

000

884001

71-756

GEOPEKO LIMITED
KING ISLAND GROUP

MICROFILMED

FINAL REPORT
EXPLORATION LICENCE 4/68

by:

P. COTTAM

KING ISLAND

APRIL, 1971

001

Page 1C O N T E N T S

INTRODUCTION

SUMMARY

CONCLUSIONS

TENURE

PHYSIOGRAPHY

GEOLOGY

- (i) Granitic Rocks
- (ii) Contact Rocks
- (iii) Regionally Metamorphosed Rocks
- (iv) Quarternary Deposits
- (v) Other Rock Types

ECONOMIC GEOLOGY

GEOCHEMISTRY

- (i) Mount Council Area
- (ii) Reekara Area
- (iii) Western Alluvial Area
- (iv) Sea Elephant River alluvial Area
- (v) Analytical Method

GEOPHYSICS

ATTACHED PLANS:

1. Map showing boundaries of E.L. 4/68.
2. Mount Council Regional Sheet showing regional geology, Mount Council and Reekara gridded areas, auger holes and licence boundaries.
3. Sea Elephant regional sheet showing regional geology, auger holes and licence boundaries.
4. Mount Council plan showing geology, auger holes and contoured tungsten geochemistry assays.

INTRODUCTION

Exploration licence 4/68 covers an area of approximately 63 square miles of the central eastern portion of King Island. King Island Scheelite obtained the option of Exploration Licence 4/68 in May, 1969 from the late J.H. Curtain. This original option agreement expired in December, 1970. However, a clear picture of the economic potential of the area had not been obtained at this time and the option agreement was extended for a further six months from December, 1970, expiring on the 1st May, 1971.

Five areas of potential economic interest were highlighted in a previous report (2). Further work has been carried out in four of these five areas and concentrated activity has enabled a clearer picture of the economic potential of these areas to be obtained.

The purpose of this report is to record the work carried out; to consolidate all knowledge within the exploration licence and to provide an assessment of the economic potential of the area.

SUMMARY

Exploration was concentrated primarily on three areas within the Exploration Licence. These were the Mount Council granite-sediment contact area, the Reekara area in the vicinity of the old tin workings and the central western area of the Exploration Licence bordering Exploration Licence 9/71.

A detailed geochemical and geological study of the Mount Council granite was undertaken in order to assess its potential as a mineral producer. A Gemco auger programme was carried out over a portion of the Mount Council granite - sediment contact. Minor anomalous tungsten values were recorded in four of the 38 samples taken.

378 hand auger holes were put down in the Reekara area but all results from this programme were negative.

23 scout auger holes were drilled in the central western portion of the Exploration Licence that adjoins the alluvial tin workings. No traces of tin was encountered in these holes or in seven holes drilled along Sea Elephant River. Various geophysical work was carried out in the Reekara and Mount Council areas but neither of these areas is considered to be of any further interest to the geophysicists.

A test strip of multiband black and white photography, colour and colour infrared photography and infrared scanning was flown over a portion of the area.

CONCLUSIONS

1. There is little likelihood of any significant economic mineralisation in the Reekara area.
2. No significant alluvial tin deposits occur in the western portion of Exploration Licence 4/68 and their presence in southern Exploration Licence 4/68 can be regarded as extremely doubtful.
3. The Mount ~~Council~~ **granite** is unlikely to be a source of tin mineralisation.
4. Tungsten mineralisation possibly occurs in the ~~Mount Council~~ Council area but it is very much in doubt and can only be elucidated by further exploration.

TENURE

Exploration Licence 4/68 was granted in July, 1968 to the late Mr. J.H. Curtain.

The exploration licence was originally defined as commencing at the posted notice, situated at the south west corner, and being distant 4 chains northerly from the south east angle of 100 acres 1 rood and 3 perches, purchased by J.H. Cowan, and bounded on the west 10 miles, on the north by 5 miles 64 chains easterly to the high water mark on Bass Strait, and then by that high water mark in a general southerly direction to a point distant 55 chains or thereabouts northerly from the mouth of the Fraser River and to the south by 7 miles 10 chains westerly to the point of commencement.

A number of areas have been excluded from this original licence schedule. Exploration licence 9/71 and an adjoining "pending" area are clearly defined and located approximately in the centre of Exploration Licence 4/68. Another area of 500 acres, purchased by William Royle, is also clearly defined. A third area, Exploration Licence 9/69 held by Naracoopa Rutile Ltd., covers an area of approximately fifteen square miles in the eastern and southern areas of Exploration Licence 4/68.

A map clearly showing the Exploration Licence boundaries is attached to this report. The expiry date of the Exploration Licence is the 11th July, 1971.

PHYSIOGRAPHY

The area of the Exploration Licence is located on the eastern half of King Island and is one of the largest swampy regions of King Island. Swamp has developed around and adjacent to the Sea Elephant River and tributaries, which form the drainage system for one quarter of the island. Any rain makes access to the interior of the area difficult.

The area is flat lying and predominantly scrub covered. Farmland has only been developed in the north and south west corners of the Exploration Licence.

The only prominent rock outcrops are in the Mount Council and Sea Elephant River areas where granite and silicified contact metamorphosed sedimentary rocks occur.

Elsewhere rock outcrop is very sparse, much of the regional geology being based on float occurrence.

The area north of the Sea Elephant River can be divided into five clear physiographic units:

- (i) Recent strand lines 150 metres wide and widening to the north.
- (ii) Recent coastal dunes 350 to 500 metres wide.
- (iii) Permanent swamp 600 metres wide.
- (iv) Old coastal dunes and strand lines 500 to 600 metres wide.
- (v) Flat and slightly undulating swampy region 6 miles wide with isolated sand hills and numerous creeks.

The road network within the area is relatively good but during the wet winter months the tracks leading to the interior are unpassable, even to four wheel drive vehicles. Floods have destroyed several bridges in the area making access to some areas difficult.

GEOLOGY

Outcrop in the licence area is very sparse particularly in the low lying, alluvium covered central region. Evaluation of any distinct regional trend is therefore difficult and only broad inferences can be made. Outcrops had previously been adequately mapped at a scale of 1:1000. The only regional mapping carried out in the recent programme consisted of rechecking certain outcrops that appeared anomalous to the regional trend. Outcrop mapping and rock collection for thin section study was carried out in the vicinity of the Mount Council grid to correlate the outcrop and float geology with the auger hole rock chip results.

Granitic Rocks

Granite appears to cover the entire north east of the exploration licence and cover a large part of E.L. 9/71. Relatively good exposures of this granite, the Mount Council granite, occur in the vicinity of Mount Council and just south of the Sea Elephant River.

