

516001

933 No 2.

55-117

BLUE TIER URANIUM PROSPECT
TASMANIA

Blue Tier Uranium Prospect
(Enterprise Ex. Co. Pty. Ltd.)
by
P.G. Millar 23.8.55.

516E

Enterprise

EN: 215 000

File M 244 Q-32,33

EXPLORATION COMPANY PROPRIETARY LIMITED

(Incorporated in New South Wales)

P.O. BOX 388
BROKEN HILL, N.S.W.

Telegrams :
"EXPLORECO"
CODES USED
BENTLEY'S
BROOMHALL'S

23rd August, 1955.

Memorandum to: MR. M.A. MAWBY

From: P.G. MILLER

BLUE TIER URANIUM PROSPECT - TASMANIA

I spent from 23rd to 28th July inspecting a uranium prospect in the Blue Tier district of Tasmania. The prospect is held by Mr. R. Tucker of Winnaleah, in conjunction with Mr. K. Turner of Dorset Tin Dredging Company and Mr. E. Armstrong, a local farmer.

Location

The Blue Tier mineral field lies in the County of Dorset in the north-east part of Tasmania, approximately 80 miles by road E.N.E. of Launceston. The actual prospects are approximately 8 miles east of Weldborough, which is on the Tasman Highway (see Locality Plan No. X27/520).

Physiography

The area is one of high relief consisting of an elevated plateau, at approximately 2,300 feet above sea level, with low surrounding ridges with very steep flanks in all directions. Although the land was cleared and grassed some thirty years ago it is now heavily timbered with dense bracken and blackberry undergrowth, and movement is almost wholly restricted to roads and tracks which have been kept open by the Forestry Department. The annual rainfall is high, averaging approximately 65 inches.

Previous History

The area is one which was worked for tin over a period of fifty years, beginning in 1875, when prospectors discovered the alluvial deposits, and the working of these was in most cases very profitable. Eventually most of the alluvial deposits were depleted, and attention was focussed on the primary deposits, which were never really successful, although

001

(2)

it is estimated that 2,000,000 tons of ore were mined averaging 0.2% tin. The Anchor Mine, which appears to be the most favourable with regard to radioactivity, was by far the largest producer, 1,750,000 tons of ore were broken and treated. The companies gradually went into liquidation, and the only work done after 1930 was on a very small scale by prospectors working on a tribute basis. Most of the failures were due to the sporadic occurrence of the ore, and the obsolete methods used for its extraction. Although an attempt was made in 1928 to test and thoroughly outline the orebodies, and several drill holes were put down, very little more work was ever done. A survey was made in 1943 by D.E. Thomas in an attempt to open up the field as a source of tin due to the wartime shortage, but his recommendations were never carried out. ||| ?

Previous Investigations

The field was visited periodically by officers of the Tasmanian Mines Department, but very little was ever published, and the following is a list of the publications available:

1. Blue Tier Mining, by G. Thureau (1886).
2. Report on Blue Tier Mining District and Its Tin Deposits, by G. Thureau (1886).
3. Blue Tier Tin Field, by A. Montgomery (1889).
4. Blue Tier Tin Mines, at Blue Tier, County of Dorset, by A. Montgomery (1893).
5. The Mines of the Blue Tier, County of Dorset, by W.H. Twelvetrees (1901).
6. Blue Tier Tin Field, Geological Survey Bulletin 38, by A. McIntosh Reid and Q.J. Henderson (1928).
7. Blue Tier Tin Field, by D.E. Thomas (1943).

Of these, the report by McIntosh Reid is by far the most comprehensive, and most of the petrological data used in this report is taken from that work.

Leases

Mr. Tucker has taken out a fifty acre mineral lease, which covers the area around the Anchor Mine, and has applied for a Special Prospector's Licence of 3,210 acres, to include the Don, Australia and Summit mines, which includes also his original lease. A Mr. Hale, however, has pegged a square mile surrounding the 50 acre Mineral Lease held by Tucker, and embracing part of the Special Prospector's Licence (see accompanying Plan No. E27/521). Mr. Tucker has also applied for a Mineral Lease over the area around the F.B. Mine, but this has yet to be granted pending grazing rights.

