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PROGRESS REPORT
AND
STAGE 2 EXPLORATION PROGRAM.

E. L. 9/71, KING ISLAND, TASMANIA.

BY

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I. SUMMARY

A large acid intrusive and its offshoots of Devonian age occur in the property. The main intrusive is bounded to the east and west by pre-Cambrian and Cambrian rocks. The majority of all rock types, however, are obscured by extensive sand and alluvium covers.

The interpretation of the geological and geophysical information suggests that the area of the Exploration Licence contains potential geological environments in which economic mineralisation could have developed.

The targets of the proposed exploration are:

- (i) Skarn type deposits of tungsten, molybdenum and bismuth.
- (ii) Disseminated base metal deposits.
- (iii) Alluvial tin and gold deposits.

An exploration program has been designed in order to upgrade the knowledge of the geology, and to test the possible economic potential of the area. This program entails auger drilling, geochemical and geophysical surveys.

L. G. SZABO, Dip. Geol.

II. CONCLUSIONS

1. King Island has an exceptionally good mineral potential as, besides minor gold, disseminated and vein type occurrences of sulphide mineralisation, mineable alluvial tin deposits and one of the largest tungsten deposits in the world occur at King Island.
2. The area of Exploration Licence is favourably situated in relation to a granite intrusive which could have been the source of economic mineralisation.
3. The sand-covered portion, however, necessitates the predominance of geophysical and deep geochemical exploration, as well as the application of highly sophisticated interpretation techniques.
4. The similar geological environment and geophysical conditions to those of Grassy and Bald Head regions where tungsten orebodies of considerable size have developed, and the mineable deposits of alluvial tin in the adjoining area warrant detailed exploration within the boundaries of the Exploration Licence.

III. TENEMENT

The Exploration Licence covers 8.7 square miles of uncultivated land at King Island, Tasmania.

The formal application for the Exploration Licence was made by Mr. D. C. Pursell, but all rights, benefits, liabilities, etc. derived from the Exploration Licence, have been equally shared between Mr. D. C. Pursell and Mrs. Agatha Szabo, on the basis of a private agreement.

IV. LOCATION, PHYSIOGRAPHY, ACCESS

The Exploration Licence is situated in the north-eastern quarter of King Island, and is bordered by the Sea Elephant River to the east and south-east. The area is covered by undulating sandhills and swamps.

The road network is relatively good, as several tracks reach the boundaries, and one of them reaches the centre of the area. The tracks are passable in the dry season.

V. PREVIOUS EXPLORATION

1. Several decades ago shafts were sunk about 1.5 miles west of the Exploration Licence area. The shafts revealed several quartz veins with tin and scheelite mineralisation.

In the nineteen-fifties, J. Curtain and others re-opened the old workings. King Island Scheelite (1947) Limited mapped the shafts and analysed the rock specimens. In Shaft A a quartz-tourmaline vein yielded by assay 6.7% WO_3 and 0.64% Sn.

2. In 1954 King Island Scheelite (1947) Limited put down two inclined diamond drill holes to test the vertical extent of the scheelite bearing vein of Shaft A.

The drilling intersected a regionally altered sequence of micaschist, muscovite - quartzite, minor pegmatite and quartz tourmaline veins. The DDH 1 intersected two mineralised horizons, each five feet in width, one of which yielded 0.07%, the other 0.10% of WO_3 . The drilling results were regarded, however, as inconclusive, because of the extremely poor core recovery.

3. In 1964 forty-six scout holes were sunk between Mt. Counsel and Reekara farmlands. Four holes encountered alluvial tin mineralisation. Three of these holes were within the boundaries of the Exploration Licence area.

No effort was made to ascertain the presence of tungsten in the scout hole samples.

4. In 1968 gravity and airborne magnetic surveys were made at a regional scale of 1" = 1 mile, at the request of Mount Costigan Mines Limited and King Island Scheelite (1947) Limited respectively. It appears that the results were only partly evaluated.

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PREVIOUS EXPLORATION (Cont'd.)