The Mount Council granite appears homogeneous in mineralogy and texture. No porphyritic or greissen phases have been noted. The granite is considered a single phase intrusive. It has been radiometrically dated as Devonian in age and is thought to have been intruded during the Tabberabberan orogeny.

Pegmatite intrusions appear to be very limited, only a small number being noted and they are only a few inches in width. These pegmatites are predominantly feldspar pegmatites with some biotite-feldspar pegmatites and very occasional feldspar-quartz-muscovite-biotite pegmatites.

Aplite intrusions are much more widespread and range in size from massive bodies to narrow veins, they also range in grain size from medium to fine grained.

The granite itself is a medium grained rock with quartz, feldspar and biotite as the main constituents. Limited petrographic work gave the following average compositions;

Quartz	30%
Microcline Perthite	30%
Orthoclase	15%
Biotite	10%
Tourmaline (schorlite)	7%
Hornblende	3%

GEOLOGY (cont.)

Accessory minerals include magnetite, analcime, zircon, rutile, sphene, apatite, chlorite, clinozoisite, epidote, muscovite, and sulphides which make up approximately 5% of the rock. The rock can be termed a biotite-tourmaline-horneblende granite. Overall the composition is largely typical of a normal granite apart from the high tourmaline content. The tourmaline appears primary and though such high contents of primary tourmaline are unusual they have no specific significance with relation to economic mineralisations (9) (unlike high contents of secondary tourmaline which can be of significance with relation to tin, tungsten mineralisations).

Contact Rocks

At both Sea Elephant River and Mount Council the granite contact and contact metamorphosed rocks are exposed. The contact rocks show strong contact metamorphic effects and form quartz-andalusite-sillimanite-cordierite (?) - biotite assemblages. This assemblage belongs to the horneblende-hornfels metamorphic facies of Eskola. Limited petrographic work was carried out on the contact rocks from Mount Council. In hand specimen the rocks closest to the granite are fine, intensely spotted rocks with black spots in a light grey matrix. In thin section these show andalusite porphyroblasts set in a hornfelsic matrix of quartz and sillimanite. Accessory minerals present are magnetite, biotite, muscovite and feldspar. With distance away from the contact the size of the spots increases up to 1 centimetre in diameter.

Certain horizons show elongation and streaking out of the spots, indicating shear, while other horizons show no spotting. The variation is probably an expression of original lithology differences as well as distance from the contact. The rocks with the larger spots show the spots in thin section to be fine laths of biotite and quartz crystals in a compact porphyroblastic mass with a brown opaque mineral, possibly altered cordierite, filling the interstices and surrounding it with a rim. The groundmass consists of microcrystalline granular quartz, enclosing laths of biotite which show some degree of alignment and larger quartz crystals up to 0.5 m.m in diameter. Magnetite is a major accessory mineral in these contact rocks.

The studies and evidence indicate that the original rocks were probably aluminous mudstones and quartzose sandstones with aluminous matrix (5). A sequence of interbedded mudstones and sandstones is likely.

GEOLOGY (cont.)Regionally Metamorphosed Sediments

Regionally metamorphosed quartz-muscovite schists, muscovite-sericite-garnet schists, slates and quartzites are found in the west of the licence area at Reekara and further south. These rocks are thought to belong to the suite of regionally metamorphosed Upper Proterozoic rocks that outcrop in the central northern portion of the island. These rocks strike approximately north-south. In the south west of the licence area the rocks are of a much lower metamorphic grade, consisting of minor occurrences of shale, siltstone and sandstone. A major east-west trending fault, upthrown to the north, or a major flexure in the basement rock is postulated to explain this change in rock type (8).

Quaternary Deposits

These consist of dune sand deposits and river alluvium covering the underlying rocks over much of the licence area. Transgression and regression of the quaternary sea is clearly depicted in the two sets of dune sands and distinct old shoreline. The licence area is drained chiefly by the Sea Elephant River which has deposited a cover of alluvium in the low lying central island area.

Other Rock Types

Residual quartz is a common float material, particularly in the north west. The well rounded nature of the quartz float in the Reekara and Mount Council area is indicative of considerable working and transport.

Pisolitic limonitic ironstone is also common as float throughout the area, it also commonly forms a hard ironpan layer in the soil profile. This type of ironstone is common throughout the island.

Floater of a basic, fine grained porphyritic rock have been found at some dams in the Reekara area. This indicates the possibility of a mafic or ultramafic body in the area, substantiated by geochemical work at Reekara.

ECONOMIC GEOLOGYGranitic Rocks

An assessment of the mineral potential of the Mount Council granitic body using "remote sensing" techniques was made by J.J. Gresham and the author (4).

The major tin occurrences of Tasmania are intimately associated with Devonian granites or quartz porphyry phases of these granites. On this premise it has been postulated that the cassiterite - scheelite bearing quartz tourmaline veins found at Reekara are derived from the Mount Council granite. To substantiate or refute this premise field, petrological and geochemical investigations were carried out.

Geochemical investigations consisted of analysis of granite and pegmatite samples for Sn, W, Mo, and silicate analysis of samples of all King Island granites. The conclusion of the investigations was that the Mount Council granite body is most unlikely to be a tin producing granite. The evidence presented does not however, preclude the granite from being a source of tungsten mineralisation, especially for contact metasomatic deposits.

Contact Rocks

Scheelite mineralisation requires certain strict geological conditions for its generation. Firstly a source rock is required. In this case the Mount Council granite is a possible source rock. Secondly suitable host rocks are required; for scheelite mineralisation they should be lime rich rocks. There is no evidence for limey rocks at either of the granite contacts observed within Exploration Licence 4/68, the evidence being that the outcropping contact metamorphosed sediments were originally aluminous mudstones and sandstones. Limited outcrop however, precluded determination of the extent of the contact aureole and the ability to discount the existence of suitable host rocks. All rock chips recovered from from auger drilling over the Mount Council grid showed distinct contact metamorphic effects.

Mineralogically the contact rocks examined have some resemblance to the Bold Head contact altered interbedded sandstones and siltstones that directly underlie the Grassy Group (6). These Bold Head rocks are spotted and belong to the metamorphic hornblende hornfels facies and have similar mineral assemblages with the exception of a greater proportion of muscovite.

ECONOMIC GEOLOGY (cont.)

A suitable host rock - source rock relationship is another geological condition required for scheelite mineralisation; the very lack of observance of a suitable host rock puts the possibility of such a relation in doubt. In the Grassy - Bold Head environment, metamorphosed basic volcanic rocks appear to be intimately associated with scheelite bearing mine series of rocks (3). Again in the Mount Council area, basic volcanic rocks have not been seen, but may possibly exist.

