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PROGRESS REPORT
EXPLORATION LICENCE 19/78
WELDBOROUGH
August 20th, 1979.

79-1387

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August, 1979.

OPEN FILE

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SUMMARY

In the F-B/Cream Creek district, there is evidence that large tonnage, low grade, tin deposits occur as a large sheet of tin granite, beneath a shallow cover of normal granite. The tin granite occasionally appears as "windows" in the overlying normal granite.

The trace element characteristics of the granitic rocks were used to detect the significant tin granite sheets. The results clearly show a degree of fractionation within the tin-granite sheets, but the trace element geochemistry of the normal granite does not reflect fractionation in the underlying tin granite sheets.

It is recommended that detailed geological mapping be carried out to locate and identify structural highs.

INTRODUCTION

Following a regional evaluation of the Blue Tier Tinfield, Exploration Licence 19/78 Weldborough of 50 sq km (Fig. 1) was pegged on September 8, 1978. The E.L. covers the Cream Creek Tin Mine and is located near the F-B lode (Nichols Mine).

The initial programme included a review of literature relating to production statistics and geology of the mining properties, property and prospect evaluation and trace element analysis to assess the metal zoning associated with greisen Sn deposits.

The Cream Creek district was shown to have potential for the discovery of a hitherto undiscovered and roofed greisen tin deposit. There is evidence a large sheet of tin granite is present at Cream Creek that is only exposed through "windows" in the overlying normal granite. The F-B and Cream Creek mines may not necessarily represent the main tin deposits in the district but are simply the only exposures or near exposures of tin granite available to prospectors. There is every possibility that large tonnage, low grade, (>3,000,000 tonnes of 0.2 - 0.3% Sn) tin deposits occur in the district, beneath a shallow cover of normal granite.

LOCATION AND ACCESS

The Blue Tier mineral field lies in the County of Dorset, in the north-eastern part of Tasmania. Weldborough, central to the area, is situated on the Tasman Highway 40 kilometres north-west of St. Helens. Most convenient access is from St. Helens via the Tasman Highway to within 4-6 kilometres of most of the old mining properties.

Access is then by means of forestry tracks and old mine roads, many of which are now overgrown and impassable. Access is generally poor in the Cream Creek area where the old tracks need opening up and repairing.

PREVIOUS WORK

The Cream Creek workings were opened up as alluvials in the early 1880's. G. Thureau in 1886 reported over 200 tons of concentrate production. The primary deposits had also been discovered. The Cream Creek Tin Mining Company N.L. was formed in 1888 and a plant erected, in 1889, 21 tons of concentrate was produced. In 1906-1908 the Mt. Lyell Company completed 3 diamond drill holes and produced 20 tons of concentrate. In 1817-1929, 18 tons of concentrate was produced by the Pioneer Tin Mining Co. with a small plant on the upper workings. There is no report of any other work until modern exploration was conducted in 1974, by Geophoto Resources, consultants for Texins Development Pty. Ltd. Geophoto established the presence of a "mass" of tin granite, being continuous from south of the F-B lode to north of the Cream Creek Mine. Geophoto completed a 56 hole programme using a Cobra rock drill to maximum depths of 1.5 metres.

Low tin values were recorded with only one value (0.47% Sn) of any significance. An estimate of the average grade at Cream Creek, based on the Mt. Lyell sampling and drilling is 0.2 - 0.3% Sn, which is confined to only small exposures of tin granite.

REGIONAL GEOLOGY

Granitic rocks of north-east Tasmania crop out over an area of more than 2,500 square kilometres, the largest mass being the Blue Tier Batholith with an area of about 1,800 square kilometres. Radiometric dating (McDougall and Leggo 1965) of these granitic rocks indicates an Upper Devonian age.

The granitic rocks have been emplaced into a folded sequence of essentially unmetamorphosed sub-greywacke-sandstone, siltstone and slate of Siluro-Devonian age called the Mathinna Beds, which are the only exposed Palaeozoic sedimentary sequences in the area. They are unconformably overlain by Permian and minor Triassic sedimentary sequences, which have been intruded by Jurassic dolerite sills. An extensive cover of Tertiary sedimentary rocks and basaltic lavas exists, particularly in the north and north-eastern parts of the area.

The Blue Tier Batholith has been shown to be a composite body (Fig. 1) intruded in evolutionary sequence from early mafic granodionites to late leucocratic granites (Gee and Groves 1971). The granite plutons have sharp discordant contacts, narrow zones of thermal metamorphism, and appear to be high-level magmatic intrusions.

A number of relatively small bodies of medium-grained biotite-muscovite granite are the latest major intrusions in the batholith and tin mineralisation shows a marked association with them. Evidence from several localities indicates these granites form essentially sheet-like bodies with feeder dykes in some areas.