(3)

General Geology and Petrology

The rocks around the area are mainly of igneous origin of Devonian age (A. McIntosh Reid) consisting of granites and differentiates, with some basic dykes of basalt and diabase, presumably of a later age. Two types of granite were to be seen in the areas that I visited, viz., the upper porphyritic granite, and beneath it the medium grained biotite muscovite granite, known locally as "tin granite". It is at the junction of these two granites, or not far beneath it, that most of the tin mineralisation was found, and it is here also that there are signs of radioactivity, and although it is probable that the two are related, it may be that the only areas opened up were quite naturally richer in tin, and nearly all of the exposures are at the junction of the two granites. Numerous bands of coarse and fine grained pegmatite are also present, and often the junction between the two granites is marked by a pegmatite band. Greisenization is also prevalent, especially near the top of the "tin granite", and it is to this that most of the tin mineralisation has been attributed by the earlier investigators. The "tin granite" has suffered considerable hydrothermal alteration, and is conspicuous by the formation of pinite, giving the rock a greenish appearance and making it very susceptible to weathering agents, but the granite has been protected in the main by the overlying porphyritic granite and the fact that there is often a band of siliceous apfite (alaskite) present at the junction of the two granites.

The actual cassiterite is seldom visible to the naked eye, but experience in the field enabled the previous investigators and prospectors to pick the richer concentrations merely by the outward appearance of the rock.

Mineralisation

The most important economic mineral found in the area has been tin, and the occurrences have been quite widespread, but nearly always confined to the junction of the "tin" and porphyritic granites. The tin occurred in two main types of deposits -

- (a) Flat floor deposits corresponding to the bedding planes of the granites;
- (b) thin seams which run in the direction of the jointing planes and, like them, have a steep dip.

Of these, (a) was the most important, the larger workings such as the Anchor, Don and Australia being this type of occurrence. The F. B. Lode, which I also inspected, is of a different type, the tin being associated with copper in a vertical vein.

(4)

As well as cassiterite, other minerals usually associated with pegmatites are also present in small quantities of no economic significance, and specks of galena, molybdenite, chalcopyrite, pyrite, and some carbonates of copper were found in the dumps and workings.

Apart from a few minute specks of torbernite, no radioactive minerals could be determined, and the evidence for any primary minerals is very poor.

Radioactivity

The area as a whole has a higher background count than normal, a feature common to many granitic areas, and the "tin granite" in particular is quite high in the dumps with counts of up to 150 per minute (P.R.M.). High individual counts of up to 1,000-1,200 per minute (P.R.M.) were recorded in the underground workings and in the quarries, but most of this is due to a considerable mass effect, and samples when taken outside show a much lower count, usually dropping to 200-250 per minute (P.R.M.), and often lower. The higher counts are usually confined to joints and veins, and coatings on the backs of the underground chambers, although at the Anchor Mine counts of up to 300 per minute (P.R.M.) were recorded over widths of up to 9 ft., but again this appears to be a probable secondary coating in the joints and on the exposed surfaces. A considerable amount of water is continually flowing along the joints in the chambers, and leaching and reprecipitation would be appreciable. However, there is very little sign of the normal oxidised minerals that are to be expected under such conditions, although a few small flakes of torbernite were usually found after a careful inspection of the areas of higher counts.

Altogether, a total of six different localities were visited during the period I was in the area, and these will be enumerated in detail below.

(1) The Anchor Mine

This is the most southerly of the line of prospects visited (see Locality Plan No. K27/521), and is the most favourable as far as radioactivity is concerned. The workings consist of a very large quarry (approximately 1,750,000 tons were removed), and occasional adits and chambers. A reasonably good road provides access to the workings, and although the hill slopes are heavily timbered, the quarry itself is relatively clean.

(5)

Occasional slightly higher counts than normal were recorded at various points in the quarry, but the only significant readings were in a chamber excavated by tribute miners in the north-east corner of the workings known as the Pentridge face. This chamber gave high counts, especially in the joints and puggy micaceous veins, and was sampled in considerable detail (see attached Plan No. X27/522).

The chamber, which is just below the pegmatite band at the junction of the two granites, has three main joints dipping south at 5-10°. These joints, filled with biotite, quartz and a brown clayey material, are from 3-12 ins. wide and show high counts of up to 1,200 per minute (P.R.M.), while the intervening granitic material also gave high counts of up to 400 per minute (P.R.M.). The same joints when tested outside the chamber gave a higher count than the normal "tin granite", but considerably lower than the readings taken in the chamber, though a lot of the material could have been leached away.

