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WARMAN SERVICES LIMITED

REPORT NO. 12/87

FINAL REPORT EL 15/66



S. GRIEVE BROWN

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INTRODUCTION

This report presents a brief summary of all exploration work carried out on that portion of EL 15/66 not covered by Mineral Licence 17M/79 (Figures 1 and 2).

Mineral Licence 17M/79 and its proposed extensions cover the Grassy Granite and Bold Head Adamellite contacts, the areas of primary interest for mineral potential in EL 15/66. For this reason this report will actually cover only a small proportion of the total work carried out during the life of EL 15/66, although a brief summary of the total exploration programme will be given.

At the time of its relinquishment on 24th October, 1987 Exploration Licence 15/66 was held by Warman Services Limited in respect of 130 sq km in south east King Island (Figure 2).

The licence was initially granted to King Island Scheelite (1947) Limited in respect of an area of 2340 acres (9.5 sq km) in 1966.

The area covered by the licence reached a maximum of 238 sq km in 1969 and has been progressively reduced to the area of 130 sq km held at the last renewal. During the period from 1966 to 1987 two other contiguous licences were amalgamated into 15/66. This was done because of unified work programmes for these areas, and to minimise administrative and tenure paperwork (Figure 3).

The two licences amalgamated with EL 15/66 were EL 13/73 amalgamated on 24th April 1973 and EL 21/78 amalgamated on 24th October 1983.

Within the area of EL 15/66, Mineral Lease 17M/79 covers an area of 22.98 sq km around the Grassy Granite and Bold Head Adamellite contacts with their associated Dolphin and Bold Head Orebodies.

The Licence was essentially taken up to allow exploration of the areas adjacent to the contacts of the Grassy Granite and the Bold Head Adamellite.

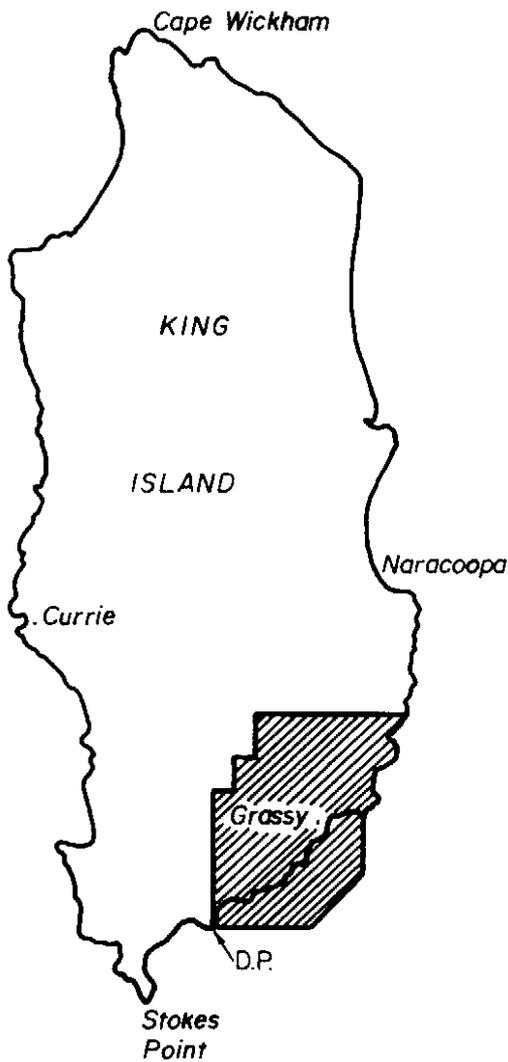
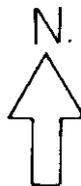
The writer's knowledge of the work carried out by King Island Scheelite (1947) Limited, prior to that company's take over by Peko Wallsend Limited in 1969, is restricted to the data presented in the 1968 report by P.J. Anthony which outlined the areas of potential then considered to exist in the contact zones.

A large amount of detailed work has been carried out since that date with no major additions to the on-shore target areas but with the accumulation of a large body of knowledge, not only on the defined orebodies, but also on the nature and occurrence of sheelite deposits.

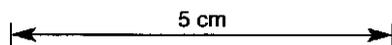
843004

003

230000



560000



DATA POINT (D.P.) CO-ORDINATES
 D.P. - E.L. 15/66: 5 555 000m N.
 242 000m E.

Australian Map Grid (A.M.G) Zone 55

REF. DRG

LEGEND



- E.L. 15/66
 AS AT 23/10/87

DRAWN	DJS	11/87

1: 500 000
 SCALE



R.Z. MINES
 (NEWCASTLE) PTY. LTD.

WARMAN SERVICES L.T.D.
 EXPLORATION LICENCE 15/66
 KING ISLAND

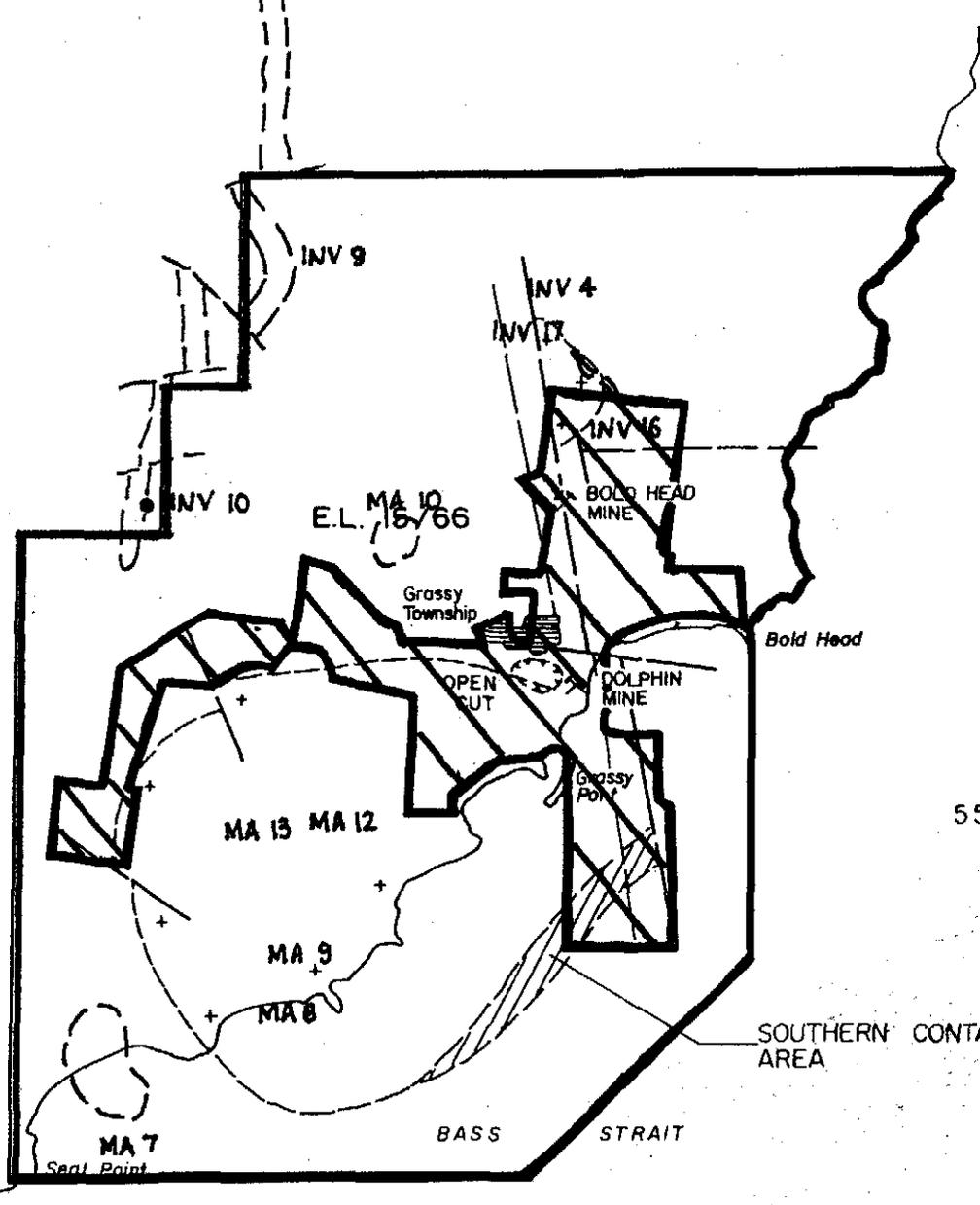
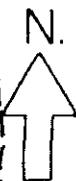
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FIGURE 1