The occurrence of the tin-bearing granites suggest they are confined to high levels in the batholith. They occupy about 10 per cent of the surface of the batholith. As they are sheets of limited thickness they may occupy only 1 - 2 per cent of its volume. Groves has proposed that the high tin content of the granite sheets is due to the partitioning of tin concentrating in residual liquids, the biotite-muscovite granite magma representing the low-volume, ultimate, residual liquid of the primary magma.

LOCAL GEOLOGY

Regional mapping of the Blue Tier Region (Groves, Cocker, Jack 1977) indicates there are only small outcrops of tin granite (Lottah sheets) in the Cream Creek district relative to the areas of more intensive workings in other parts of the Blue Tier.

At Cream Creek a typical "floor" deposit of tin granite is seen in the main quarry face dipping shallowly beneath normal granite. The mode of mining was two-fold. In one instance, numerous quartz-greisen, mica greisen and narrow veins of greisenised tin granite varying in width to approximately 1 metre were worked, creating trenches in a general 310° - 330° direction with a second less developed set of veins (and trenches) striking 040° - 060° . The second mode of mining was to sluice the decomposed normal granite creating the larger open pits and subsequently exposing the underlying tin granite.

PRODUCTION RECORDS

Of all the mining in the Blue Tier only that at the Anchor Mine has been of sufficient scale to give information of the grades to be expected when mining greisen sheets on a large scale. Past production indicates at least 1,552,500 tons were mined with a head grade of 0.20% Sn. When combined with the indicated geological reserves (Aberfoyle 1967), some 2,750,000 tonnes of 0.27% Sn approximates the original size and grade of the orebody. It should be noted that Aberfoyle did not close off the orebody.

With the exception of the Anchor Company no complete and reliable records of production can be obtained. Production records of most of the other old mines are so meagre that it is only possible to make rough estimates; these are summarised in (Fig. 2) where the output of the various mines are shown in relation to the geological environment.

TRACE ELEMENT GEOCHEMISTRY OF THE GRANITIC ROCKS

Groves (1978) states: "The economic potential of a granitoid can readily be assessed by examining the range in concentration of Sr and Ba in coarser grained varieties (not aplites). The greater the concentration range, the more likely is the presence of economic tin deposits. Furthermore, Sr and Ba are useful pathfinder elements in the search for areas where Sn is likely to have been concentrated, since these areas will be characterised by low Sr and Ba contents. Confirmation of such an area as being a region where late stage crystallisation has occurred can be obtained by examining concentration changes of incompatible elements, such as Li and Rb, with height in the granite".

Although a great proportion of Groves' data is from a restricted area of the Anchor Mine, a geochemical method of identifying and assessing the economic potential of a tin-granite and in particular to determine the "height" or "fractionation" (area of late stage crystallisation) of a granite when prospecting for tin mineralisation is most significant.

An orientation programme was designed to investigate:-

- 1) The trace element characteristics of both the normal and tin granite types.
- 2) The trace element metal zoning associated with greisen Sn deposits on a broad scale.
- 3) The possibility that trace element geochemistry could identify late stage crystallisation (fractionation) in a tin granite sheet when covered by normal granite.

Evaluation of the excellent geological map produced by Groves et al (Bulletin 55) indicated that samples collected on a 2 kilometre grid would be sufficient for the study and would detect all the significant tin granite sheets. Accordingly, an arbitrary 2 kilometre grid was designed and samples collected on this grid wherever there was reasonable access. The rock samples collected were in general surprisingly fresh. They were assayed by AMDEL using XRF for Sn, Rb, Ba and Sr and specific ion electrode for F.

The trace element characteristics of the granitic rocks is clearly shown by the contoured assay data (Figs. 3 - 9). Analysis of the contoured data shows that:-

- . Within the tin-granite sheets, degree of fractionation is very clearly outlined by high Rb/Sr and Rb/Ba ratios.
- . With the exception of the Anchor mine area, the highest Rb/Sr ratio was obtained from the Cream Creek area indicating a high degree of fractionation of the tin granite.
- . With the possible exception of fluorine (cf. Anchor Mine Sample No. 206960, normal granite) trace element geochemistry of the normal granite does not reflect fractionation in the underlying tin granite sheets.

CONCLUSIONS AND RECOMMENDATIONS

The surface part of the Blue Tier have been thoroughly prospected thus the best possibility for finding new deposits is in areas where exploration by early miners was restricted by a cover of the normal porphyritic biotite granite. The cover of normal granite is often decomposed and in an open pit mining situation may possibly be removed very cheaply by sluicing (cf. Cream Creek and F-B lode).