5. In 1969-70 Hawkes Alluvial Tin Limited explored the area. Within the boundaries of Exploration Licence 9/71 about 90 shallow pits were back-hoed to a maximum depth of ten feet.

The pits were channel sampled.

The heavy mineral concentrates obtained by panning the samples, were bulked, and the bulk samples were analysed for tin and tungsten. The bulk of the heavy mineral concentrates yielded by assay 6.0% of tin but WO_3 was not detected in the percent range.

It is thought, however, that:

- a. The pits were not deep enough to reach the bedrock surface, for this reason the major portion of the alluvium was not tested.
- b. Samples from the mineralised areas might have been highly diluted with samples taken from non-mineralised areas. In this respect 6.0% tin assay should be regarded as highly significant regional anomaly.
- c. Scheelite, being soft mineral and therefore very fine grained in the alluvium, could have easily been lost when the samples were panned. On the other hand, the geochemical tungsten anomalies, being in the p.p.m. range, could have been undetected when tungsten was sought in the percent range.

6. In an undated report, P. N. Johnston evaluated a scout drilling program along the eastern coast. The scout holes revealed a large granite body north east of the Exploration Licence area.

PREVIOUS EXPLORATION (Cont'd.)

7. In 1969-70 L. G. Szabo carried out outcrop mapping in the north eastern quarter of King Island. His most important findings were:

a number of limestone, pyroxene-hornfels and volcanic pebbles at the mouth of the Sea Elephant River. These could have come from the area of Exploration Licence, suggesting that it is similar in geological make up to the Grassy Complex in which tungsten orebodies occur.

VI. PRESENT WORK1. General

Reports by previous explorers of the area were summarised and re-evaluated, as well as photo-mapping (scale 1" = 0.5 miles) was completed as the initial stage of present exploration. This work was followed by outcrop mapping on east-westerly traverses spaced about 1,000 feet apart.

The mapping revealed a number of granite outcrops, contact altered rocks and quartz-tourmaline veins.
(PLAN 1.)

2. Geophysics

A qualitative interpretation of the regional gravity and aeromagnetic contours has been made in order to assist the correlation of the sparse field data and to sketch up the regional geology.

(PLAN 2.)

- (i) The magnetic contours show a fairly good north-southerly linearity which is conformable with the strike of the pre-Cambrian and Cambrian sequences. The aeromagnetic contour pattern has been interpreted as the indicatives of major rock units characterised by different magnetic susceptibility and remnant magnetism. The magnetic highs and lows have been correlated with outcrops, and interpreted as follows:

magnetic low : micaschist, slate
and shale

magnetic high : biotite/staurolite/
garnet schists

PRESENT WORK (Cont'd.)

- (ii) In places the linearity is interrupted by irregular shaped magnetic lows which are associated with gravity lows. The geological maps show that these anomalies coincide with or overlap large granite intrusives.
- (iii) The tungsten orebodies of King Island occur in skarn rocks within the contact aureole of intrusive granite bodies. The skarn zones are indicated by magnetic highs, the source of which can be identified with grossularite and andradite garnets, as well as with biotite and actinolite to a lesser extent.

A comparison of the magnetic anomalies recorded over known scheelite orebodies, and a postulated skarn zone located within Exploration Licence 7/71, are shown by (PLAN 3.)

3. Geology

(i) Regional Geology

Apart from the rock exposures along the coast line, and the sporadic outcrops of hard and resistant rocks in the interior of the Island, the bedrocks are obscured by sand and alluvium covers. For this reason the geology of the Island has tentatively been sketched up.

King Island is made up of northerly striking beds of pre-Cambrian and Cambrian rocks.

PRESENT WORK (Cont'd.)

The former occupies the western three-quarters of the Island, and are comprised of granite gneiss, garnet/staurolite/biotite/muscovite schists, etc.

The Cambrian sequence occupies the eastern quarter of the Island, and consist of slate, shale with interbedded carbonate rocks, tillitic formations, black shale and volcanics mainly of basaltic composition.

The pre-Cambrian and Cambrian sequences have been intruded by acid and basic/ultrabasic igneous rocks. The acid intrusives are of Devonian age, but the age of basic/ultrabasic intrusives have not yet been established.