A small adit to the north of the chamber, and in a similar position with relation to the two granites, also showed signs of a higher count on the joints inside the adit of up to 500 per minute (P.R.M.), but most of this is due to a mass effect.

Several pegmatite bands and dykes of various types occur throughout the quarries, but showed no higher count than normal.

A sample taken from the old battery site, and apparently consisting of some of the old slimes, gave a very high count and assayed 0.26% U_3O_8 (equivalent to 5.8 lbs. per ton). The material was in a too finely divided state to be identified, but may possibly have been composed in part of monazite, but is of no significance economically as it is obviously some form of concentrate.

Chemical assays of samples taken in the chamber show a much lower U_3O_8 content than previously reported by radiometric and fluorimetric assays done by the Bureau of Mineral Resources, as values of 0.22% to 0.35% U_3O_8 equivalent were reported. The chemical assays shown below are much lower, and possibly the uranium may have been leached out leaving the products of decomposition, or possibly some monazite is present. The samples previously assayed by the Bureau were, however, only pieces from joints showing a high count, and only one representative sample was taken. The details of chemical assays obtained from the South Australian Mines Dept. are shown in the table below:

(6)

<u>Sample Number</u>	<u>Description of Sample</u>	<u>% U₃O₈</u>	<u>lbs. U₃O₈ per ton</u>
1	Puggy vein in top of chamber 4 in. thick	0.060	1.3
2	5 ft. sample down wall of chamber	0.045	1.0
3	Puggy vein in top of chamber 6 in. thick	0.12	2.7
4	Vein in top of chamber	0.17	3.8
5	Sample of coating of back of chamber	0.13	2.9
6	6 ft. sample down wall of chamber	0.02	0.5
7	6 ft. sample down wall of chamber	0.03	0.7
8	9 ft. sample down wall of chamber	0.02	0.5

For location of samples refer to attached Plan No. Z27/522. Radiometric and fluorimetric assays of similar samples done by the Bureau of Mineral Resources are as follows:

<u>Description of Sample</u>	<u>Radiometric</u>	<u>Fluorimetric</u>
3 in. mica seam between two granites	0.22% equiv. U ₃ O ₈	0.26%
1 ft. above seam to 4 ft. below seam (5 ft.)	0.02% " "	0.029%

Australia Mine

This is south of the old town of Poimena, and is one of the three mines worked in later years in conjunction with the Anchor Mine, to which it was connected by an aerial tramway. The workings consist of a large quarry with several benches. It is situated in the "tin granite", presumably near the top, but all overlying material has been removed. Counts in the quarry were generally low, rarely exceeding 130 per minute (P.R.M.) and could probably be traced to the "tin granite" which gives a similar count in bulk. To the north of the main workings, however, a fairly deep pit exposed a vein of brown clayey material dipping 80° W. and striking N.E., varying from 3 ins. to 2 ft. wide, which gave very high counts in places of up to 3,000 per minute (Philips monitor). Closer examination of these high spots invariably showed traces of torbernite while the surrounding granitic, almost pegmatitic, rock showed a much lower count of 150-200 per minute (Philips monitor). The R.P.M. instrument occasionally reached counts of up to 700 per minute over isolated spots in the vein. The vein showed some iron and manganese staining, but was very weathered and could have been greizenization along a previous joint plane. A chemical assay of the vein showed 0.035% U₃O₈, or 0.8 lbs. per ton U₃O₈, which is much lower than the

(7)

counts would indicate, but again there is a considerable mass effect. Traces of copper were found on pieces of apfite in the dump, but none could be found in situ.

This area, then, does not appear to show much promise, in spite of the high counts previously reported.

Summit Mine

This mine is situated just north of the Australia Mine (see attached Plan No. K27/521). The workings are all in the "tin granite", which shows some iron and manganese staining in places, but no count above 120 per minute (P.R.M.) could be found, and this is probably due to a mass effect.