As the main zones of tin mineralisation occur within the top 40 metres of the greisenised biotite-muscovite granite sheets, those that are still roofed, i.e. covered by normal granite, obviously have the best potential to host large tonnage deposits.

There is good evidence that in the F-B/Cream Creek district a large sheet of tin granite is present that is only exposed through "windows" in the overlying normal granite.

When covered by normal granite trace element geochemistry does not reflect fractionation in underlying greisen sheets. Structural highs need to be identified by geological means, i.e. increase in the frequency of fractures, quartz and greisen veins, etc.

It is recommended that further evaluation of the Cream Creek area be conducted by detailed geological mapping designed to locate structural highs.

Mapping of covered greisen sheets may also be required by electrical sounding using the Schlumberger I.P. technique.

EXPENDITURE

Salaries and Wages	2,150
Materials	225
Accommodation and Travel	268
Vehicles	400
Contract Geochemical analysis	1,060
Communication	95
Tenure	103
Sundries	58
Administration	872
	<u>\$5,231</u>

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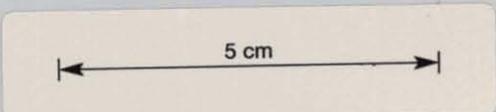
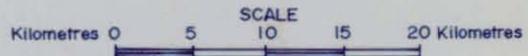
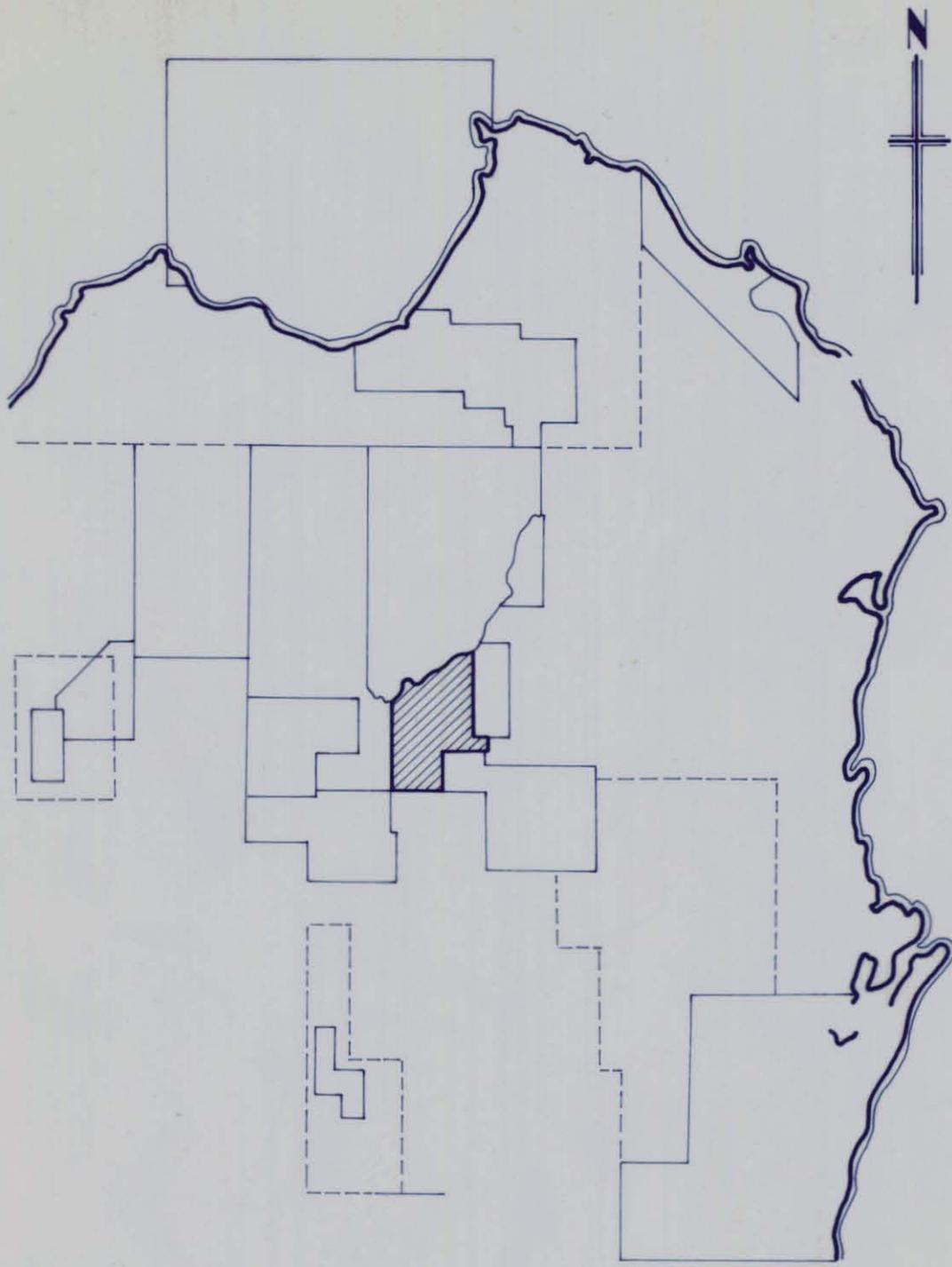
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ENDORSED: *K.R. Yates.*
 K.R. Yates,
 Manager - Outside Exploration.