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250 000



5560 000

SOUTHERN CONTACT AREA

BASS STRAIT

MA 7 Seal Point

MA 13 MA 12

MA 9

MA 8

E.L. MA 10 15/66

Grassy Township

OPEN CUT

DOLPHIN MINE

Grassy Point

BOLD HEAD MINE

Bold Head

INV 9

INV 4

INV 7

INV 16

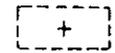
INV 10

REF. DRG.

LEGEND



- M.L. 17M/79



- GRANITE

DRAWN

D.J.S

11/87

1:100 000 SCALE



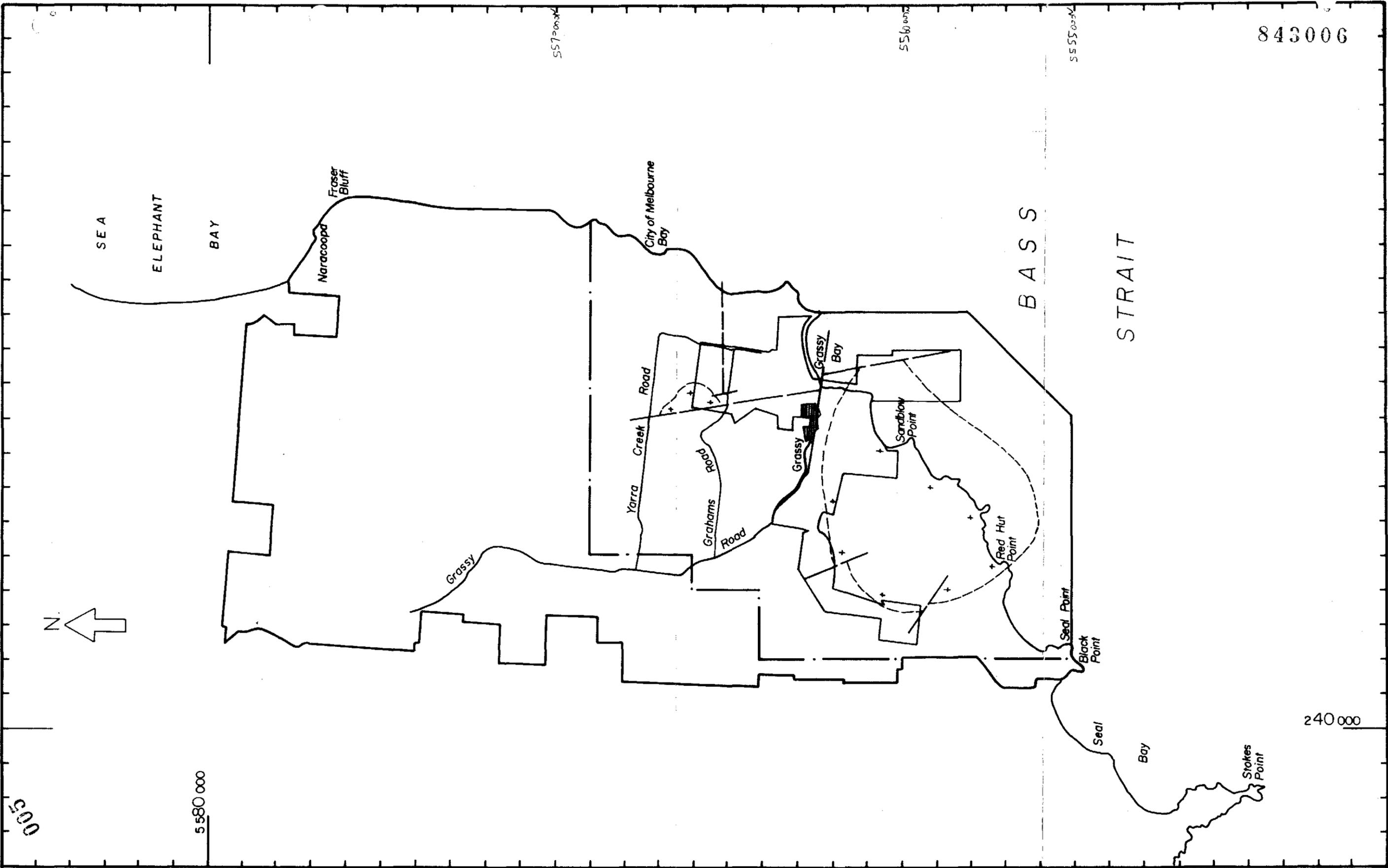
R.Z. MINES (NEWCASTLE) PTY. LTD.

EXPLORATION LICENCE 15/66

SHOWING LOCATION OF M.L. 17M/79

DRG. NO.—A4 51

FIGURE 2



REF. DRG.								
LEGEND								
	MAXIMUM EXTENT	E.L. 15/66		GRANITE				RZM R.Z. MINES (NEWCASTLE) PTY. LTD.
	FINAL BOUNDARY	E.L. 15/66						
	BOUNDARY	M.L. 17M/79			EXPLORATION LICENCE 15/66 TENURE			
					DRAWN	D.S.	11/87	1:100 000 SCALE
								DRG NO A3 32
								FIGURE 3

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Since 1981 exploration work in King Island has, due to the perilous state of the tungsten industry, been confined almost entirely to the area in the immediate vicinity of the Dolphin and Bold Head Mines. No full-time geological staff have been employed at King Island since December 1983 and almost all geological input by visiting personnel has been concentrated on maintaining the viability of the mining operation.

This report is, due to the circumstances, a compilation of data from the series of reports previously written on both regional exploration and local prospect work within EL 15/66. A large percentage of the sections in this report are taken verbatim from previous reports by the author for which no apologies are offered.

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SUMMARY

Exploration on the area covered by EL 15/66 has, to a large extent, been cyclical with a relatively close relationship being shown between exploration activity and the economic viability of the operating mines.

For this reason two major periods of low exploration activity have occurred in the early 1970's and from 1982 to the present. The 1982 to present downturn in the tungsten market has been particularly severe, and since the only significant potential within the area under discussion is for additional tungsten resources, only very minor work has been conducted over the last 5 years. Notwithstanding the above comments it is felt that the exploration carried out, within the areas covered by EL 15/66 since its grant, has successfully assessed the economic potential of this portion of King Island. The stage has been reached where it can be stated that in the current and immediately foreseeable future all potentially economic deposits are located either in the Bold Head Adamellite or Grassy Granite contact zones.

The work carried out within the licence area is summarized below:

A) GEOLOGICAL AND GEOCHEMICAL

- i) Base map compilation on I.S.G. from aerial photographs scale 1:5000 & 1:12000.
- ii) A regional C horizon geochemical soil sampling programme at 1000ft (304.8m) spacing along all roads and tracks within the area. This provided regional geochemical and bedrock geological data to aid in compilation of the 1:12000 geological maps.
- iii) Test surveys using infra-red scanning and multi-spectral methods over the Bold Head Area of the licence.
- iv) Regional photo controlled geological mapping at approximate scales of 1:12000 and 1:5000.