Don Mine

This quarry, which is south of the Australia workings, showed no appreciable amount of radioactive material. The workings, which consist of a quarry and several large underground chambers, are all in the "tin granite", the junction of the tin and porphyritic granite not being exposed in the chambers, but according to previous investigators is further up the hill slope covered by dense undergrowth. Counts were very low, even in the chambers which had a background of 100-120 per minute (P.R.M.), although one spot gave a count of 300 per minute (P.R.M.) but was confined to a narrow steeply dipping joint. Occasional small specks of unidentifiable sulphide (possibly molybdenite) were present in the back, occasionally surrounded by green copper stains.

Counts in this mine were too low, however, to be of any significance.

Liberator

This prospect, which is just outside the area applied for by Tucker, was also visited, but apart from an occasional higher count in a joint nothing of any significance was discovered. The workings are again in the "tin granite", just below the junction with the porphyritic granite which has been removed by erosion.

F.B. Mine

This mine is situated west of the line of workings previously reported (see Plan No. K27/521). It can be reached by an almost abandoned road which necessitates chains on a vehicle.

(8)

It is a different type of deposit to those previously reported, in that it is clearly a vein deposit, filling and probably replacing a previous line of weakness. The lode was vertical, and from 10-15 ft. wide, and was worked to a depth of 40 ft. over a length of 800 ft. Its mineralogical associations are different in that the tin occurs with chalcopyrite, although the lode was never worked for its copper content. All workings are under water at the moment, and the original lode cannot be seen, all mineralised material having been removed.

Three diamond drill holes were earlier drilled, and although I found some of the core, all mineralised portions appear to have been removed for assay. The drill holes (two to the west and one to the east) were placed so as to apparently intersect the lode at a depth of 100-200 ft., and the lode apparently consisted of primary mineralisation, although none can be seen at present apart from some pyrite on the edge of the cut.

Although the actual workings are relatively clear of undergrowth, the area around is very heavily timbered with dense undergrowth, and further possible extensions of the lode could not be traced as movement is very difficult.

Radioactive counts around the area are very low (see attached Plan No. K27/529), although the junction of the two granites is exposed, and it appears that the tin ore was concentrated in the vein which may or may not be slightly radioactive. On present indications, however, the prospect does not appear promising as far as uranium is concerned, while little can be stated about the copper content on present surface exposures.

Summary and Conclusions

Of the areas inspected during the visit, the Australia, Don, Summit and Liberator workings do not appear worthy of any further exploration, and the only area of any importance, although not of economic significance, is that of the workings of the Anchor Mine. Although the high radio-active counts reported in this area by Tucker did exist, he was not completely aware of how great the mass effect could be in the places that he had tested. The chemical assays show that the amount of uranium present is not as high as might be expected from counts of the material in situ. Possibly the radioactive equilibrium has been upset by the leaching out of the more soluble uranium, leaving the daughter products of decomposition which are, after all, what are detected by a Geiger counter. Monazite has been reported in the area, and this also may have contributed to the higher count. However, leaching effects would not be so appreciable in the chip samples which were taken across the "tin granite" containing the veins. This sampling was done in an attempt to obtain some idea of the grade that would need

to be mined to work the prospect, and the assays here show that no economic grade of ore exists.

Although areas of slightly greater concentration may still be hidden, the problem would appear to be somewhat similar to that which confronted the earlier workers of the tin, in that unless some loci for deposition such as a line of shearing, or a bed suitable for replacement, are present, granitic and pegmatitic mineralisation is notoriously sporadic, even though it may be widespread. In this instance, the mineralisation appears to be somewhat structurally controlled within the granite itself, in structures following the emplacement of the granite, and the mineralising solutions have been deposited in many widespread low grade occurrences instead of the one area of high concentration.

Therefore, although uranium does definitely exist in the area, there appears to be very little chance of any economic deposits, and the area does not appear to warrant any further interest as far as radioactive material alone is concerned.