135012



 Aberfoyle Exploration Pty Ltd

 Other companies

Aberfoyle Exploration Pty Ltd

Drawn
Traced
Checked
Revised
Date

NORTH EAST TASMANIA

LOCATION OF TENURE

Location code	
Date	October 1978
Scale	1: 500,000
Plate N°	NETIN 9

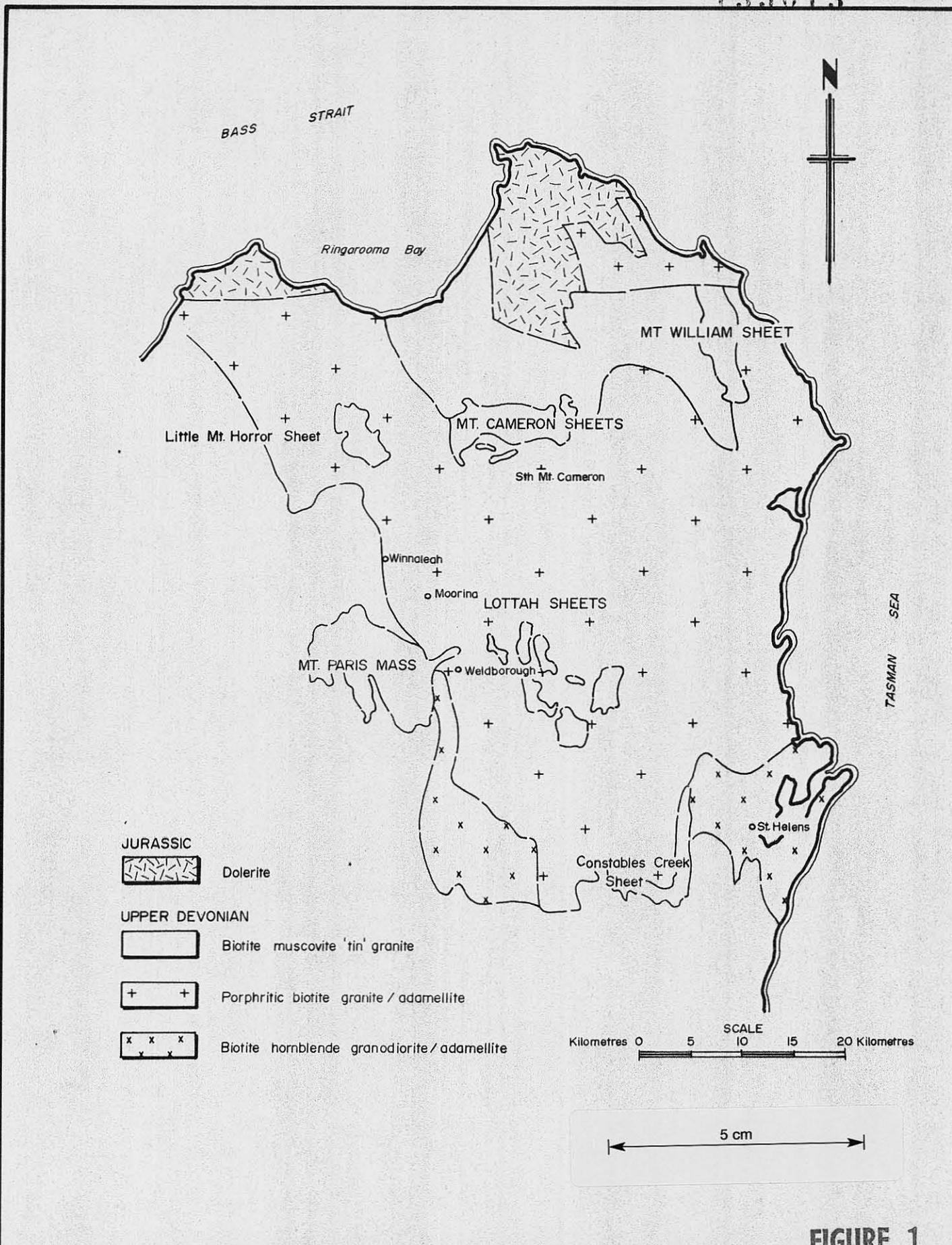


FIGURE 1

Aberfoyle Exploration Pty Ltd

Drawn Groves, Tas. Mines Dept.	NORTH EAST TASMANIA LOCATION OF 'TIN' GRANITES	Location code
Traced R.K.Y.		Date October 1978
Checked		Scale 1:500,000
Revised Date		Plate N° NETIN 8