(ii) Geology of Exploration Licence 9/71

The regional geology, sparse outcrops and geophysics suggest that the area is made up of regionally and contact altered sequences of sedimentary rocks and volcanics.

At the north-eastern zones of the Exploration Licence outcrops of granite, its satellites, as well as spotted shale and biotite-hornfels in the close vicinity of the granite have been mapped. In the north-western corner tin bearing quartz-tourmaline veins were located.

The regionally altered schistose rocks of upper pre-Cambrian age occupy the western quarter of the area. An elongated magnetic high lying along the western boundaries suggests a bed of biotite/staurolite/garnet schist which was mapped elsewhere on the Island. To the east this rock grades into micaschist and slate which have been exposed by the alluvial tin workings, and are correlated with an elongated magnetic low. It is thought that the eastern portion of this sequence belongs to the Cambrian system.

PRESENT WORK (Cont'd.)

In the centre of the area an isolated magnetic high consisting of two parallel anomalous zones, has been recorded. In the given regional setting the anomaly could have been caused by a skarn zone in the contact aureola of a major granite intrusion. Pitting by Hawkes Alluvial Tin Ltd. has uncovered some "blue clay" over the anomalous zone. This rock shows great similarity to the weathered zone of shale at Grassy and Bald Head where the shale contains limestone beds converted to garnet skarn and mineralised by tungsten.

It is probable that the Cambrian sequence contains carbonate rocks which are the pre-requisite of skarn type economic mineralisation, as the pebbles mentioned under Previous Exploration 7. and the presence of rounded spinel (Reference 9) in the heavy mineral concentrate of Hawkes Alluvial Tin Ltd. definitely suggest this possibility. (The spinel is a high temperature mineral which occurs in contact altered limestone xenolites, and high temperature regionally altered rocks.)

East of the magnetic high, granite detritus and granite intrusions of Devonian age as well as spotted shale probably of Cambrian age were mapped. The information available suggests that this area is made up of granite and contact altered sedimentary rocks.

(iii) Economic Geology

The area of the Exploration Licence is situated within the Tasman Geosyncline area which suffered several periods of tectonism accompanied by acid and basic/ultrabasic intrusions.

PREVIOUS WORK (Cont'd.)

The intrusions resulted in different types of mineral deposits. The region has consequently had an extensive history of production of gold, silver, tin, tungsten, base metals etc. Most of these deposits are associated with the Devonian granite which resulted in a very rich tungsten mineralisation at King Island.

The tungsten occurs mainly as large disseminated scheelite deposits in the contact aureole of granite intrusives. The scheelite is associated with limestone and impure carbonate rocks being converted to garnet skarn and garnet and/or pyroxene hornfels.

Besides the tungsten, the granite intrusives are the postulated sources of the alluvial tin deposits, as well as the economic zircon-rutile mineralisation in the beach sand of Naracoopa.

Early reports recorded gold bearing quartz veins in the central zone of King Island, and silver-gold mineralisation in the Barrier Creek area (Reference 1.). The author of this report observed some flakes and nuggets of gold in the alluvial tin concentrate of Hawkes Alluvial Tin Ltd., but the miners regarded it as "insignificant". The occurrences proved to be, however, uneconomic, as production of gold and silver has not been recorded to date.

The economic significance of the basic/ultra-basic intrusives has not yet been clarified, but it is understood that such rocks are associated with sub-economic nickel (Beaconsfield) and chromium mineralisation elsewhere in Tasmania.

4. Mineralisation

Indications of the following mineralisation are present in the area of the Exploration Licence:

- (i) Disseminated deposits in the centre of the Exploration Licence area. The prospective zone has been delineated by an isolated magnetic high. Possible mineralisations are:
 - a. tungsten, molybdenum and bismuth in contact altered limey rocks;
 - b. base metals associated with acid intrusives.

- (ii) Alluvial tin and gold deposits. The prospective zone has been defined by the elongated magnetic low, the southern portion of which covers the known alluvial tin deposits. This anomaly has been correlated with the soft micaschist and shale in which the fluvial/glacial erosion could have formed suitable environment for the fluvial accumulation of heavy minerals.