The possibility of combined tin-uranium production to combat the low grade of each does not appear favourable under present day conditions. The Anchor Mine is reported by McIntosh Reid to have had an average grade of 0.2% tin, equivalent to 3.5 lbs. per ton, and this at present day prices (£8.25 - 8.5 per unit F.O.R. Sydney, May 1955) would value the ore at approximately £1.6 per ton for the tin content. This grade, however, is rather high in my opinion for future work, as the areas previously quarried had little or no overlying barren porphyritic granite. Any advance on faces at present exposed in the quarry would, however, increase the thickness of the overburden to be removed, and as open cut methods seem essential, then it is doubtful whether a grade of much greater than 0.1% could be maintained. This, combined with a uranium content of approximately 1 lb. U_3O_8 per ton, does not appear to be a particularly high grade deposit, especially as it is not known whether the uranium and tin are always associated, or if the uranium occurs in an easily separated form. Therefore, the fact that tin is associated with the radioactive ore does not greatly increase the economic significance of the area.

The F.B. lode, where the main interest lies in the copper content, can hardly be accurately appraised under existing conditions. The ore appears to have been all primary, with almost no chance of any secondary enrichment, and the grade may have been dropping off in depth as was the tin content. Much work would need to be done around the workings before a thorough surface investigation could be made, but on present indications this does not appear to be warranted.