135012

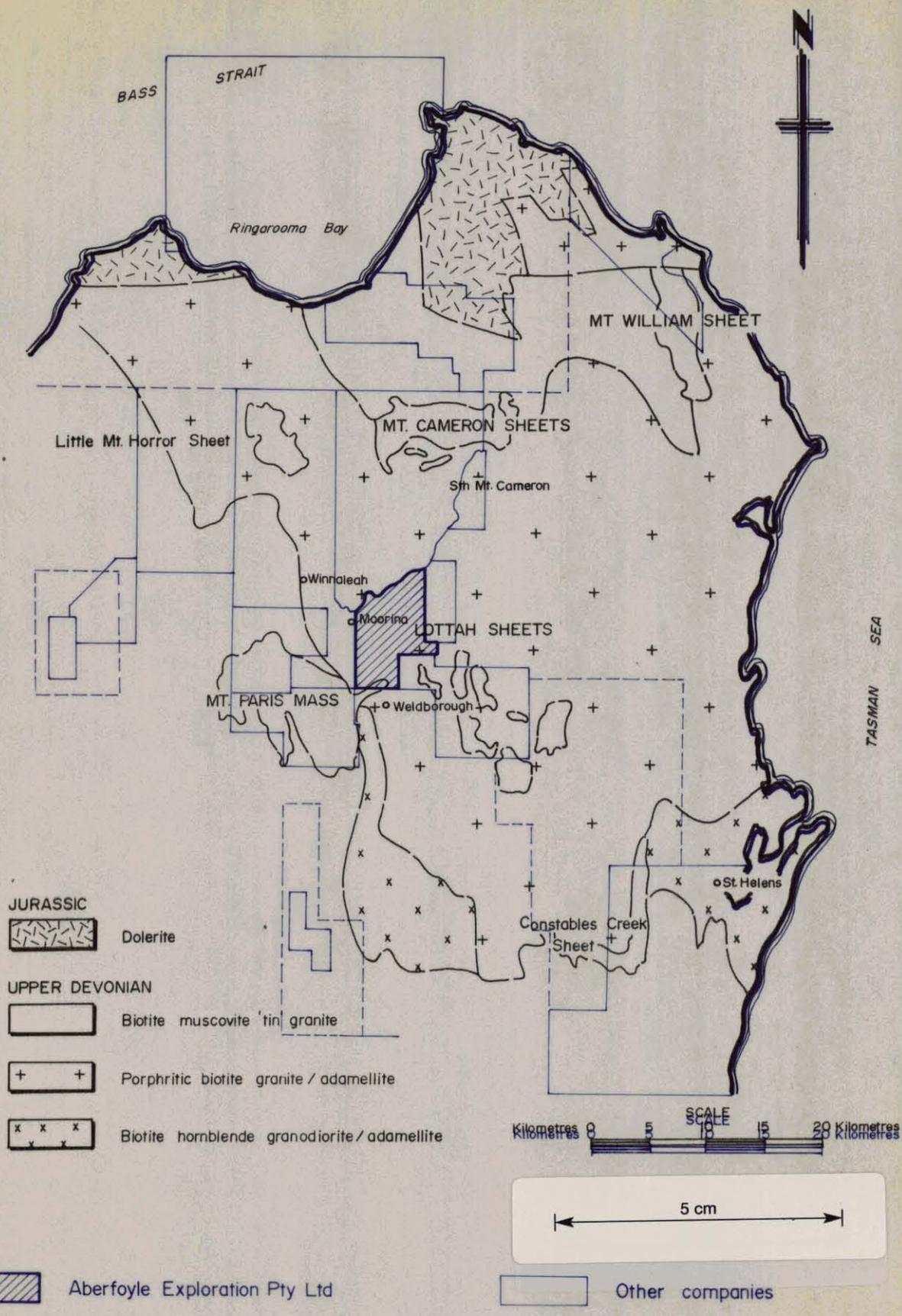


FIGURE 1

Aberfoyle Exploration Pty Ltd

Drawn Groves, Tas. Mines Dept.	NORTH EAST TASMANIA LOCATION OF 'TIN' GRANITES LOCATION OF TENURE	Location code
Traced R.K.Y.		Date October 1978 October 1978
Checked		Scale 1: 500,000 1: 500,000
Revised Date		Plate N° NETIN 8

