,500' west of the Western working face of the Endurance Mine appears to indicate that the Endurance Lead has entered an old valley as a tributary to another lead. The wash deposits of the Endurance lead occur about 40' above the deepest ground in this valley and it appears likely that the actual bottom deposits of the Endurance gutter will merge with those of the main valley gutter west of the bore line.

Only one bore line is available for evidence of this theory but it is supported by gradient studies along the Endurance lead and by the nature of the cassiterite in the deep valley and the "perched" Endurance lead. The former has finer sizings of cassiterite perhaps indicative of greater movement from the source, whereas the latter is coarser.

It is feasible that a deep lead heading in the Dorset area may be responsible for the deeper valley of the Endurance bore line and this offers scope for testing for the shallower headwards extensions of such a lead, if it exists.

067

(2) Monarch Mine Area

Coarse tin was recovered in patchy ground at the head of an embayment of Tertiary sediments in this area. Small mines operated for many years in these shallow marginal areas. It is possible that tin deposits may occur along an old stream course which must emerge from this embayment. Some shallow R.T.A.E. scouting with hand bores has to date not been conclusive.

In the Mussel Roe River area there are chances of discovering deep leads in untested areas and in unbottomed sections of worked ground. On the experience of past production yardage is likely to be comparatively small, though values of $\frac{1}{2}$ lb/yard are quite probable.

Estuarine Gravels & terrace deposits.

This type of ground appears to be rather patchy, judged on past boring and examination of mine faces. Small richer patches of ground are of little interest to Rio Tinto and when the deposits are considered as part of the large areas within which they occur the overall values are low.

GENERAL CONCLUSIONS

(1) Unexploited tin occurrences are known from R.T.A.E. permits but the more obvious areas on present information comprise either large yardages of subeconomic grade or small deposits (< 100,000 yards) with better values (say $\frac{1}{2}$ lb/yard). It is apparent that neither of these types of deposits are of interest to the company.

(2) The best chances for economic production lie in the discovery of virgin deposits of which shallower sections of deep leads would appear to be the best targets. The only means of exploring for these is line boring, and this must necessarily be of a wildcat nature until interesting indications are discovered.

(3) The methods of working deposits depends on the dimensions, grade and the morphology of the area in which deposits are proved.

(4) Any exploratory boring should be properly planned beforehand and such boring carried through to completion.

(5) It is considered that the Govt. boring plant recently used for the R.T.A.E. scouting would not be the most suitable for testing deep ground (>180')

10th October, 1958.

J.H. Rattigan,
Geologist.