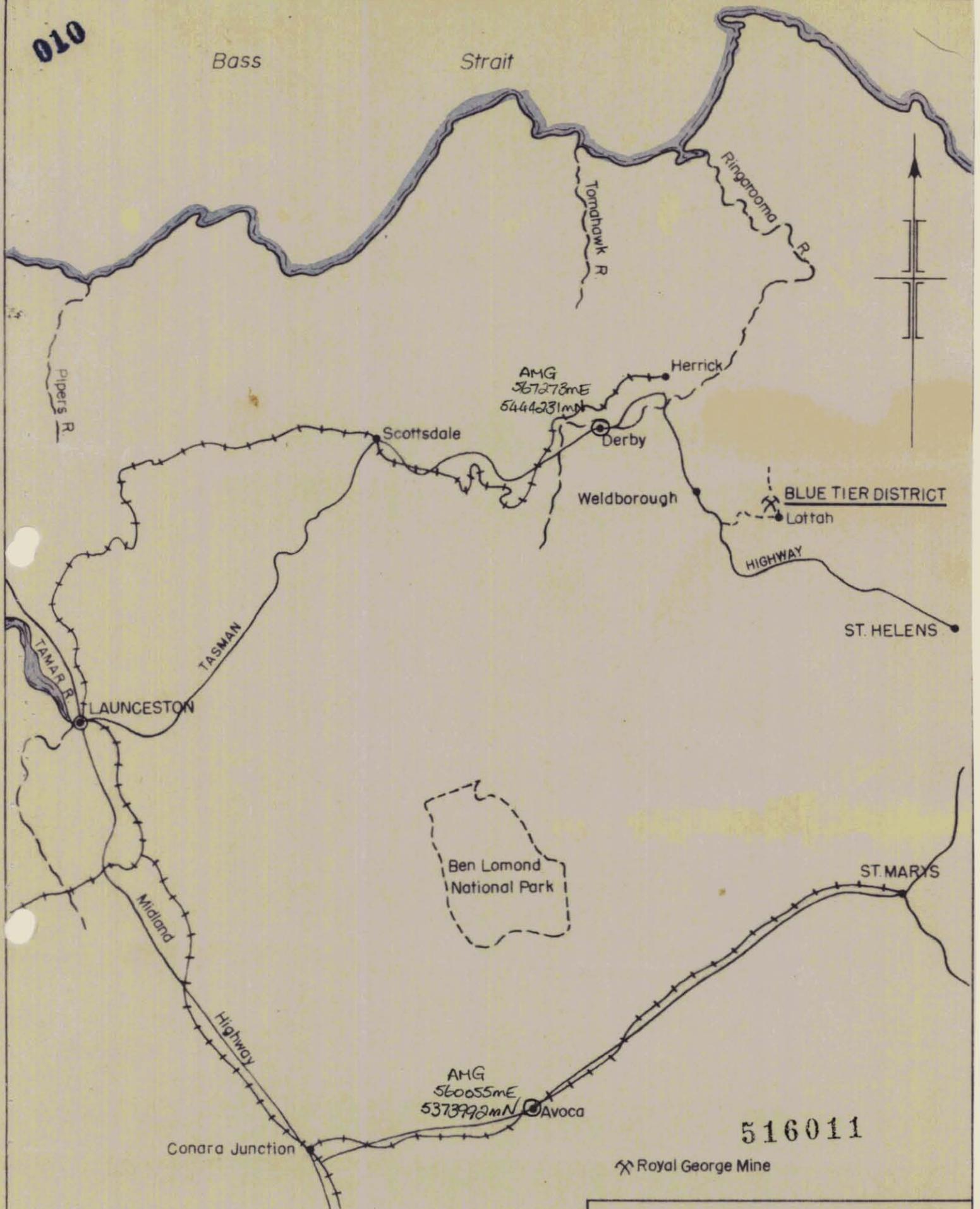
P.G. Miller

P.G. MILLER

010

Bass

Strait



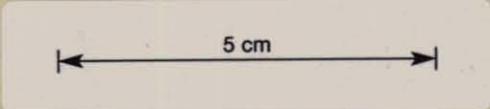
516011

⚡ Royal George Mine

Enterprise Exploration Co. Pty. Ltd.

LOCALITY PLAN
BLUE TIER DISTRICT, TAS.