007

135014



- Q Alluvials (Quaternary)
- Qtb Basalt Talus
- Qtd Dolerite Talus
- T Sand, gravel, clay (Tertiary)
- Tb Basalt
- Jd Dolerite
- P Conglomerate, sandstone, shale, limestone
- Dg1 m.g. Biotite Granite, biotite muscovite granite, greisenised.
- Dg2 Biotite muscovite granite porphyry
- Dg6 Porphyritic biotite granite / adamellite
- Dg15 Biotite hornblende granodiorite
- Sm Mathinna Beds

- TIN DEPOSITS
- Tin deposit, No information
 - ① Deposit 0 - 50 tonnes Sn
 - ② Deposit 50 - 100 tonnes Sn
 - ③ Deposit 100 - 500 tonnes Sn
 - ④ Deposit > 500 tonnes Sn

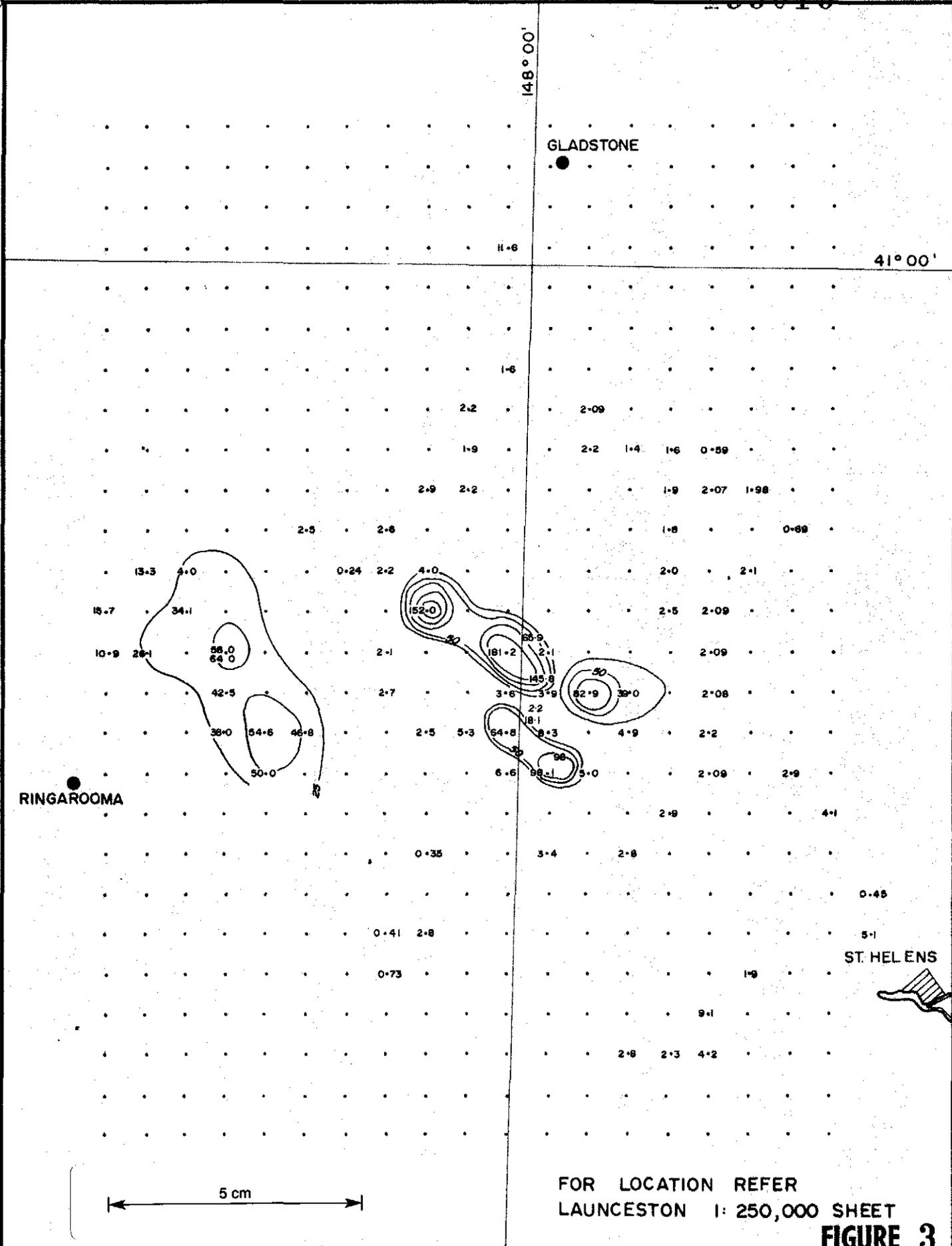
Graph Scale 1cm² = 500 tonnes Met. Tin

Aberfoyle Exploration Pty Ltd

Drawn: R.J.E.	NORTH EAST TASMANIA	Location code:
Traced:	BLUE TIER BATHOLITH	Date: March, 1979
Checked:	Summary Plan showing Sn Metal Production	Scale: 1:126,720
Revised by: Date:	from Lode Sn Deposits	Plate No Fig. 2