Reconnaissance bedrock geochemical soil sampling over the following prospects:-

Magnetic Anomaly	6
Magnetic Anomaly	11
Investigator	9
Investigator	10
Investigator	15
Ireland's Farm	

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- v) Detailed Gemco bedrock geochemical soil sampling of the Grassy Granite and Bold Head Adamellite contact zones:

Investigators 1, 4, 16, 17 (Bold Head Adamellite) and 2, 3, 6, 18, 21, 22, 23, 24 (Grassy Granite).

Mapping and geochemical sampling of the East Coast strip including the Barrier Creek Workings.

Surface sampling of ironstone outcrops at Investigator 15.

Interpretation of the results of above and planning of ongoing programmes.

B. GEOPHYSICAL

i) Airborne

1973 A low level airborne aeromagnetic survey over South East King Island.

1973 An Airborne Geophysical Survey over the majority of King Island for Magnetics and Radiometrics. Production of contours at 1:25000 scale.

1980 Low level Airborne Geophysical Survey over the South Eastern corner of EL 15/66 for Magnetics and radiometrics. Production of contours at 1:25000 scale.

ii) Ground

Ground I.P. Survey over the Ireland's Farm Prospect

Ground Magnetic Traverses over the following prospects MA's 6, 7, 10, 11, 12 and 13 (1973 - 1975).

Ground Magnetic Surveys over the following Prospects Investigators 1, 2, 3, 4, 6, 9, 10, 15, 16, 17, 18, 21, 22, 23, 24, (1968 to 1975).

Ground Gravity Surveys over the following Prospects Investigators; 1, 2, 3, 5, 6, 16, 17, 21, 22, 23, 24 (1969 - 1975).

Ground Gravity Surveys over the Bold Head South, Investigator 1 and Horst Prospects (1982).

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iii) Marine

Trial echosounder traverses offshore of Grassy area (1981).

Interpretion of the results of the above and planning of ongoing programmes.

C. DRILLING

Three types of non geochemical drilling were carried out within EL 15/66:-

- i) Auger Core drilling to produce 1 metre of core from bedrock for geological mapping purposes.
- ii) Rotary Percussion drilling for three dimensional geological purposes and to test for non outcropping mineralization.
- iii) Diamond drilling to test areas of potential outlined by all other exploration methods.

The drilling carried out in EL 15/66 consisted of:-

Auger Core drilling on a grid essentially 100m x 50m round the entire contact area of the Grassy Granite and rocks of the Mine Series or Volcanic sequences.

Diamond drilling of 2 inclined holes, Irelands Farm Prospect.

Diamond drilling of one scout hole at Tank Hill (1952/53).

Diamond Drilling to test the sources of anomalies outlined by the detailed bedrock geochemical soil sampling programme.

Investigator 6	✓	17 holes	(1952/3-12, 1970-2, 1972/3-2)
Investigator 2	✓	3 holes	(1952/3-1, 1972/3-1)
Investigator 3	✓	4 holes	(1968-1, 1972/3-3)
Investigator 18	✓	5 holes	(1947-3, 1968-1, 1972/3-1)

Scout rotary percussion drilling consisting of 62 holes around the contact aureole between Investigator 2 and Investigator 6, Grassy Granite contact area.

Scout diamond drilling of 3 precollared drilling holes close to the Grassy Granite contact to test for deeply buried mine series.

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Follow up diamond drilling of areas of mineralization located by the scout percussion drilling programme:-
Investigator 24 - 2 holes, Investigator 2 - 2 holes,
Investigator 21 - 9 holes, Investigator 22 - 1 hole,
Investigator 3 - 3 holes and Investigator 23 - 3 holes.

Rotary Percussion drilling to test the source of Magnetic Anomalies 10, 11 and 12 (1977, 1 hole each).

Diamond drilling to test the source of Magnetic Anomaly 7. (1974 1 hole.)

Structural and stratigraphic diamond drilling to test the areas adjacent to, but immediately outside of the Bold Head and Dolphin Mines.

Interpretation of the results of the above and planning of subsequent programmes.

CONCLUSIONS

1. No economic mineral deposits occur outside of the Grassy Granite and Bold Head Adamellite Contact zones within the area previously covered by EL 15/66.
2. Some minor potential exists in the south east of the area covered by EL 15/66 for heavy mineral sands deposits but work carried out previously by Naracoopa Rutile (Buka Minerals) was not sufficiently encouraging to require follow up.
3. The silver-lead mineralization recorded at Barrier Creek is of minor interest geologically but has apparently minimal potential for a major deposit. It has not been tested by drilling due to the reported nature of the occurrence.
4. The lateritic iron stone located in the Pegarah Road area (I 15 and Irelands Farm prospects) is relatively thin and of erratic grade.

S Grieve Brown,
EXPLORATION MANAGER
R.Z. MINES

EXPLORATION HISTORY

Within EL 15/66 exploration has, over the years, been concentrated on the Grassy Granite and Bold Head Adamellite contacts. These zones lie in the south east of the area covered by the licence at its greatest extent.

Exploration elsewhere within the licence area was, until 1966, sporadic being concentrated on the search for gold. The only gold prospects located in or immediately adjacent to the licence area were at the Fraser River and Barrier Creek. At Fraser River both reef quartz and alluvial gold were found in small quantities while at Barrier Creek the gold was associated with lead-zinc mineralization in narrow quartz veins. These deposits were reported on by Debenham (1910) and Blake (1935).

Various attempts have been made to explore the contact environment of the Grassy granite since the discovery of scheelite on the beach at Grassy Bay in 1910. Until 1953 the majority of the work consisted of gouges, adits and pits around the contact by various prospectors, with three short diamond drill holes being completed in the Forestry block (INV.18) by K.I.S. in 1947. Between 1953 and 1955 a total of 15 diamond drill holes were completed by K.I.S. in two areas of interest (Investigator 2 and 6) before difficulties of tenure caused a cessation of exploration.

In 1968 following a recommendation by P.J. Anthony (Senior Geologist K.I.S.) diamond drilling recommenced within the contact area with holes being drilled in the Investigators 3, 6, 18 and Tank Hill areas as well as at Bold Head. Drilling around the Grassy Granite area ceased in August 1968 during the drilling of D.D.H. 220 to allow detailed diamond drilling the mineralization encountered at Bold Head. (Bold Head Orebody).

Geochemical sampling was continued in two areas of the contact (Investigators 2 and 6) where mine series rocks had been recognized during the regional mapping programme. Reports were presented by W. Arendt (1969) and N.R. Kinnane (1969) on these areas covering all work up to 1968.

Prior to the compilation of the 1:12000 scale base maps in February 1970 exploration within the licence area was mainly confined to the Grassy and Bold head granites and their associated contact aureoles. With the production of the 1:12000 bases surface mapping was extended throughout the Licence area. (J.J. Gresham 1970.)

Further geochemical sampling was carried out in the Investigator 6 area to define the tungsten geochemical anomalies encountered in that area and a total of 189 auger holes were

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drilled (138 by hand auger). This work together with a proposal for diamond drilling was detailed in a report by J.J. Gresham in November 1970. The diamond drilling proposed was carried out in 1971 with no mineralization being encountered.

In 1971 an auger drilling programme was initiated on Integrated Survey Grid in the Investigator 3 area. This survey was extended in 1972 to cover the entire granite contact from the Wharf Road to the southern limit of Miller's block. At the same time auger drilling was carried out to the east of the Wharf Road in the Investigator 6 area, on Old Mine Grid, to complete the definition of this prospect. Following the acquisition of the area south of Miller's block in 1973 the drilling was extended to cover the whole contact area. The auger drilling was commenced with a series of wide spaced lines across the contact zone and provided a broad definition of the geology within the Grassy granite contact aureole.