AMG REFERENCE POINTS ADDED

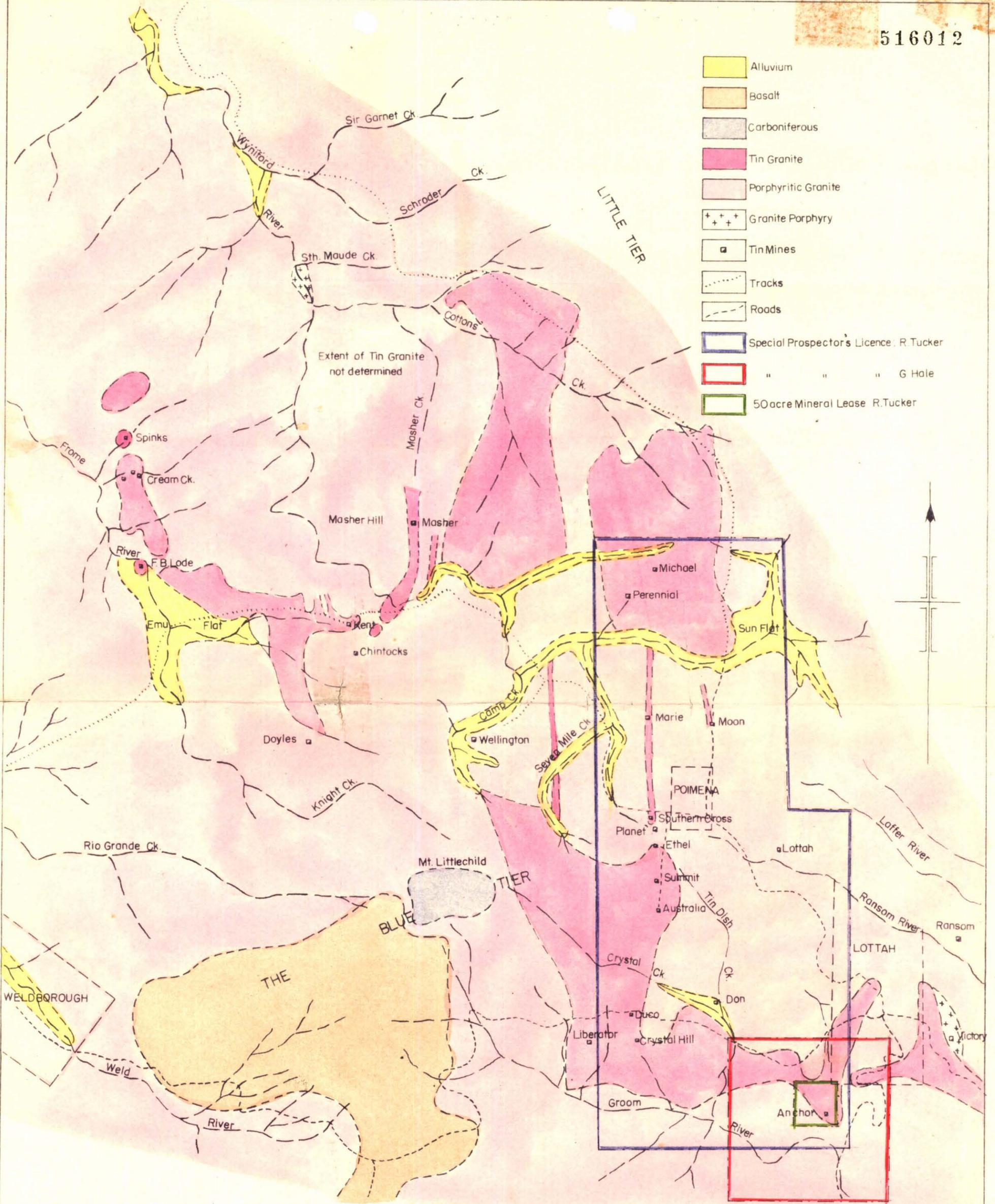


Scale
1" = 8 Miles

Date
August 1955

Plan No
X27/520

- Alluvium
- Basalt
- Carboniferous
- Tin Granite
- Porphyritic Granite
- Granite Porphyry
- Tin Mines
- Tracks
- Roads
- Special Prospector's Licence: R. Tucker
- " " " G Hale
- 50acre Mineral Lease R. Tucker



Enterprise Exploration Co. Pty. Ltd.

012

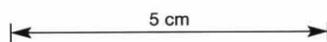
**GEOLOGICAL SKETCH PLAN OF BLUE TIER
TIN FIELD SHOWING KNOWN OCCURRENCES
OF THE TIN GRANITE.**

(After D E. Thomas, DSc. Govt. Geologist, Tasmania, 1943)

Scale
1" = 40 chs.

Date
Aug. 1955

Plan No.
X27/521



011

Background outside 100-150/min. P.R.M.

Pentridge West Face

Back is junction of tin granite with overlying aplitic and pegmatitic band

Back is joint dipping S. at 5-10°

A

⑥ 6' sample across veins

④ 6" vein in back 1000/min. P.R.M.

⑦

6' sample across veins

Background on floor 250-300/min. P.R.M.

⑤ Coating on back 1500/min. P.R.M. in places

5-10°

③

Sample No.	% U_3O_8	lbs/ton. U_3O_8
1.	0.060	1.3
2.	0.045	1.0
3.	0.12	2.7
4.	0.17	3.8
5.	0.13	2.9
6.	0.02	0.5
7.	0.03	0.7
8.	0.02	0.5

⑧ 9' sample across veins

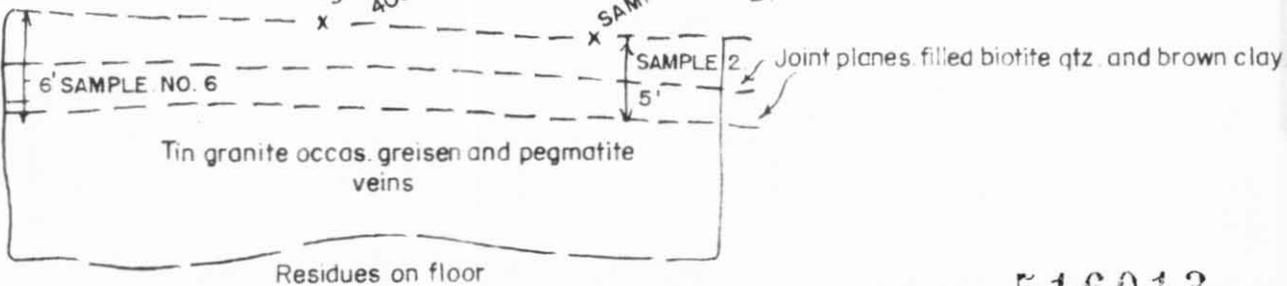
B

SAMPLE 3. VEIN IN BACK. 400/MIN. PHILIPS

A.

SAMPLE 1.

B.



516013

SECTION ALONG A-B LOOKING N.E.

Enterprise Exploration Co Pty Ltd.

PLAN AND SECTION OF CHAMBER IN ANCHOR WORKINGS, BLUE TIER DISTRICT, TASMANIA, SHOWING SAMPLING DETAILS.