013

135015

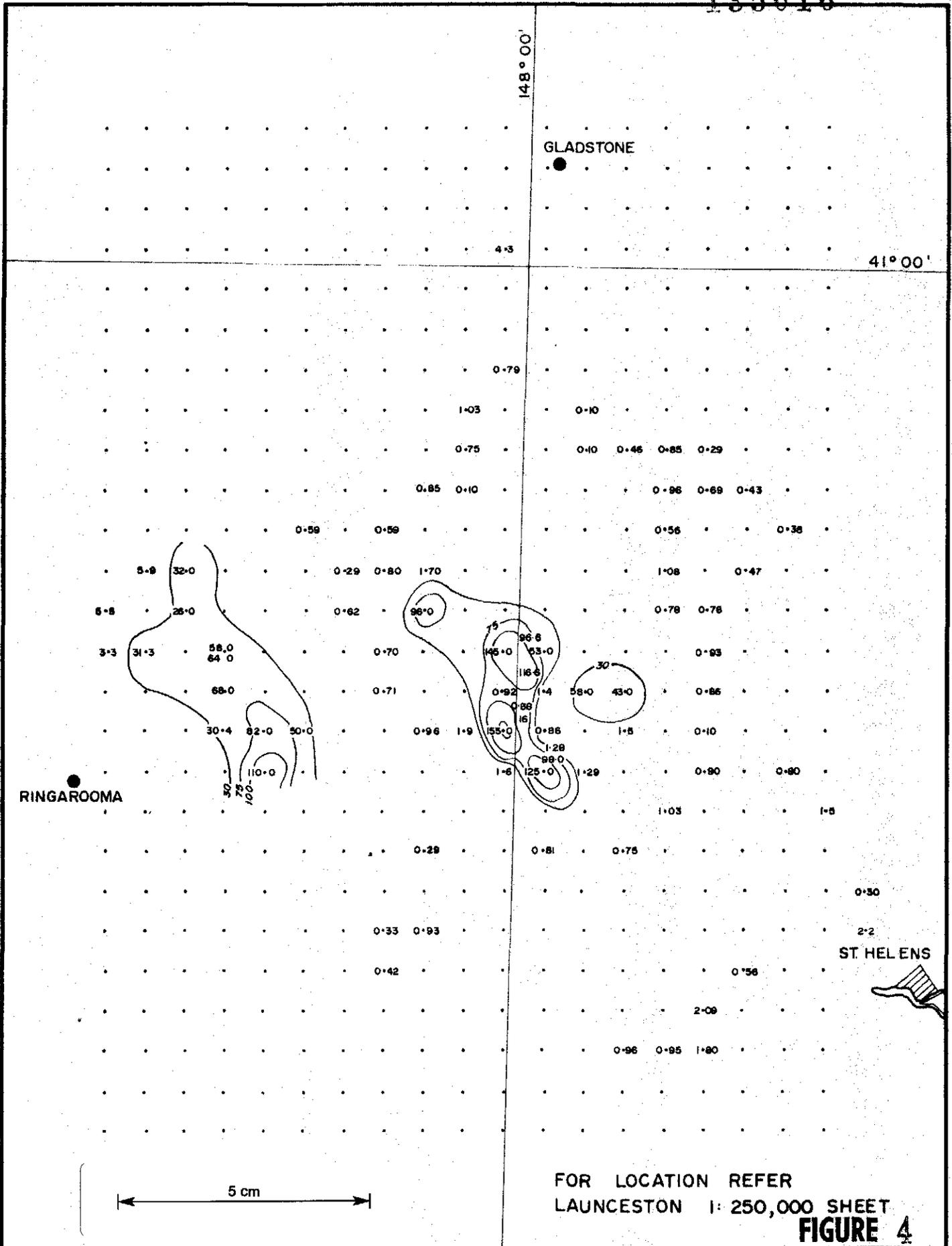


FOR LOCATION REFER
 LAUNCESTON 1: 250,000 SHEET
FIGURE 3

Aberfoyle Exploration Pty Ltd

Drawn: C.H.Y.	NORTH EAST TASMANIA ROCK CHIP SAMPLING GEOCHEMISTRY - Rb / Sr	Location code:
Traced: R.J.E.		Date: Nov. 1978
Checked:		Scale: 1: 250,000
Revised by: Date:		Plate No NET 10/a