'C' horizon geochemical sampling carried out with this auger drilling programme defined two areas of anomalous tungsten and molybdenum associated with mine series rocks. These locations were termed Investigator 3 and Investigator 6.

Diamond drilling of these anomalies was carried out between June and December 1972 with three holes being drilled in each prospect. All drill holes intersected mine series rocks with significant marble horizons.

A considerable number of ground geophysical surveys have been carried out during the term of the exploration licence.

Ground Magnetic traverses have been carried out over most areas of interest outlined by the various airborne magnetic surveys while more detailed surveys have been carried out on the majority of prospects as shown on table 1. I.P. work has been confined to two areas, Irelands Farm and Investigator 1 with generally inconclusive results.

Gravity surveys have been confined to the Bold Head Adamellite and Grassy Granite contact areas where they have been utilized as a tool in interpreting the sub surface shape of the granite contacts, not always with a great deal of success due to the relatively close density values recorded for the granitic rocks and the precambrian quartzites with which they are often in contact.

As a result of the diamond drilling carried out between 1966 and 1982 it was evident that simple bedrock auger drilling followed by diamond drilling of the anomalous areas was not a suitable method for testing such a large area of mine series, especially when it was considered that orebodies could exist within the mine series sequence without having any surface geochemical expression. This situation occurs due to the fact that the mineralization occurs within limestone horizons as part of a replacement skarn phenomenon and this may only

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happen in the deeper portions of the limestones, nearer the granite, while only unreplaced marble occurs in outcrop.

Previous work had also shown that throughout very large areas of the contact a thick unconformable cover of volcanics overlies the mine series allowing only a very minor part of the sequence to outcrop. Attempts to drill through the volcanics using an auger drill rig met with little success.

For these reasons a less expensive method of sampling, which retained a high degree of precision was required to test the mine series, and rotary percussion drilling was considered to fulfil the necessary requirements.

A programme of scout rotary percussion drilling was carried out between March 1973 and March 1974. This programme consisted initially of a series of 30 percussion drill holes spaced at 200m intervals around the granite contact.

These holes outlined the geology and structure of the rocks in the Grassy granite aureole much more closely than had been obtained by surface mapping (largely float mapping) and auger drilling. A number of holes intersected scheelite mineralization, values over 100ppm being regarded as significant, and in a number of cases this mineralization was clearly related to previously defined 'C' horizon anomalies.

The areas with significant scheelite mineralization were followed up by precollared diamond drilling to obtain representative samples of the mineralized horizons. This follow up work was carried out at 50m spacings round the initial percussion hole on the assumption that if the mineralization did not extend at least 50m laterally it was of insufficient extent to comprise an economic deposit.

The follow diamond drilling consisted of twenty diamond drill holes located in areas where percussion drilling encountered mineralization. Of these twenty holes, two were drilled at Investigator 24, two at Investigator 2, nine at Investigator 21, one at Investigator 22, three at Investigator 3 and three at Investigator 23.

Airborne Magnetic and Radiometric surveys had been conducted over King Island prior to the grant of EL 15/66 and this data was initially utilized in the interpretation of EL 15/66.

With the advent of more precise equipment it was decided to up-date the regional geophysical and in 1973 a low level airborne aeromagnetic survey was carried out over south east King Island for King Island Scheelite (1947) Ltd. This survey delineated both the Grassy and Bold Head granites, the volcanics and also the Grassy River Fault.

During March to May 1973 a regional Airborne Geophysical Survey was flown by Canadian Aero Services, on behalf of Geopeko

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Ltd., at a height of 100m on a 200m line spacing using conventional photographic methods to fix position. This survey covered the whole of King Island except for a small area between the Sea Elephant River and Naracoopa where the then tenure holder would not agree to overflying.

Areas of anomalous magnetic character located within EL 15/66 were followed up by ground magnetic traverses and 3 percussion holes were drilled to test the ones considered most significant, Magnetic Anomalies 10, 11 and 12. One diamond drill hole was drilled to test the source of Magnetic Anomaly 7.

No meaningful results were obtained from the radiometric survey in the areas covered by EL 15/66.

During the mid to late 1970's the majority of the effort was concentrated on the development of and exploration immediately adjacent to the Dolphin and Bold Head Deposits. (Investigators 5 and 1 respectively). Development of these bodies commenced in 1973 and 1972 respectively. The complex structural and replacement features required an intensive underground drilling and mapping programme to be undertaken for development control. Most non mine related work was aimed at following up zones of interest outlined by the 1973 Aeromagnetic survey in areas outside of EL 15/66.

In 1980 a reassessment of the 1973 Aeromagnetic data indicated that, with the current advances in technology, this survey was deficient in both detail and accuracy of positioning.

A detailed low level aeromagnetic survey was therefore conducted by Austirex International Pty Ltd on behalf of Geopeko over EL 21/78 (later amalgamated with EL 15/66) and portions of EL 15/66 in July/August 1980.

The survey was conducted on east-west lines spaced 150m apart, with north-south tie lines 1500m apart. Mean terrain clearance was 50m onshore and 15m offshore. Navigation and flight path recovery were achieved using VHF range-range radio equipment supplemented by conventional photographic techniques. About 1800 line kilometres of data were collected.

The Austirex Nomad N22B aircraft was equipped with a modified Varian V85 magnetometer, a Geometrics GR800D multichannel gamma ray spectrometer, 50 l of 4 TT geometry NaI (Tl) scintillation crystal, 15 l of 2 TT geometry upward looking crystal, a Sonotek digital data acquisition system and navigation equipment.

Inspection of analogue records showed no significant spectrometer anomalies and no further processing of this data is contemplated.

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Preliminary contours of residual total magnetic intensity have been produced on 1:25000 scale. This plan has confirmed the overall magnetic picture of the area with increased detail and a number of significant variations in some areas.

Since the significant data produced by this survey is contained within the bounds of ML 19/79, which is to be retained, it is not detailed here.

A deep diamond drilling was carried out in 1980 from the -240m level at the Dolphin Mine to test the effect of the Grassy River Fault on the Grassy Granite. This hole penetrated the fault and progressed to a depth of 337m (-530mRL). Heavily faulted ground east of the fault prevented the hole reaching its target depth of -600m.

During 1982 all regional geological and geophysical data in the Grassy and Bold Head Contact areas was transferred to the new base scale of 1:10000 to allow better assessment. A major survey grid was also established over the area between Bold Head Mine and the coast and reconnaissance ground gravity and V.L.F. surveys were conducted. The V.L.F. survey did not yield meaningful results (Sumpton 1982).

Drill core susceptibility studies were carried out to define the magnetic character of the various rock types as an aid in further interpretation of the 1980 aeromagnetic survey.

A total reassessment of the structural data available on the Bold Head and Grassy Contact Zones was completed. Additional diamond drilling in the Bold Head Mine area defined a hitherto unknown major east west fault which has a major influence on the economic potential of the area.

Examination of the potential for offshore deposits was carried out in 1981 and trial offshore echo sounds traverses were undertaken in an attempt to identify any topographic expression of the southern contact of the Grassy Granite. No such expression was recorded probably due to the thick sand cover and insufficient resolution of the equipment used in the trial.