The scheelite deposits at Bold Head and Grassy also appear to be associated with a major structural lineation or fault; no major structural lineation is apparent in the Mount Council area. The conclusion is that though the possibility of tungsten mineralisation cannot be precluded, it is very much in doubt and can only be elucidated by further exploration.

Regionally Metamorphosed Sediments

Cassiterite and scheelite bearing quartz tourmaline veins were encountered by several shafts and trenches sunk in the Reekara area by J. Curtain a number of years ago. These proved to be uneconomic but indicated the presence of mineralisation in the area. The above mentioned studies of the Mount Council granite indicated that it was most unlikely to be a tin bearing granite. The west coast granites are also unlikely to be the source as no trace of tin has been found in quartz-tourmaline pegmatites associated with these rocks. The source of the Reekara tin mineralisation is still therefore unknown.

Quartz-muscovite schist and muscovite-sericite-garnet schists are thought to form the bulk of the rock sequence of the Reekara area.

To test for possible metasomatic or epigenetic mineral bodies extensive hand augering in the vicinity of the tin workings was carried out. Negative results seem to have borne out of the premise that sizeable epigenetic or metasomatic mineral bodies were unlikely in this area due to the lack of a suitable host rock.

Quaternary Deposits

Economic deposits of secondary tin occur in the Sea Elephant River alluvium in the north of the 'pending' area (formerly central E.L. 18/68). As this area is completely enclosed by E.L. 4/68 and the alluvium from the Sea Elephant River covers a large portion of southern and central E.L. 4/68 it was felt that potential existed for further concentrations of alluvial tin.

ECONOMIC GEOLOGY (cont.)

The area between the western limits of E.L. 4/68 and E.L. 9/71 was virtually untested and it also lies between the believed source of the alluvial tin at Reekara and the known alluvial deposits. The search for secondary tin was therefore concentrated in this area. However, results proved entirely negative.

The area south of E.L. 9/71 and "pending" was also a possible area of deposition of alluvial tin. Seven holes were augered along the Sea Elephant River tributary that runs approximately parallel to the border of the licence areas. Results again proved entirely negative.

The conclusion is that economic concentrations of alluvial tin are very unlikely to occur in Exploration Licence 4/68. No further work can be recommended in this direction.

Economic concentrations of the heavy minerals zircon and rutile occur in the recent sand of Naracoopa Bay. The older sands are missing in Naracoopa Bay and appear to have been reworked into the more recent dunes, resulting in economic concentrations of heavy minerals. Elsewhere on the coast this reworking has not occurred and economic concentrations are lacking (8).

No significant concentrations have been found in E.L. 4/68. Recommended sand distribution studies have yet to be carried out on the area.(2) Previous workers, however, regard the possibility of economic heavy mineral concentrations in the area as doubtful.

Other Rocks

Floaters of mafic and ultramafic rocks have been found in both west E.L. 4/68 and south west E.L. 4/68

Sulphide and chromite deposits, with or without economic potential have previously been predicted in the south of the licence based on geophysical evidence and mapped outcrop of basic dykes (8). The possible presence of an ultramafic body in the Reekara area has been indicated by a sharp chromium geochemical anomaly discovered over a weak magnetic anomaly. There is thus the possibility of some chromite mineralisation in this area.

GEOCHEMISTRYMount Council

013

A base line of 650 metres was pegged approximately parallel to the granite-country rock contact and 6 lines varying length the longest of 650 metres and shortest of 350 metres were pegged out at right angles to the base line. Each line crossed the granite contact but lay predominantly over the contact metamorphosed sediments so that auger drilling gave delimitation of the granite contact, suitable geochemical samples and rock chip from the contact aureole. The westward and southern extension of the grid was limited by excess scrub which prevented access for the Gemco rig.

Holes at 100 metre intervals were augered with the Gemco drill down to bedrock level. Bottom hole soil and rock chip samples were collected and sealed in "Fortis" sample bags. Drill hole logs giving brief descriptions of soil, rock type encountered and depths were compiled. A total of 38 holes were augered.

Rock chip recovered was inspected under a binocular microscope. The outcrops and float in the immediate vicinity of the grid were checked so as to correlate outcrop rock type and auger hole rock chip type. It is generally hard in this area to distinguish boulder float from in situ material. Only in one area, to the south of the grid, is there a reasonably unbroken series of outcrops over the actual contact so that apart from this area the granite contact can only be established with an accuracy of ± 50 metres.

A map was drawn up approximately delimiting the granite contact and indicating areas of massive aplite based on both surface and subsurface information. As the variation within the contact metamorphosed sedimentary rocks is both gradational and lithological, the outcrop sparse, and the width of the contact aureole not determined, no division was made within these rocks on the map.

Results

It was felt that 38 samples was not enough to warrant plotting cumulative frequency curves or histograms for geochemical results.

The soil and rock chip samples were analysed by Mc Phar Geophysics Ltd for 10 elements; Cu, Pb, Zn, Co, Ni, Bi, Sn, Cr, Mo, W.

Copper Cu

All values lay between 2 and 50 p.p.m except for one anomalous value of 450 p.p.m located at 600E 850N. No rock chip was recovered from this hole but all surrounding holes indicated the common spotted meta-sediment.

GEOCHEMISTRY (cont.)

Page 14

Copper Cu (cont.)

The holes flanking it at 550E 850N and 700E 850N gave no anomalous values, giving 40 and 50 p.p.m Cu respectively. These values are within the normal soil range. Of interest is the fact that hole 600E 850N also records the highest nickel and cobalt values of the 38 samples assayed being 50 and 70 p.p.m respectively. These values cannot however, be regarded as anomalous within the distribution of values and lie within expected values for the country rock type.

Lead Pb

All values lie within the range 0-25 p.p.m excepting 2 values of 45 and 75 p.p.m at 1200N 900E and 1200N 1000E. The underlying rocks were aplite (1200N 900E) and dark finely spotted sediment (1200N 1000E). The values are not distinctly anomalous, and as they lie within normal soil ranges no significance can be attached to them.

Zinc Zn

There is a fairly even scatter of values between 10 and 100 p.p.m. One anomalous value of 190 p.p.m occurs at 750N 900E within the coarsely spotted meta-sediment. Though this value is anomalous within the limited number of results received it can only be considered moderately anomalous for the rock types encountered.

Cobalt Co

A fairly even distribution of values between 0 and 50 p.p.m occurs.