014



5 cm

FOR LOCATION REFER
LAUNCESTON 1: 250,000 SHEET
FIGURE 4

Aberfoyle Exploration Pty Ltd

Drawn:	C.H.Y.
Traced:	R.J.E.
Checked:	
Revised by:	Date:

NORTH EAST TASMANIA
 ROCK CHIP SAMPLING
 GEOCHEMISTRY - Rb / Ba

Location code:	
Date:	Nov. 1978
Scale:	1: 250,000
Plate No	NET 10/b

016

135018

148° 00'

41° 00'

GLADSTONE

RINGAROOMA

ST HELENS

5 cm

FOR LOCATION REFER
LAUNCESTON 1: 250,000 SHEET
FIGURE 6

Aberfoyle Exploration Pty Ltd

Drawn: C.H.Y.	NORTH EAST TASMANIA ROCK CHIP SAMPLING GEOCHEMISTRY - Ba in p.p.m.	Location code:
Traced: R.J.E.		Date: Nov. 1978
Checked:		Scale: 1: 250,000
Revised by: Date:		Plate No: NET 10/d

018

135020

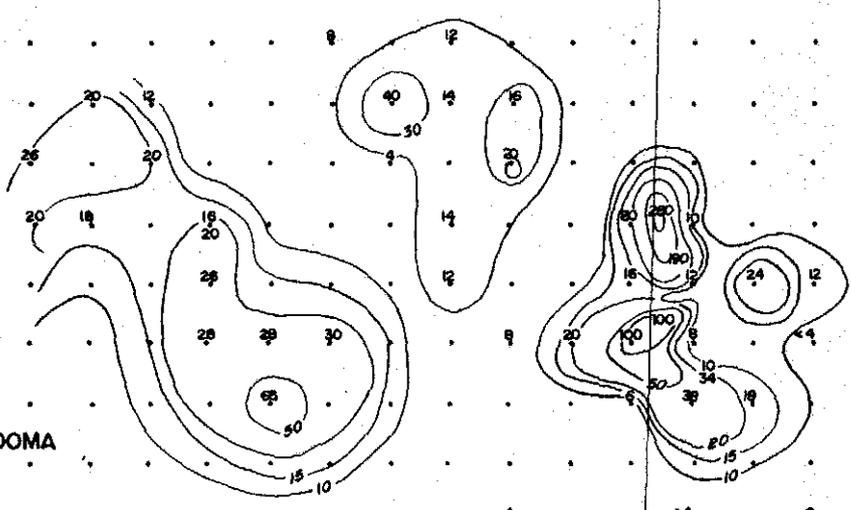
148° 00'

GLADSTONE

41° 00'

RINGAROOMA

ST HELENS



5 cm

FOR LOCATION REFER
LAUNCESTON 1: 250,000 SHEET
FIGURE 8

Aberfoyle Exploration Pty Ltd

Drawn: C.H.Y.	NORTH EAST TASMANIA ROCK CHIP SAMPLING GEOCHEMISTRY - Sn in p.p.m	Location code:
Traced: R.J.E.		Date: Nov. 1978
Checked:		Scale: 1: 250,000
Revised by: Date:		Plate No: NET 10/f

019

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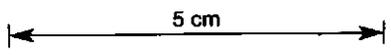
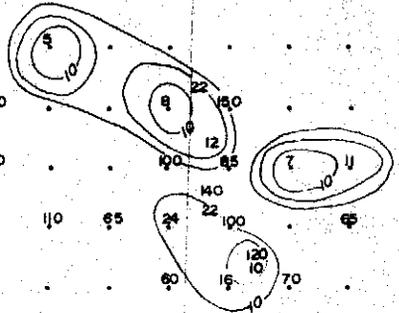
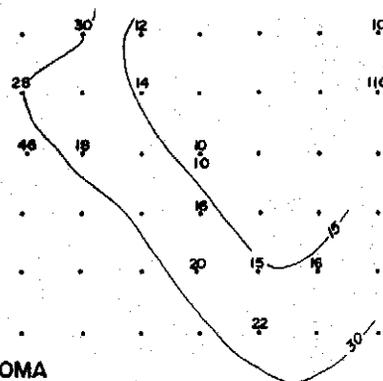
148° 00'

GLADSTONE

41° 00'

RINGAROOMA

ST HELENS



FOR LOCATION REFER
 LAUNCESTON 1: 250,000 SHEET
FIGURE 9

Aberfoyle Exploration Pty Ltd

Drawn: C.H.Y.	NORTH EAST TASMANIA ROCK CHIP SAMPLING GEOCHEMISTRY - Sr in p.p.m.	Location code:
Traced: R.J.E.		Date: Nov. 1978
Checked:		Scale: 1: 250,000
Revised by: Date		Plate No: NET 10/g