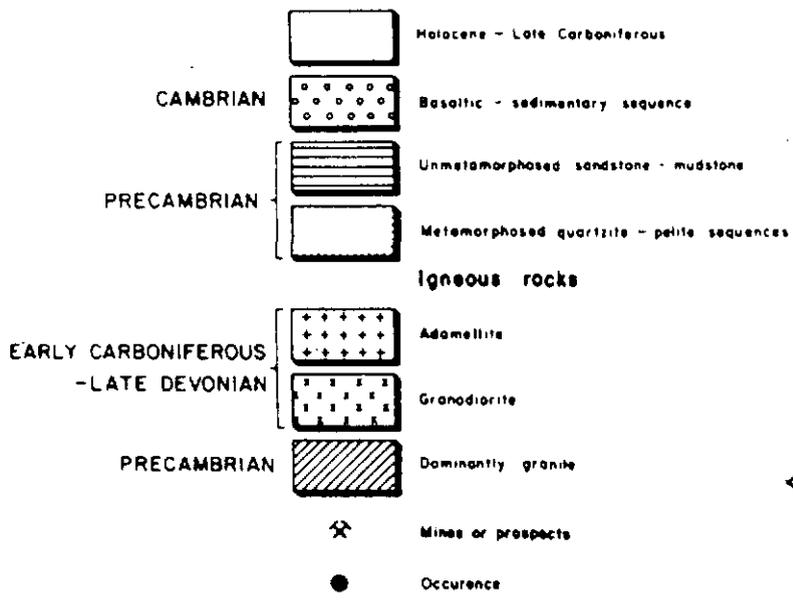
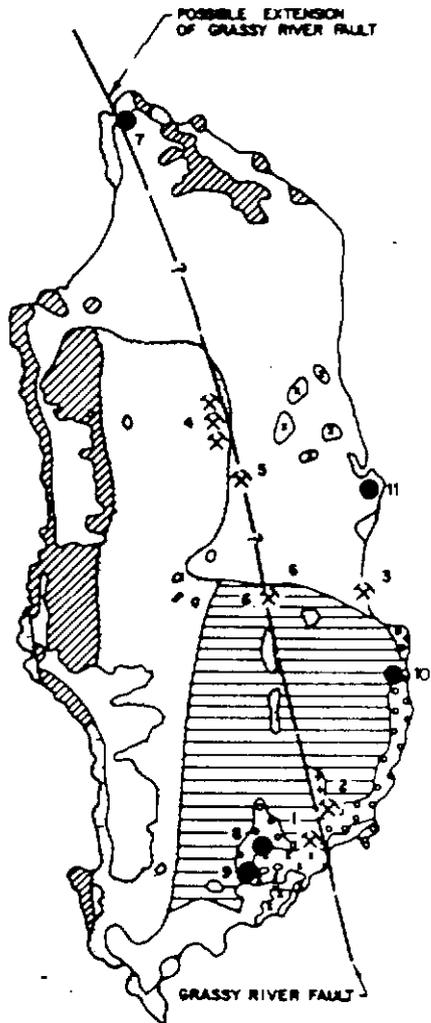
Examination of offshore drilling methods was also completed during 1981, however the conditions prevalent at King Island preclude the use of such techniques at the present time. A cost estimate of the only feasible methods showed an outlay of some \$1.9 million for a total of 1300m of drilling.

During 1982 deep drilling was commenced south of the Dolphin orebody, unfortunately only one hole (D 300/8) was completed in the envisaged programme which was terminated with the second hole D 360/14 at a depth of 157m. The suspension of all major exploration activity outside of the immediate mine areas was caused by the drastic downturn in tungsten price which demanded that all available resources be directed towards maintaining the viability of the producing mines.

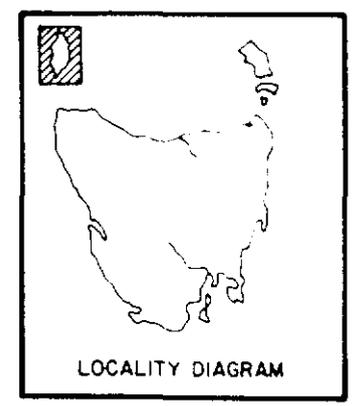
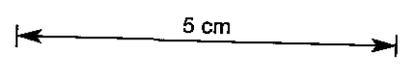
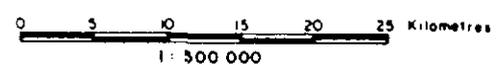
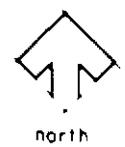
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Geological manpower at King Island was reduced from 4 in 1981 to nil at the end of 1983 and all geological services since that time have been provided on the basis of periodic on-site visits to keep geological mapping and interpretation up to date on the one operating mine, Dolphin Mine. For this reason major exploration efforts have not been possible since 1982 and no significant further work has been carried out.

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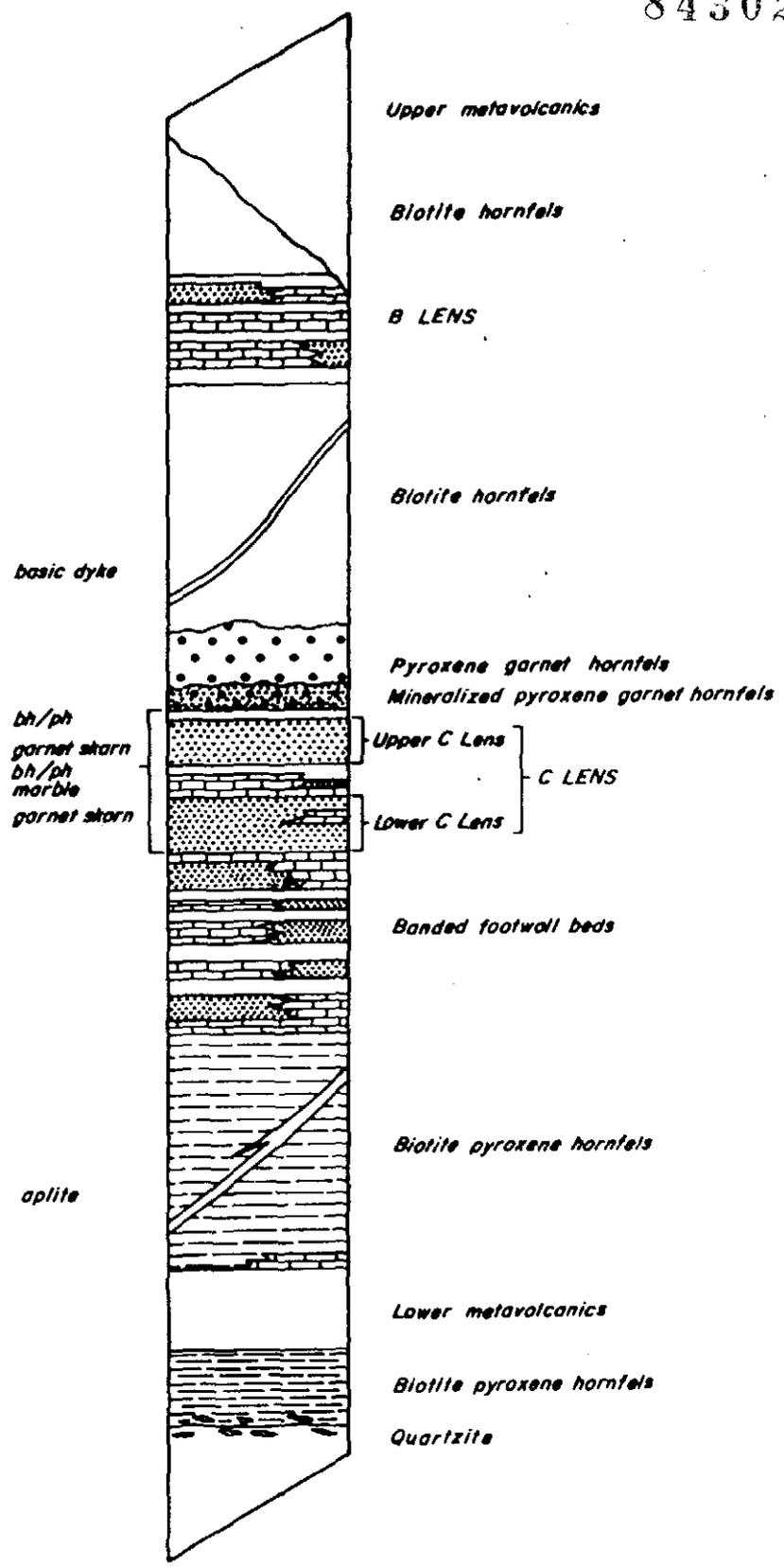
1. DOLPHIN/N91 OREBODY - W, Mo
2. BOLD HEAD - W, Mo
3. NARACOOKA - Beach Sands
4. REEKARA - W, Sn
5. HAWKES ALLUVIAL - Sn, W
6. FRASER RIVER - Au
7. VICTORIA COVE - W
8. LOOP ROAD - W, Mo
9. INVESTIGATOR 21 - W, Mo
10. BARRIER CREEK - Au, Ag, Pb, Cu, As
11. COWPER POINT - Beach Sands