Nickel Ni

None of the values can be considered anomalous. All values lie between 0 and 70 p.p.m with a larger proportion of the results in the 0-20 p.p.m range.

Bismuth Bi

All values were less than the lower limit of detection (20p.p.m)

Tin Sn

All values were less than the lower limit of detection (5p.p.m).

Chromium Cr

Values were fairly evenly distributed in the range 50-250 p.p.m which is well within average values for igneous and sedimentary rocks.

015

GEOCHEMISTRY (cont.)Molybdenum Mo

All values lay in the range 0-2 p.p.m except 2 values of 5p.p.m. These cannot be regarded as anomalous.

Tungsten

34 of the 38 values were in the range of 0-5p.p.m. Two values of 80 p.p.m and 60p.p.m were recorded 100 m. apart at 1000N 700E and 1100N 700E. With respect to anomalies at Bold Head these anomalies can be regarded as moderately high (3). The anomaly is closed off on all sides, except to the north west. The values surrounding these two high values are all below the lower limit of detection (2 p.p.m). The anomaly is therefore probably much more restricted than is depicted on the map (Mount Council Geological Plan, Tungsten Geochemistry).

Two values of 20 p.p.m were recorded at 750N 1000E and 750N 900E, this anomaly is closed off on all sides, these results are also plotted on the map.

A notable feature is that no molybdenum anomaly is associated with the tungsten anomaly as is usual with the mine series of rocks.

Reekara Area

The initial geochemical programme at Reekara consisted of 131 scout hand auger holes. These were sited at approximate 50 metre intervals along the roads in the general Reekara area and in the immediate vicinity of the old tin workings themselves. These holes were augered in the winter months and very few holes went below a depth of 2' 6" due to encountering the water table (below which sample recovery is very difficult) or impenetrable ironstone layer.

It is felt that these samples may not have given a true reflection of bedrock geochemistry. The soil samples obtained were analysed by Mc Phar Geophysics Ltd. for 11 elements Co, Cu, Ni, Pb, Cr, Zn, W, Sr, Ba, Mo, Sn. The results were very disappointing, with no anomalous values being recorded for any of the elements analysed.

Primarily to facilitate ground geophysical coverage of the area, a grid was pegged out around the area of the two northernmost mine shafts. The base line was 1000 metre long and lines were pegged out 500 metre East and West of this north - south base line at 50 metre intervals.

GEOCHEMISTRY (cont.)Reekara Area (cont.)

Hand augering was carried out at 50 metre intervals on lines 500S, 250S, 000, 250N, 500N. These holes were drilled in the summer months so that in most of the holes sample recovery was possible down to ten feet. A few of the holes were unable to penetrate the ironpan layer which is usually encountered at 2 to 3 feet. The sample recovered was usually a light grey micaceous clay weathered from the regionally metamorphosed muscovite schist. A total of 100 holes were augered over the grid.

Analysis of the bottom hole soil samples was carried out by Mc Phar Geophysics Ltd for the 3 elements Mo, W, Sn. Tin and tungsten mineralisation are known in the area and molybdenum is usually a good tungsten indicator due to its mobility and association with tungsten. Indications of other mineralised veins was hoped for.

All tungsten and molybdenum values were below the limit of detection and similarly with tin except for ~~one~~ hole at 00N 500W which gave an assay of 20 p.p.m tin.

Four holes equally spaced at 25 metre around this anomalous value were drilled with the hand auger.

The grid was extended for further geophysical work 500 metre east from 00N to 500S. Two weak magnetic anomalies were revealed over this grid.

The centre of the largest of these two magnetic anomalies was at approximately 895E 55S. Twenty eight holes at 25 metre interval were pegged out over the extent of the anomaly and hand augered. Most of the holes went down 10' giving a sample of light grey micaceous clay.

The smaller anomaly has its centre at approximately 450S 800E. Fifteen holes were pegged over the extent of the anomaly and hand augered. Only five of the holes were able to penetrate to 10 feet, most of the holes being unable to penetrate the ironpan layer at 2 to 3 feet, and a couple of holes encountering water at about six feet.

The soil samples recovered from augering over the two magnetic anomalies as well as the few samples from augering around the small tin anomaly were analysed by Mc Phar Geophysics Ltd for Mo, W, Cu, Pb, Zn, Co, Ni, Bi, Sn, Cr.

GEOCHEMISTRY (cont.)Results

- 1) All tin, tungsten, molybdenum and bismuth assays were at or below the lower limit of detection of the elements.
- 2) No distinct anomalies were apparent in assays for lead, zinc, cobalt, or nickel but some areal variation was apparent.
- 3) A conspicuously high value of 1830 p.p.m of chromium was obtained in hole 425S 700E which is just south of the centre of the smaller magnetic anomaly. Another much lower but still anomalous chromium value of 290 p.p.m was recorded 25 metre east of this at 425S 725E. All other chromium assays were between 20 and 90 p.p.m.
- 4) Seven of the fifteen holes augered over the small magnetic anomaly showed values higher than is normally apparent in the region for lead, zinc, cobalt, and nickel. None of the values for any of these elements though was greater than 80 p.p.m.
- 5) Of the four holes augered around the anomalies tin value at OON 500E all gave negative results for tin. However, one hole at OON 475W gave distinctly higher assays than the other three for copper, lead and zinc. The copper value at 130 p.p.m was anomalous to the other regional results, but the lead and zinc assays were within the regional distribution of values.

Two conclusions can be drawn from the high chromium value in hole 425S 700E. Firstly it possibly indicates the presence of an ultramafic or basic body in the area previously indicated by mafic and ultramafic floaters. Ultramafic rocks have an average of 2000 p.p.m chromite. Secondly it appears likely that the chromium was concentrated in the limonite of the lateritic ironstone in the area.

If the mineral chromite is present within the parent rock it will occur in the soil phase as detrital grains of chromite (6). These were not seen. Chromium's other soil phase is within the mineral limonite, the major component of the lateritic ironstone. As the magnetic anomaly indicated has a very shallow source and the area contained a large concentration of ironstone it is most likely that the chromium is contained within the limonite lattice. This infers that any ultramafic body in the area does not have its chromium in the form of the primary mineral chromite.

Western Alluvial Area

Twenty three gemco auger holes were drilled in this area. The first five holes were drilled close to the old tin mine road and the distance between these holes was as great as 500 metres.

GEOCHEMISTRY (cont.)

Western Alluvial Area (cont.)

The later holes, which were drilled in an area considered a more likely tin prospect centred around the higher reaches of the Sea Elephant River, were generally about 250 metres apart. All holes were drilled until the only material being recovered was light grey micaceous clay with no significant alluvial overburden.