In the northern part of the anomaly four scout holes encountered tin mineralisation.

VII. PROPOSAL

It is recommended that regional exploration be carried out in the area of the Exploration Licence.

Since the bedrock surface is obscured by sand and swamps, preference will be given to geochemical and geophysical methods in obtaining appropriate information about the presence and potential of economic mineralisation.

This work entails surface magnetic and gravity surveys, as well as auger sampling on east-westerly lines spaced 2,000 feet apart. Measurement and sampling will be made at 200 feet intervals. The geochemical samples will be analysed for Cu, Pb, Sn, W, Mo and Au.

The exploration is scheduled as follows:

1. Reconnaissance

Magnetic, gravity and geochemical surveys will be made on four lines (Nos. 1, 3, 5, 7) spaced 4,000 feet apart, totalling 12 line-miles and 315 geochemical auger samples.

2. Semi-Detailed Exploration

If the reconnaissance phase warrants, three additional lines (Nos. 2, 4, 6) will be filled in between the previous lines, narrowing the space to 2,000 feet. This work amounts to 8.7 line-miles and 225 geochemical auger samples.

3. Follow-up Work

Geophysical and geochemical surveys will be carried out on close grid over the possible anomalous area defined by the previous phase. This work will provide a basis for planning diamond drilling.

VIII. BUDGET PROPOSAL

1. Reconnaissance Phase

Gridding and magnetic survey, including instrument hire :	\$ 500
Auger drilling, 315 holes for 6,300 feet at \$0.50¢ :	3,150
Assaying 315 samples at \$8.00:	2,520
Professional services, labour:	2,000
Travelling, care hire, freight etc.	500
TOTAL:	<u>\$8,670</u>

2. Semi-detailed Phase

Gridding, magnetic and gravity surveys, including instrument hire:	\$1,200
Auger drilling, 225 holes for 450 feet at \$0.50¢	2,250
Assaying 225 samples at \$8.00	1,800
Professional services and labour	2,000
Travelling, care hire, freight etc.	600
TOTAL:	<u>\$7,850</u>
GRAND TOTAL:	<u>\$16,530</u>