KING ISLAND GEOLOGICAL MAP
FIGURE 4

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**STRATIGRAPHIC SUCCESSION
OPEN CUT and DOLPHIN MINE**

FIGURE 5

GEOLOGY

Geological mapping was carried out over the entire licence area on an approximate scale of 1:120000 using photo controlled regional base maps obtained from 1967 aerial photographs using the slotted template method of photo laydown.

More detailed mapping was carried out on a scale of 1:5000 using contoured plans produced by planimetry from 1967 aerial photographs.

With the exception of the outcrops along the east coast and some of the deeper creeks very little structural information is available, the majority of the area being cultivated land with moderate amounts of float and occasional outcrops.

1. REGIONAL GEOLOGY

The Grassy Granite and its associated metamorphic aureole lie in the extreme south east of King Island within a thick sequence of Precambrian siltstones and shales, the Eastern Sediments (Figure 4).

The siltstones and shales of the Eastern Sediments, which form the higher south eastern portion of the island, have a dominant north-south strike and generally dip to the east. At least three fold axes are known to occur in this unit.

Overlying these rocks is a thin (approximately 200m) sequence of dolomitic siltstones, shales and tilloid, the Grassy Group. This sequence which has been tentatively correlated with the early Cambrian or late Proterozoic Carbine Group at Dundas and the Smithton and Jane dolomites on the Tasmanian Mainland. The 'mine series' rocks consisting of contact metamorphosed and metasomatized carbonate rich sediments are assumed, on the basis of present evidence, to be the lateral equivalents of the Grassy Group.

The mine series rocks, and the lateral equivalents, are overlain by a thick (+2500m) volcanic sequence of picritic and spilitic lavas, tuffs and agglomerates with interbedded pelitic sediments. The sequence becomes more pelitic and less volcanic rich to the south west.

The sediments were intruded during Devonian - early Carboniferous times by two granitic bodies, the Grassy Granodiorite and the Bold head Adamellite. These two bodies have been tentatively correlated with the tin/tungsten bearing granites of the Aberfoyle and Story's Creek district of Tasmania.

The granites and surrounding sediments are intruded by a series of quartz feldspar porphyries which are probably late stage activity related to the granite emplacement.

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The overall geological sequence in the south east of King Island is shown in the stratigraphic column (Figure 5).

The Eastern Sediments

This sequence consists of very low grade regionally metamorphosed quartzites and shales with minor basic sills apparent in the Pegarah area.

Where these units occur in outcrop they are generally seen to have a north-south strike and there is evidence for a series of major fold axis lying in approximately the same direction.

These sediments, which are generally blue-grey in colour, show normal sedimentary features such as graded bedding in hand specimen. This unit grades west into a series of grey-green sediments which show a slightly higher metamorphic grade.

The rocks have been described by J.J. Gresham in a 'Geological Progress Report on E.L. 15/66' in 1970.

The Grassy Group

This series of rocks is very well exposed along the south-east coast of King Island and a well defined sequence of shales - dolomites and tillites overlain by basic volcanics have been mapped.

The volcanics, which consist of lava flows showing various textures, massive, blocky, ropy and pillow have been described by a number of writers, and have been correlated with Tasmanian volcanics (Scott 1950).

Some stratification is apparent within the volcanics with the breccia and massive tuffs being earlier than the blocky, ropy and pillow lava. Showers of tuff were apparently ejected throughout the period of vulcanicity. Fine grained sediments are also apparent within the volcanic pile and there is evidence that the volcanics were occasionally injected into the sediments.

The underlying sediments consist of a basal siltstone shale sequence overlain by a thick tilloidal unit of approximately 30m. The tilloid consists of angular and subrounded fragments of bedded limestones, cherts and sediments in a matrix of carbonate and ironstained clay with some fine grained quartz. The origin of the unit is still a matter of some conjecture, see Jago (1974).

Overlying the tilloid there is a thick (approximately 50m) unit of laminated dolomite (CaCO_3 - 41%, MgCO_3 - 31%). Between the dolomite and the overlying volcanics

there is a thin sequence of micaceous siltstones and shales.

Other Rock Types

Two other rock types, ironstone and gabbroic bodies, occur within the licence area especially in the Pegarah area in the north.

The gabbroic bodies, occur as relatively thin sills within the sedimentary sequence and consists of a dark green coarsely crystalline rock with large crystals of pyroxene apparent in hand specimens.

The ironstones, limonite - goethite, pisolitic laterite types, and developed over the gabbroic bodies and adjacent sedimentary rocks. These ironstones appear to be generally a thin veneer although in some areas they reach to considerable thickness.

The ironstones are thought to be laterites developed in the Tertiary.

Massive milky quartz is relatively abundant as float throughout the licence area and is probably derived from fracture and joint infillings within the sediments. The relative abundance of this material is due to its far greater resistance to erosion than its host rocks the siltstones, shales and quartzites of the Eastern sediments.

2. THE CONTACT AREAS

The rock types can be broken down into four broad units stratigraphically arranged as follows:-

- | | |
|-----------------|---|
| Upper Volcanics | A sequence of volcanics with interbedded pelitic sediments. |
| Mine Series | Clastic and carbonate rocks with interbedded 'volcanic' horizons. These rocks are hornfelsed in proximity to the Grassy Granite and Bold Head Adamellite. |
| Quartzites | Quartzites, spotted shales and siltstones frequently interbedded. The metamorphosed equivalents of the siltstone shale sequence. |
| Granite | The above three units are intruded by the Grassy Granite and Bold Head Adamellite. |

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The Upper Volcanics

This unit contains a large variety of rock types of both volcanic and sedimentary origin. Although biotite quartz hornfels are present throughout, from No. 1 orebody to the south coast, the sediments only become a major unit from the Investigator 3 area west and south. These sediments are in hand specimen very similar in appearance to the quartzites underlying the mine series even showing the typical spotted texture associated with these rocks.

In thin section these two rock units can be differentiated by the presence of haematite in the sediments associated with the upper volcanics.

The upper volcanics lie unconformably on top of the mine series rocks and in some areas overlap onto the underlying quartzites.

In the south east of the contact aureole, that area originally held under EL 13/73, the biotite quartz hornfels becomes dominant and at the present time is interpreted as overlying the mine series which sub-outcrop much further west than is the case further north.

The Mines Series

This unit can be broken down into two broad sections:- The upper mine series, which is generally a finely bedded sequence, and the lower mine series which contains significant amounts of podded units and is more disturbed in appearance. However there is a lack of data about the lower mine series.