A whole profile sample was taken, there being total recovery of the sample. These were collected in long plastic sample bags at the intervals 0 to 4 feet, 4 to 10 feet, 10 to 16 feet, and so on. The depth of the holes was variable according to the depth of alluvial overburden but in most cases samples were taken down to at least 16 feet.

To reduce the considerable bulk of the samples recovered the samples were emptied onto a large rubber mat, well mixed and split into quarters. A suitable amount of sample was taken for panning, one quarter packaged for analysis, one quarter kept as a duplicate and the rest discarded.

The whole alluvial profile for each sample was examined, a particular watch being kept for material similar to that being mined by Hawkes Alluvial Tin Ltd. Minerals obtained in the pan were examined under the binocular microscope, any grains resembling zircon, rutile, cassiterite or spinel being noted. Black spinel is considered a good indicator of tin in this region (7). Identification of cassiterite is difficult due to its usual small grain size and its resemblance to small rutile and ironstone fragments. Only a tentative possibility of its presence could be made in the preliminary panning procedure. Samples were sent to Mc Phar Geophysics Ltd for tin analysis.

Results

Assays were entirely negative, all samples showing less than five parts per million of tin.

Considerable variation in the alluvial profile and depth of alluvium was noted from hole to hole. The depth of alluvium varied from 5 to 15 feet, averaging, about 9 feet.

Fine grained sub angular quartz was the predominant material panned, coarse grained quartz and quartz pebbles only being found in three of the holes.

GEOCHEMISTRY (cont.)Results (cont.)

Two of the holes in the north west of the area gave a few fragments of hard black mineral, possibly spinel, but no cassiterite was ever positively identified in any of the minerals panned.

Sea Elephant River

It was considered that secondary tin may have been transported from the area of the alluvial tin workings and deposited farther south. On this premise several hand auger holes were drilled along the Sea Elephant River tributary that runs approximately parallel to, and forms part of the south eastern boundary of the "pending" area (formerly E.L. 18/68).

Holes were drilled at approximate 300 yards intervals, at tributary junctions where possible and at other likely points of heavy mineral deposition. The samples were taken down to five feet. Each sample was well mixed, a suitable proportion panned, and the remainder split into two samples: one for analysis and a duplicate. Samples were analysed for tin by Mc Phar Geophysics Ltd.

Results

In the pan all samples contained sub angular to sub rounded medium to fine grained quartz grains. Two samples contained a few per cent of a hard black, angular mineral possibly spinel. Only one sample showed a mineral that could possibly be cassiterite and only a couple of grains of this were seen in the pan. The analysis by Mc Phar Geophysics Ltd, however, gave completely negative results for tin.

It can be concluded that no secondary tin has been deposited along this stream pattern. Deposits farther south are considered unlikely.

Analytical Methods

All analyses in the recent exploration programme have been carried out by Mc Phar Geophysics Ltd.

Copper, lead, zinc, cobalt, nickel, and bismuth were analysed by atomic absorption spectroscopy of a 0.25 gramme sample following leaching by hydrochloric acid and leaching by a hydrochloric - nitric acid mixture for one hour.

GEOCHEMISTRY (cont.)Analytical Method (cont.)

~~Uranium~~
Chromium

Uranium was analysed by atomic absorption spectroscopy following potassium pyrosulphate fusion on a 0.1 gramme sample.

Tungsten was analysed by modified Dithiol following potassium pyrosulphate fusion on 0.1 gramme sample.

Molybdenum analysis was identical except a 0.2 gramme sample was used.

Tin was analysed by the Gallein method on a 0.5 gramme sample.

GEOPHYSICS

Geophysical work was carried out in the Reekara and Mount Council areas by L.A. Richardson and Associates Ltd.

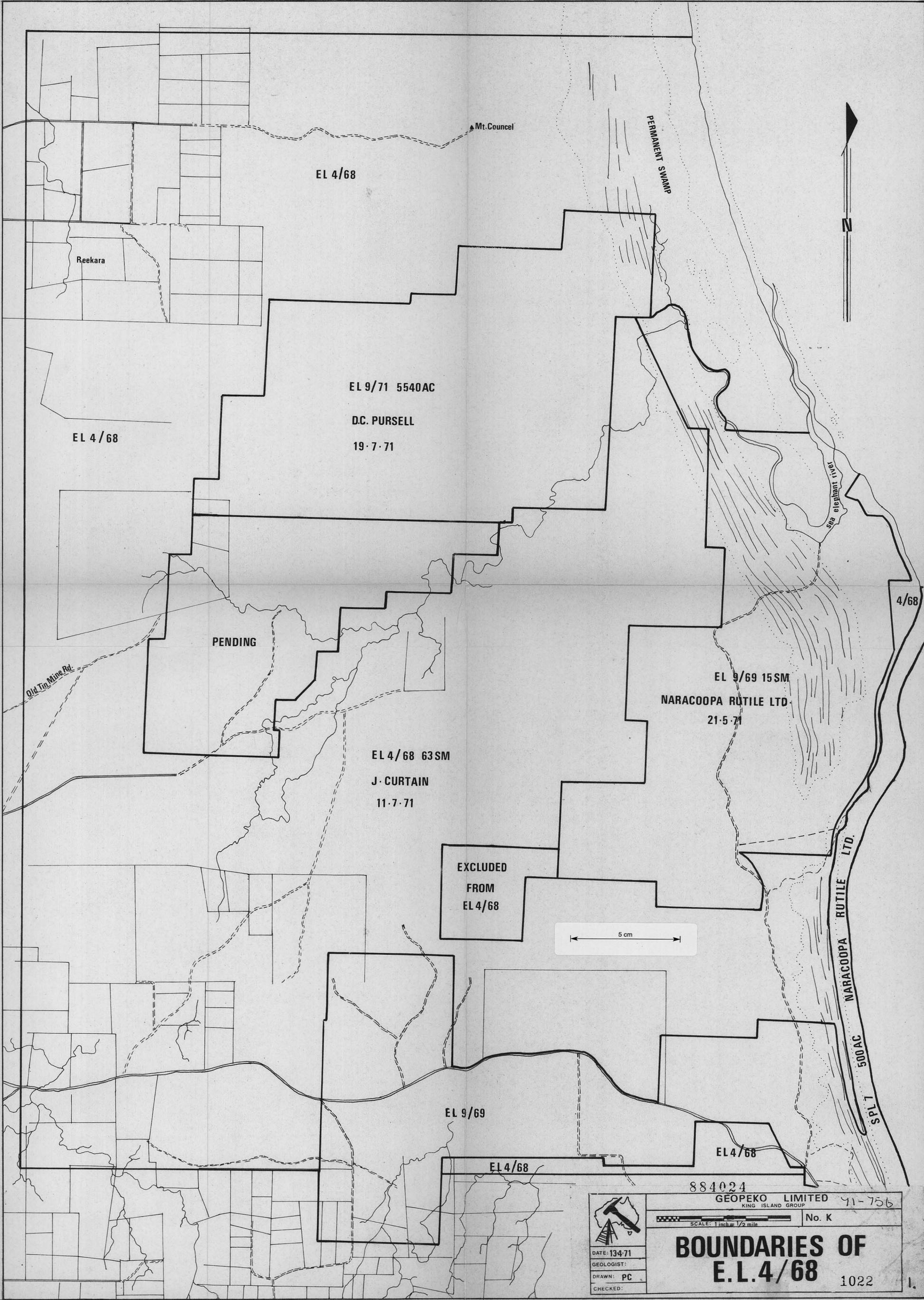
Self Potential readings were taken over the Reekara grid. Extensions were made to the grid, 500 metres east from OON to 500S at 50 metre interval, in order to close off a possible anomaly. A small irregular anomaly was found but was considered of no interest by the geophysicists.