5 cm

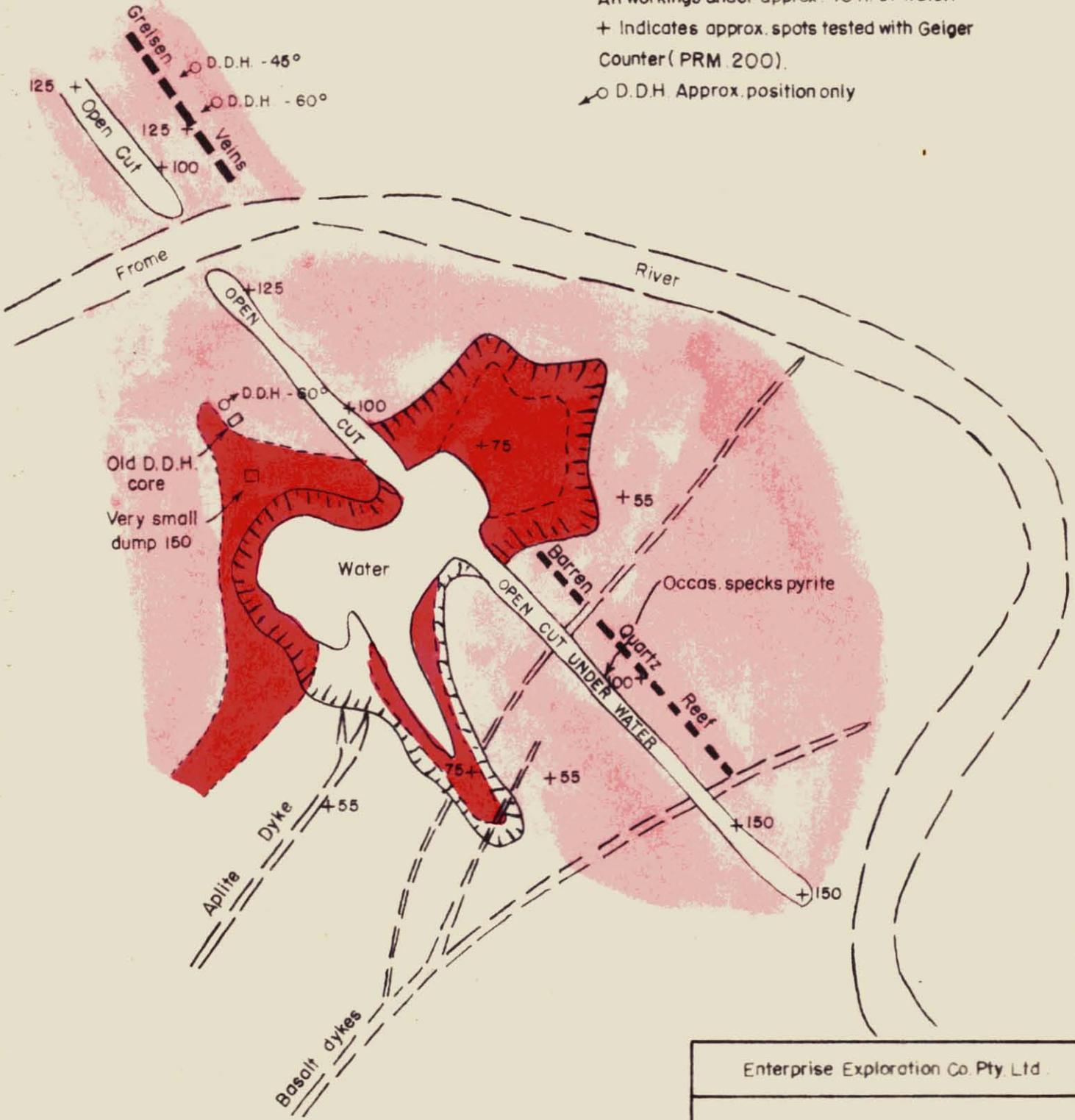
Scale 1" = 10'

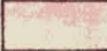
Date Aug. 1955

Plan No. X 27/522

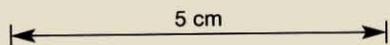
009

All workings under approx. 40 ft. of water.
 + Indicates approx. spots tested with Geiger Counter (PRM 200).
 ○ D.D.H. Approx. position only



-  Greisen
-  Fine grained tin granite
-  Porphyritic granite

516014



Enterprise Exploration Co. Pty. Ltd.		
F. B. MINE. BLUE TIERS AREA, TAS. (After D.E. Thomas)		
Scale 1" = 100'	Date Aug. 1955	Plan No. X27/529