At least two marble horizons are known to occur in the mine series at Investigator 21 and Investigator 6.

It is difficult to correlate the mine series between percussion holes due partly to the effect of a series of faults which strike approximately at right angles to the granite contact. These are best defined at Investigator 6 where a series of faults have been interpreted from diamond drilling results.

It would appear that some of these faults may have been contemporaneous with deposition of the mine series as the adjacent blocks appear stratigraphically different. In western Investigator 6 large thicknesses of marble up to 30m, were encountered in a hole adjacent to a section in which the mine series is only 50m thick and contained only 10m of marble.

Scheelite and molybdenite mineralization is, with the exception of Investigator 18, confined to the mine series rocks and is localized within them in garnet rich

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horizons. These occur either as skarn horizons associated with the thicker marble beds or as narrow beds in banded biotite pyroxene garnet calcite horizons where the garnets form at the contact between the marble and pyroxene hornfels bands.

Within the mine series a number of minor intrusive volcanic units occur. These are medium grained massive actinolite rocks which occur as sill like structures between the mine series horizons.

Quartzites

This unit is the metamorphic equivalent of the Precambrian siltstone and shale sequence which forms the bulk of south east King Island.

In fresh core they comprise a sequence of pyrite rich light grey quartzites with some very fine grey black pyrite rich siltstone horizons.

The dominant spotted texture is most obvious in weathered rocks.

The Granites

Both the Bold Head and Grassy Granites have intrusive relationships to the surrounding sediments and have been shown by age dating (McDougal and Leggo) to be of Lower Carboniferous age.

Examination of thin sections and chemical analysis has shown that these intrusions should be more correctly termed the Grassy Granodiorite and the Bold Head Adamelite.

The granite bodies are interpreted as the source of the tungsten mineralization in the metamorphosed calcareous rocks of the mine series and drilling in the centre of the Grassy Granite itself has shown tungsten values up to 140 ppm W.

The dip of the Grassy Granite contact, although generally an outwards dip, varies quite considerably and a shelving effect is known at Investigator 21 where the subsurface contact is roughly horizontal over a distance of about 150m.

A similar situation occurs at Bold Head mine and it is considered likely that this shelving may be one of the causes of the occurrence of the mineral bodies at these points.

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Other Rock Types

Only two other rock types are encountered in the area.

The quartz feldspar porphries, occur as long narrow dyke like bodies cutting both the sediments and the granite. These dykes appear, at least in some cases, to occur within fault zones probably by intrusion along existing lines of weakness.

The tertiary limestones, occur only in the south west where a thick cover of dunal material masks the rocks. This limestone commonly consists of recemented shell fragments.

Massive milky quartz is abundant as float in localized areas, (e.g. Investigator 24) and is in all probability derived from fault and joint fillings within the granite and the sediments. Due to its resistance to weathering compared to the mines series rock it forms a higher percentage of the float in the area.

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ECONOMIC GEOLOGY

There is no known economic mineralization within that portion of the licence area under consideration. All economic mineralization lies within ML 17M/79.

Narrow mineralized quartz veins containing Cu, As, Au, Pb and Zn occur in the Barrier Creek area. The area was examined in 1935 by Blake, at which time the workings were accessible. Visible galena, chalcopyrite and minor sphalerite occur in sparse discontinuous quartz veins transecting the siltstones and shales (as seen in old workings) and it is considered that the mineralization is probably derived from syngenetic sulphides occurring within the sedimentary sequence. Good values for Pb, Zn, Ag, Au and As are recorded in the mineralized quartz veins but the lack of any suitable host rocks and the limited extent of the veining make it unlikely that this occurrence possesses any economic significance.

The lateritic ironstone at Investigator 15 is derived from the weathering of relatively narrow basic bodies and surrounding sediments. Bedrock geochemical sampling and diamond drilling of the basic rocks and the surrounding sediments was carried out with no significant values being recorded for any of the elements assayed. (Fe, Mg, Cr, Ni, Zn, Pb, Cu, Mn.) The only high values occurring in this area being associated with the lateritic ironstone itself which contained high values for iron, magnesian and manganese (up to 53.4% Fe, 5.09% Mg, 0.7% Mn). The ironstone, although having a relatively large though patchy lateral extent appears to be of limited thickness. This, together with the relatively low (as compared with W.A. deposits) iron content, makes it of very limited economic significance.

No anomalous geochemical trends were recorded from auger drilling of the linear magnetic anomaly (No. 6, Investigator 9 and 10 trend), and it is considered that this anomaly is due to variations in the magnetite content of the sedimentary horizons and hence has no economic significance.

No anomalous geochemical results were recorded from either the auger drilling or the percussion drilling at Magnetic Anomalies 10 and 11. These anomalies are now interpreted as possibly very deeply buried granites, but in the absence of suitable host rocks the area is considered to have no economic significance.

Magnetic Anomalies 9, 12, and 13 are considered to reflect the presence of a quartz feldspar porphyry dyke swarm within the Grassy Granite and have no economic significance.

Magnetic Anomaly 8, the south western Grassy Granite contact occurs in an area in which no suitable host sediments are present and that area is therefore considered to have no economic significance.

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The source of Magnetic Anomaly 7, the volcanic breccia, while of geological importance has, in itself, no economic potential.

Although a considerable number of geochemical samples were examined from the East Coast sediments and volcanics, no anomalous values were recorded and in no area were any contact alteration effects apparent. It is considered that although some of the rocks could be classed as good host rocks for scheelite mineralization, they lie too far away from the source of that mineralization (granite), and have not been subjected to mineralizing fluids.

The Bold Head Adamellite contact area, with the exception of Investigator 1, showed only two areas of anomalous tungsten results (Investigator 17). Both these anomalies were located where cross faulting of the Grassy River fault has been interpreted and are localized in these fault zones. It is considered that these have a low economic potential due to their nature and limited extent.

The Grassy Granite contact area remains the prime target for economic mineral deposits within King Island. The areas of this contact which have been shown to contain economic potential have been retained under Mineral Lease 17M/79.

The other areas adjacent to the Grassy Granite not included in ML 17M/79 are considered to have no economic potential due to either a lack of suitable host rocks or excessive distance from the contact.

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PROSPECTS

For completeness, all prospects which were located within EL 15/66 are shown on Figure 6 and listed in Table 1, 'Prospects Investigated 15/66', but only those prospects which lie outside of the current boundaries of ML 17M/79 are discussed in this report.

The prospects located on King Island can basically be classified into two categories; Magnetic Anomalies located by airborne geophysics, and prospects derived from either regional or local geochemical and geological surveys.

1. Airborne Magnetic Anomalies were generally derived from the 1973 survey although two Investigators 9 and 10 were derived from the earlier 1960's survey.

The prospects in this category which occur within the area under discussion are:

Investigator 9
 Investigator 10
 Magnetic Anomalies: MA6
 MA7
 MA8
 MA9
 MA10
 MA11
 MA12
 MA13

Magnetic anomalies 1 - 5 lie outside the limits of EL 15/66 and have been previously reported on (Brown 1974).

The interpretation of the 1973 Airborne Survey was carried out by Mr. R. Richardson for Geopeko Limited and was the subject of a number of memos and discussions.

2. Prospects derived from either regional or local geochemical and geological surveys. A large percentage of these fall within the boundaries of ML 17M/79 and are not described in detail here.

The prospects in this category which occur within the area under discussion are:

Barrier Creek
 Irelands Farm
 Investigator 15
 Investigator 4
 Investigator 16
 Investigator 17
 Southern EL 15/66
 Northern Contact Area

A brief outline of each of the above prospects is attached in the order in which they are listed.