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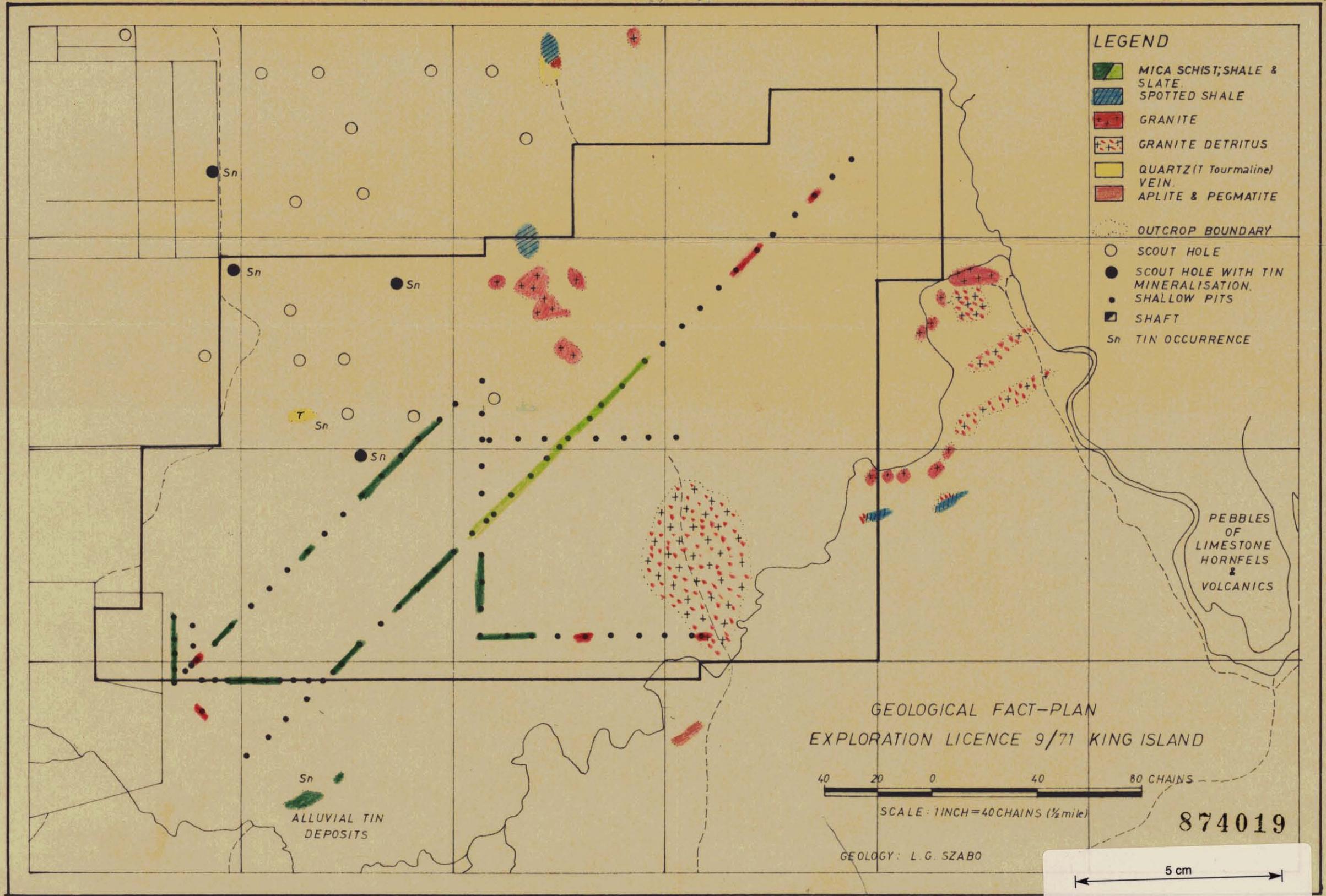
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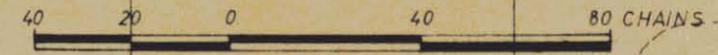
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- LEGEND**
- MICA SCHIST; SHALE & SLATE
 - SPOTTED SHALE
 - GRANITE
 - GRANITE DETRITUS
 - QUARTZ (Tourmaline) VEIN
 - APLITE & PEGMATITE
 - OUTCROP BOUNDARY
 - SCOUT HOLE
 - SCOUT HOLE WITH TIN MINERALISATION
 - SHALLOW PITS
 - SHAFT
 - Sn TIN OCCURRENCE

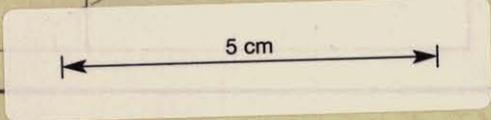
GEOLOGICAL FACT-PLAN
EXPLORATION LICENCE 9/71 KING ISLAND



SCALE: 1 INCH = 40 CHAINS (1/2 mile)