Ground magnetometer coverage of the Reekara grid and its extensions revealed two weak anomalies, with the source of the anomaly indicated as being close to the surface, in the eastern extensions of the grid.

A ground magnetometer survey over the Mount Council grid revealed no significant results.

REFERENCES

1. BAKER G. 1962
Detrital Heavy Mineral in Natural Accumulates
Autralian Institute of Mining & Metallurgy Publication
2. GRESHAM J.J. 1970
Progress Report Exploration Licence 4/68
Unpublished Company Report.
3. GRESHAM J.J. 1970
Geological Progress Report Exploration Licence 15/66
Unpublished Company Report.
4. GRESHAM J.J. & COTTAM P. 1971
Criteria for the Assessment of the Mineral Potential of the
Mount Council Granitic Body.
Geopeko Technical Seminar Paper.
5. JOPLIN G.A. 1968
A Petrography of Australian Metamorphic Rocks.
Angus and Robertson Ltd. Publishers.
6. LARGE R.R. 1969
The Bold Head Adamellite Contact Aureole
BSc (Hons) Thesis, University of Tasmania
7. SCOTT J.B. 1926
Report on Leases held by Sea Elephant Prospecting Ass.
Unpublished Report.
8. SZABO L. 1970
Progress Report Exploration Licence 4/68
Unpublished Company Report.
9. WILLIAMS H., TURNER F.J., GILBERT C.M. 1954
Petrography
W.H. Freeman and Company Publishers
10. HAWKES H.E. & WEBB J.S. 1962
Geochemistry in Mineral Exploration
Harper and Rowe Publishers.



EL 4/68

Reekara

Mt. Council

PERMANENT SWAMP

N

EL 9/71 5540AC

DC. PURSELL

19.7.71

EL 4/68

PENDING

Old Tin Mine Rd.

EL 4/68 63SM

J. CURTAIN

11.7.71

EXCLUDED FROM EL 4/68

5 cm

EL 9/69 15SM

NARACOOPA RUTILE LTD

21.5.71

sea elephant river

4/68

NARACOOPA RUTILE LTD.