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GEOLOGY: L. G. SZABO



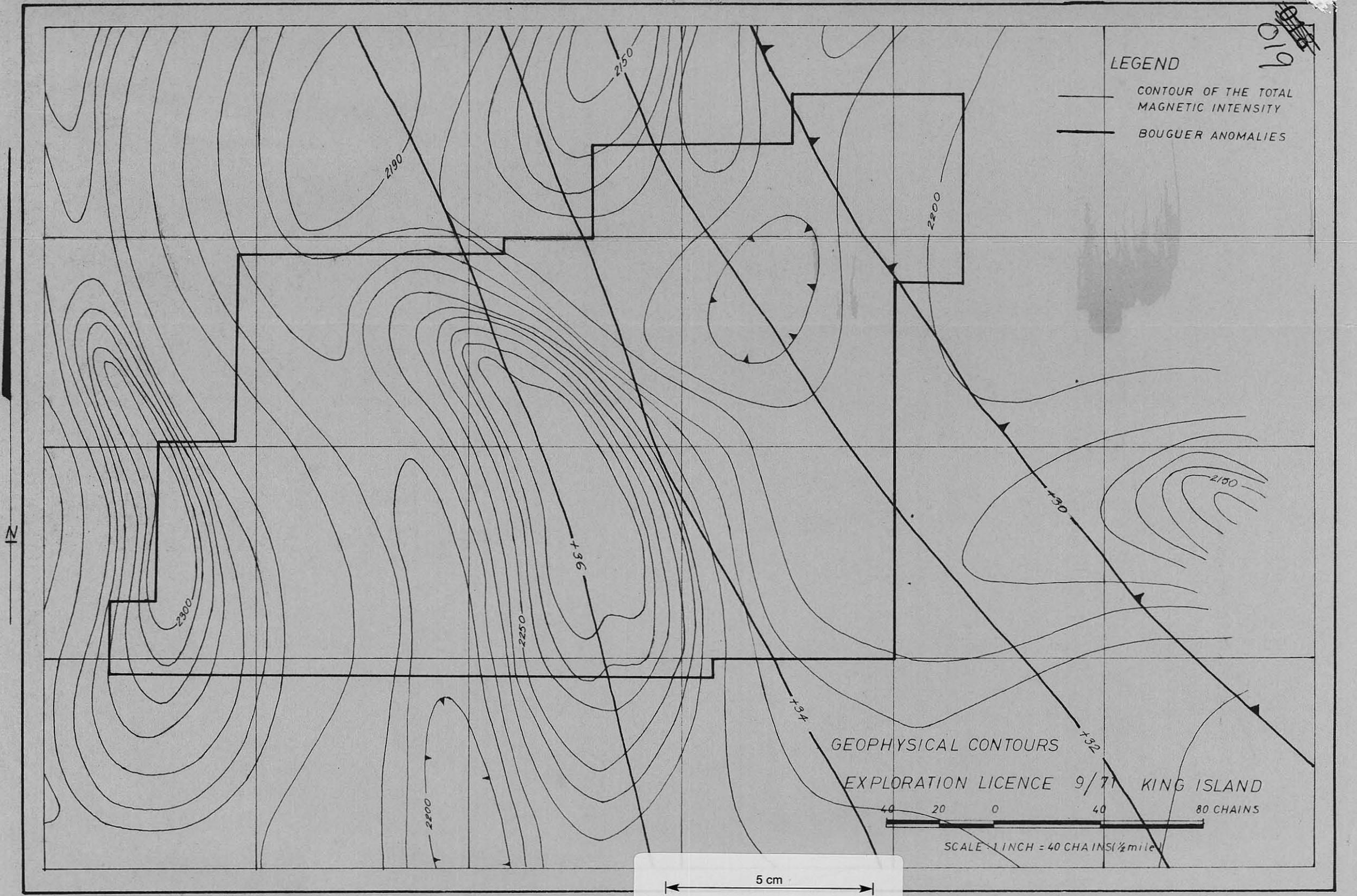
Sn
ALLUVIAL TIN DEPOSITS

PEBBLES OF LIMESTONE HORNFELS & VOLCANICS

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LEGEND

- CONTOUR OF THE TOTAL MAGNETIC INTENSITY