500 AC SPL 7

EL 9/69

EL 4/68

EL 4/68

884024

GEOPEKO LIMITED

KING ISLAND GROUP

41-756

No. K

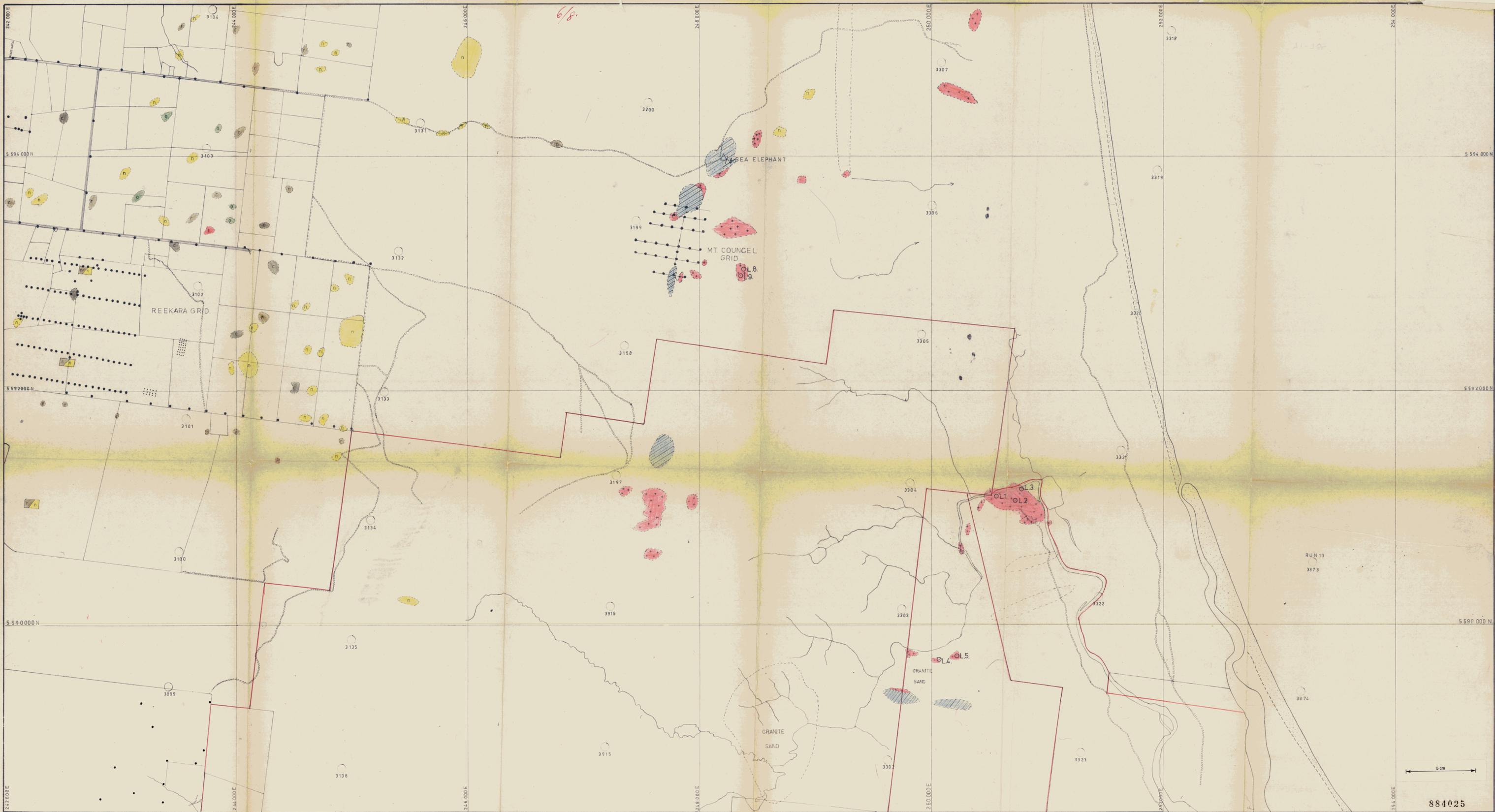
BOUNDARIES OF E.L. 4/68

1022



DATE: 13.4.71
GEOLOGIST:
DRAWN: PC
CHECKED:

SCALE: 1 inch = 1/2 mile



a	Sandstone	g	Black Shale	o	Porphyry and Basic Dyke
b	Limestone	h	Slate	p	Tillite
c	Laterite or Ironstone	i	Breccia	q	Quartzite
d	Volcanics	j	Actinolite Hornfels	r	Mica schists and muscovite sillimanite schists
e	Altered Volcanics	k	Biotite Actinolite Hornfels	s	Siltstone
f	Agglomerate and tuffs	l	Biotite Hornfels	t	Aplite
g	Shale	m	Pyroxene Hornfels	u	Granite
h	Spotted Shale	n	Pyroxene Garnet Hornfels	v	Sand dune development boundary
i	Grey mudstone	o	Quartz	w	Formed Roads

-----	Unformed Roads	-----	Geological boundary observed	-----	inferred
-----	Fault observed	-----	inferred	-----	Anticlinal axis
-----	Synclinal axis	-----	Horizontal Dip and Strike	-----	vertical

-----	Inclined Dip and Strike	-----	Old dunes
-----	Scout bore for mineral beach sands	-----	Lagoon stream
-----	Submarine bar	-----	Intermittent stream
-----	Sand beach shore reef	-----	Swamp
-----	Sand cliff	-----	Slope in bedrock
-----	Vegetated sand cliff	-----	Conical dunes
-----	New stranded shorelines	-----	Direction of younging
-----	New dunes	-----	Sandhills
-----	Old stranded shorelines	-----	Drains
-----		-----	Auger Drill Hole

156° 09' 30"

Convergence and declination approx only

3	13
4	14
5	15

Index to adjoining sheets

884025

5cm

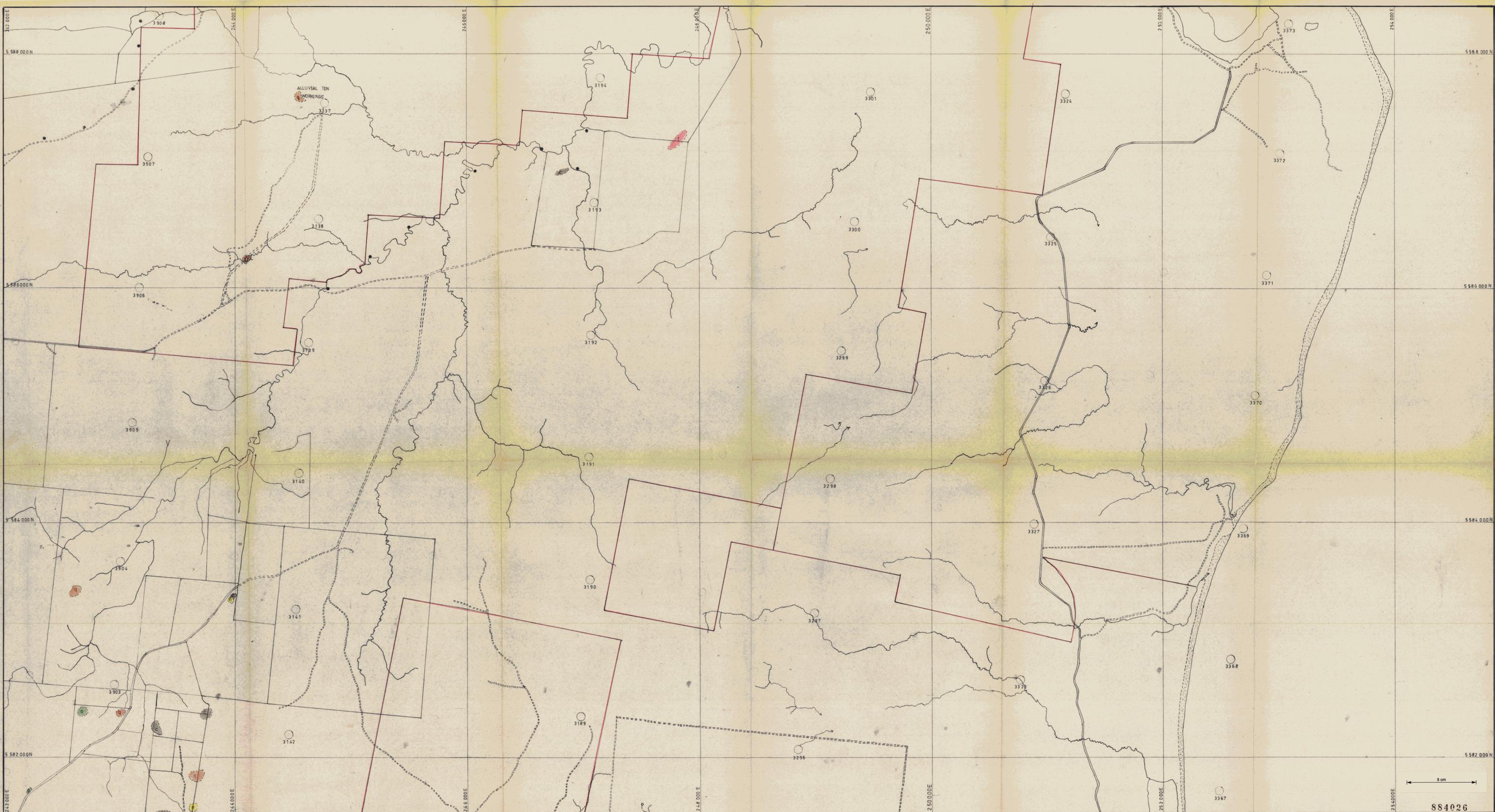
GEOPEKO LIMITED
KING ISLAND GROUP

SCALE 1:12,000 METRIC GRID N° K

1023

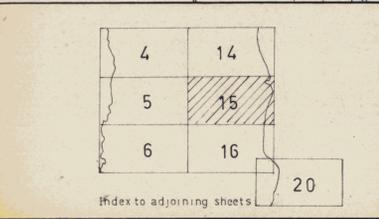
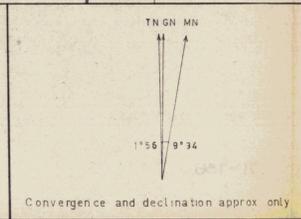
MOUNT COUNCIL
REGIONAL GEOLOGY & AUGER HOLES
SHEET 14