- BOUGUER ANOMALIES

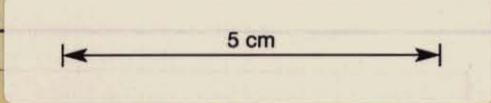


GEOPHYSICAL CONTOURS
EXPLORATION LICENCE 9/71 KING ISLAND

40 20 0 40 80 CHAINS

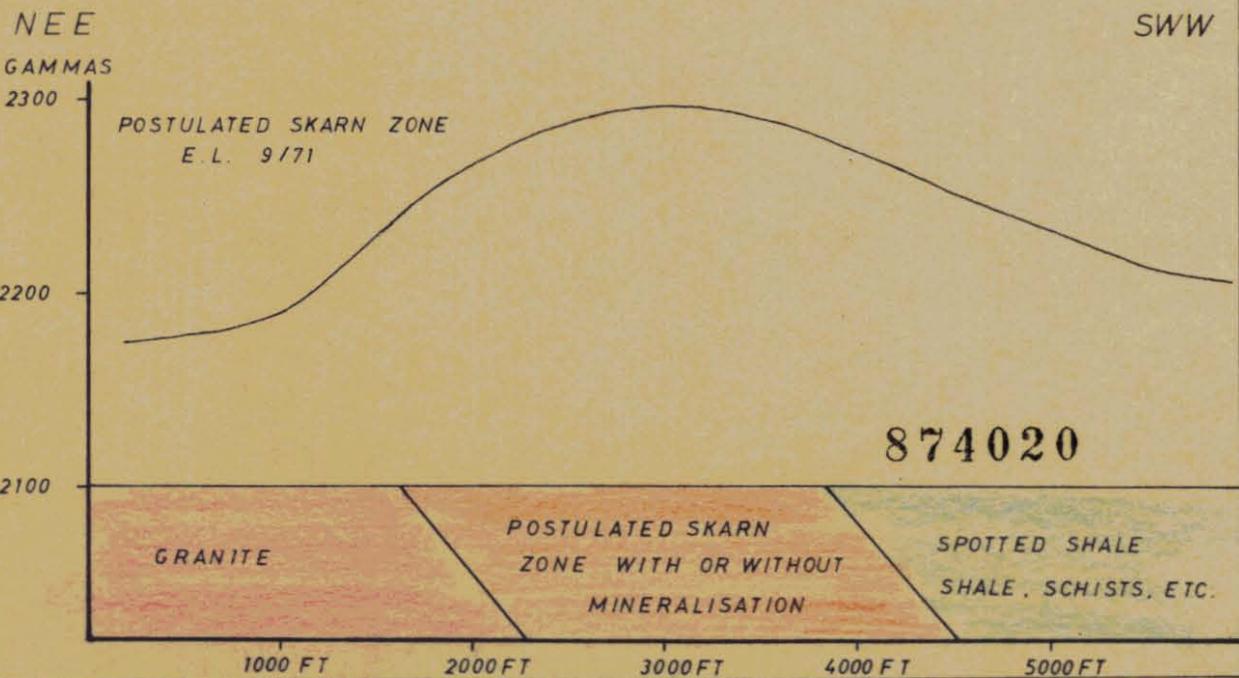
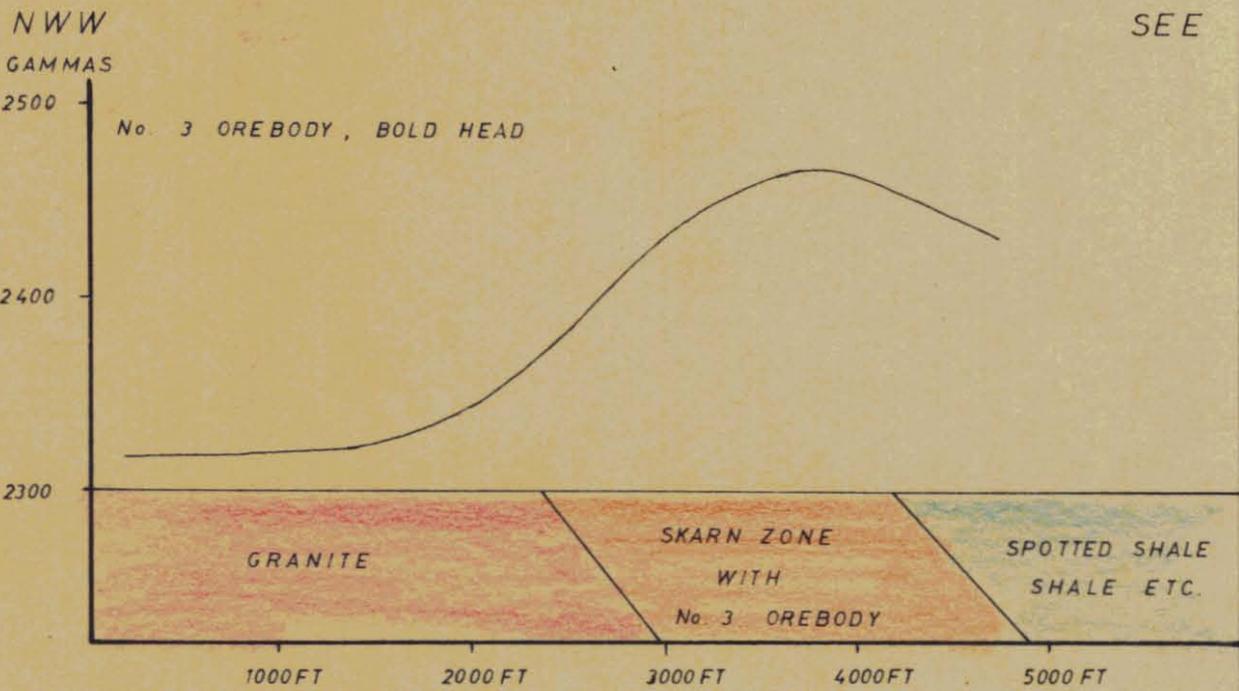
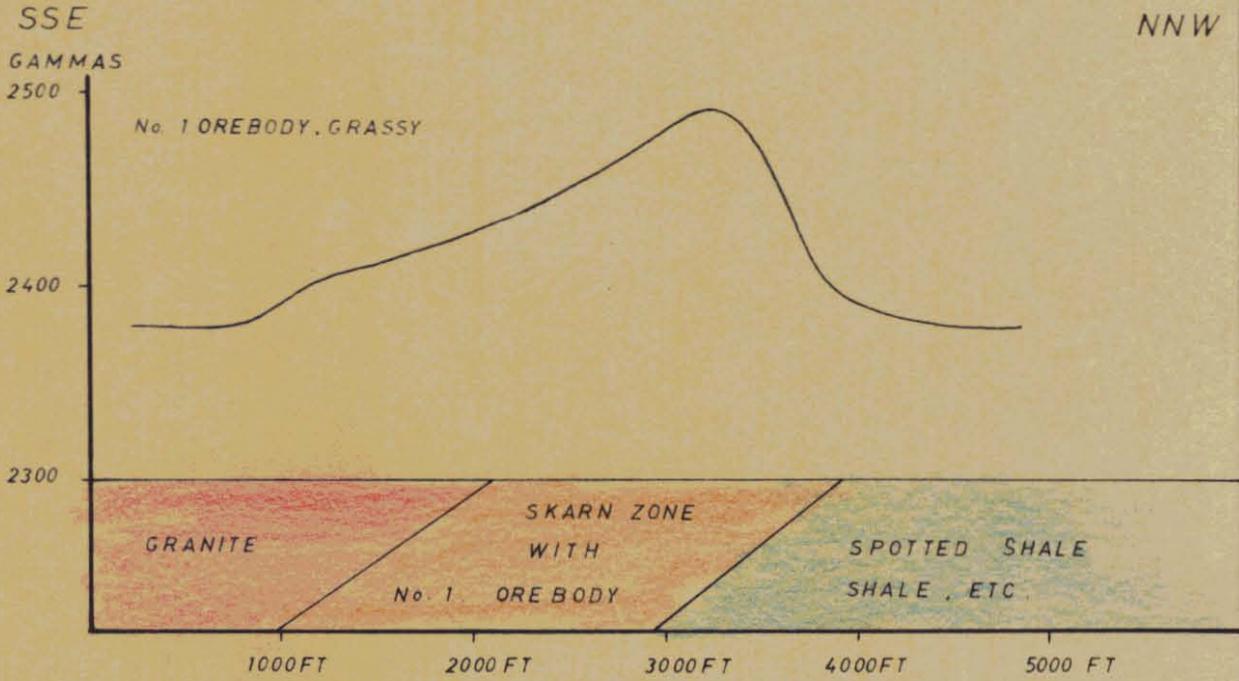
SCALE 1 INCH = 40 CHAINS (1/2 mile)

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 AEROMAGNETIC ANOMALIES OVER SCHEELITE OREBODIES
 AND A POSTULATED SKARN ZONE OF E.L. 9/71
 KING ISLAND, TAS.

COMPILED BY L.G. SZABO 1971



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