Date: _____
Geologist: _____
Drawn by: NRK
Checked: _____



a	Sandstone	g	Black Shale	o	Porphyry and Basic Dyke
b	Limestone	h	Slate	p	Tillite
c	Laterite or Ironstone	▲	Breccia	q	Quartzite
v	Volcanics	▲	Actinolite Hornfels	r	Mica Schists and muscovite sillimanite schists
▲	Altered Volcanics	▲	Biotite Actinolite Hornfels	s	Siltstone
d	Agglomerate and Tuffs	▲	Biotite Hornfels	t	Aplite
e	Shale	▲	Pyroxene Hornfels	+	Granite
▲	Spotted Shale	m	Pyroxene Garnet Hornfels	+	Sand dune development boundary
f	Grey mudstone	n	Quartz	—	Formed Roads

—	Unformed Roads	—	Inclined Dip and Strike
—	Geological boundary observed	○	Scout bore for mineral beach sands
—	inferred	—	Submarine bar
—	Fault observed	—	Sand beach shore reef
—	inferred	—	Sand cliff
—	Anticlinal axis	—	Vegetated sand cliff
—	Synclinal axis	—	New stranded shorelines
—	Horizontal Dip and Strike	—	New dunes
—	Vertical	—	Old stranded shorelines



GEOPEKO LIMITED
 KING ISLAND GROUP
 SCALE 1:12500 METRIC GRID
N° K

SEA ELEPHANT
REGIONAL GEOLOGY AND AUGER HOLES
SHEET 15 1024

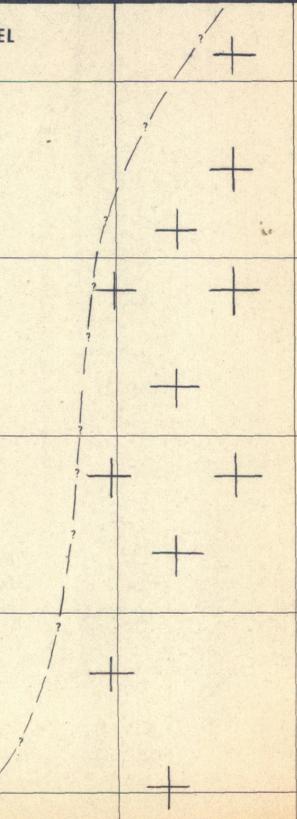
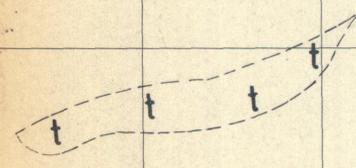
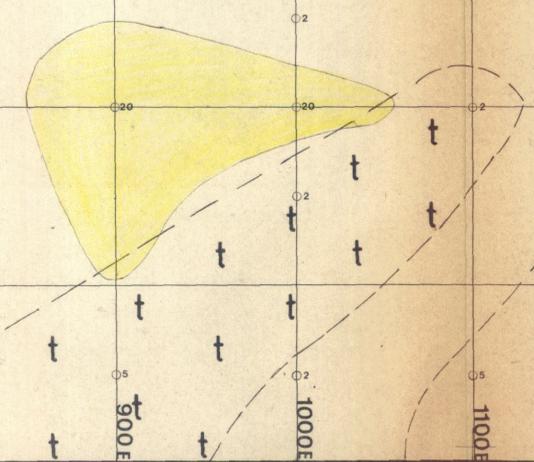
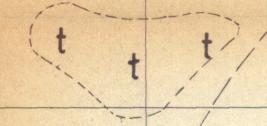
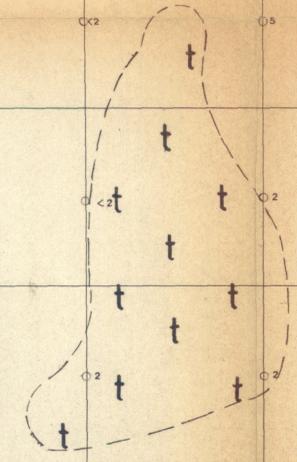
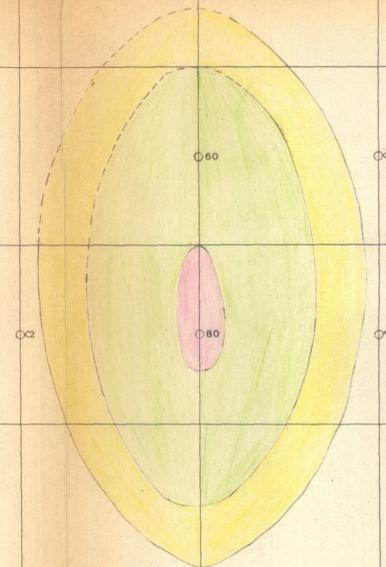
DATE _____
 GEOLOGIST _____
 DRAWN JJG _____
 CHECKED _____

3.

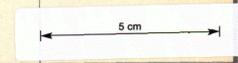
△ MOUNT COUNCEL

1550 N
1450 N
1350 N
1250 N
1150 N
1050 N
950 N
850 N
750 N
650 N

500E 600E 700E 800E 900E 1000E 1100E 1200E 1300E 1400E 1500E



- Granite
- Aplite
- Contact Metamorphosed Sediments Quartz-Andalusite-Sillimanite-Biotite-Assemblages
- Auger Hole With Tungsten Value In P.P.M.
- 0-10 ppm
- 10-30 ppm
- 30-70 ppm
- >70 ppm



1600E
1700E
1800E
1900E

DATE: APRIL '71
GEOLOGIST: P. C.
DRAWN: C. F. J.
CHECKED: F. C.

884027
GEOPEKO LIMITED
KING ISLAND GROUP
71-756
No. K
SCALE: 1-2000
Geological Plan 1025
MOUNT COUNCEL Geochemistry Tungsten