PROSPECTS INVESTIGATED EL 15/66

PROSPECT	LOCATION	CURRENT TENURE	EXPLORATION METHODS EMPLOYED								COMMENTS
			MAPPING	GEOCHEM	GROUND GEOPHYSICS			DRILLING			
					MAGNETICS	GRAVITY	IP	AUGER	PERCUSS'N	DIAMOND	
BARRIER CREEK	BARRIER CREEK	NIL	NO	MINOR	NO	NO	NO	NO	NO	NO	Au, ag, P6, Zn, Minor
IRELANDS FARM	IRELANDS FARM	NIL	YES	YES	NO	NO	YES	YES	NO	YES	
INVESTIGATOR 1	BOLDHEAD	17M/79	YES	YES	YES	YES	NO	YES	NO	YES	NOW BOLD HEAD OREBODY
INVESTIGATOR 2	MILLER'S BLOCK	17M/79	YES	YES	YES	YES	NO	YES	YES	YES	Mo, W
INVESTIGATOR 3	PERRY'S BLOCK	17M/79	YES	YES	YES	YES	NO	YES	YES	YES	Mo, W
INVESTIGATOR 4	BOLDHEAD NORTH	NIL	YES	YES	YES	NO	NO	YES	NO	NO	
INVESTIGATOR 5	EASTERN EXTENSION	17M/79	YES	YES	NO	YES	NO	NO	NO	YES	NOW DOLPHIN OREBODY
INVESTIGATOR 6	GRASSY WEST	17M/79	NO	NO	YES	YES	NO	YES	YES	YES	Mo, W
INVESTIGATOR 8	GOLF COURSE	17M/79	YES	YES	YES	NO	NO	YES	NO	NO	TESTED AS POSSIBLE PLANT SITE
INVESTIGATOR 9	LYMWOOD NORTH	NIL	YES	YES	YES	NO	NO	YES	NO	NO	
INVESTIGATOR 10	LOOP ROAD	NIL	YES	YES	YES	NO	NO	YES	NO	NO	
INVESTIGATOR 15	IRELAND'S FARM WEST	NIL	YES	MINOR	YES	NO	NO	YES	NO	NO	IRONSTONE
INVESTIGATOR 16	BOLD HEAD EAST	NIL	YES	YES	YES	YES	NO	YES	NO	NO	Mo, W
INVESTIGATOR 17	BOLD HEAD WEST	NIL	YES	YES	YES	YES	NO	YES	NO	NO	Mo, W
INVESTIGATOR 18	FORESTRY BLOCK	17M/79	YES	YES	NO	NO	NO	NO	NO	YES	Mo, W
INVESTIGATOR 21	MERRITT'S BLOCK SOUTH	17M/79	YES	YES	YES	YES	NO	YES	YES	YES	Mo, W
INVESTIGATOR 22	MERRITT'S BLOCK NORTH	17M/79	YES	YES	YES	YES	NO	YES	YES	YES	Mo, W
INVESTIGATOR 23	PERRY'S BLOCK EAST	17M/79	YES	YES	YES	YES	NO	YES	YES	YES	Mo, W
INVESTIGATOR 24	MILLERS BLOCK SOUTH	17M/79	YES	YES	YES	YES	NO	YES	YES	YES	Mo, W
SOUTHERN EL 15/66	SOUTH WEST CONTACT	NIL	YES	MINOR	NO	NO	NO	YES	NO	NO	
NORTHERN CONTACT	TANK HILL	NIL	YES	MINOR	NO	NO	NO	YES	NO	YES	
SOUTHERN CONTACT	SOUTH EAST CONTACT	ML17M/79	NO	NO	NO	NO	NO	NO	NO	NO	Mo, W
MAGNETIC ANOMALY 6	BRUMBY'S RD - INV 9	NIL	YES	MINOR	YES	NO	NO	YES	NO	NO	
MAGNETIC ANOMALY 7	COLLIERS BEACH	NIL	YES	NO	YES	NO	NO	NO	NO	YES	VOLCANIC BRECCIA
MAGNETIC ANOMALY 8	RED HUT	NIL	YES	MINOR	NO	NO	NO	YES	NO	NO	
MAGNETIC ANOMALY 9	GRASSY GRANITE WEST	NIL	YES	NO	NO	NO	NO	NO	NO	NO	
MAGNETIC ANOMALY 10	DRYSDALE'S BLOCK	NIL	YES	MINOR	YES	NO	NO	YES	YES	NO	
MAGNETIC ANOMALY 11	NARA COOPA	NIL	YES	MINOR	YES	NO	NO	YES	YES	NO	
MAGNETIC ANOMALY 12	GRASSY GRANITE NORTH	NIL	YES	MINOR	YES	NO	NO	YES	YES	NO	PORPHYRY DYKES
MAGNETIC ANOMALY 13	GRASSY GRANITE NORTH	NIL	YES	MINOR	YES	NO	NO	YES	NO	NO	PORPHYRY DYKES

1. Magnetic Anomalies

Investigators 9 and 10

These two prospects cover areas of anomalous magnetic character originally outlined by an earlier aeromagnetic survey flown over the south eastern portion of the island. From the more recent aeromagnetic survey of the island flown in 1973 by Canadian Aero Services these magnetic anomalies are interpreted as portions of the linear anomaly (magnetic anomaly No. 6) which have been displaced by faulting.

Both these areas were gridded, read for magnetics and geologically mapped. The only rock types recorded during the mapping were typical siltstones and quartzites of the eastern siltstone sequence and no surface expression of the source of the anomaly occurred.

Auger drilling to bedrock was carried out (Investigator 9 - 35/97m in 10 holes, Investigator 10 - 43.59m in 10 holes) across the magnetic anomalies and all samples analysed for Cu, Pb, Zn, Ni. No anomalous values were recorded.

Good bedrock chips of siltstones and quartzites were obtained from all holes and it was concluded that the magnetic anomaly was a function of variations in the magnetite content within the sedimentary sequence.

Magnetic Anomaly No. 6

This fairly intense linear magnetic high which was located during the 1973 airborne geophysical survey, lies in the extreme west of E.L. 15/66 within the siltstones and shale sequence.

Two ground magnetic traverses No. 6 and 6A were carried out in an east-west direction across this anomaly and gemco drilling to bedrock was carried out to determine its source. All samples were assayed for Cu, Pb, Zn, Ni, Co, Cr. No anomalous values were recorded. In all cases good bedrock chips of slightly weathered siltstones and quartzitic siltstones were obtained and the magnetic anomaly is now thought to reflect variations in magnetic content in various horizons of siltstone - quartzite unit.

Magnetic Anomaly No. 7

Magnetic anomaly No. 7 is a moderate sized ovoid shaped magnetic high the source of which was interpreted by L.A. Richardsons as occurring at a shallow depth. The anomaly lay close to the inferred location of the mine series rocks in this area. The majority of the anomaly lies off the south coast at Red Hut. The landward part

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of the high has been located by ground magnetic traverses and diamond drilling was carried out to test this target.

Diamond drill hole MA7-1 was drilled during 1975. This hole which was completed at 60.35 m encountered a volcanic breccia underlying a thick sand cover. This breccia has a high magnetic susceptibility and is the source of the magnetic anomaly.

Analytical results showed no anomalous values for economic minerals and although this breccia is of significant geological interest, its economic potential is considered minor.

Magnetic Anomaly No. 8

This linear anomaly is the magnetic expression of the contact between the Grassy Granite and the sedimentary sequence in the south west and is located both onshore and offshore in the Red Hut Point area.

Mapping and Auger core drilling over this area indicated that the potential for the presence of Mine Series Rocks was low and no further work was carried out.

Magnetic Anomaly 9

This area of linear magnetic gradient occurs within the Grassy Granite body some 1,000 m north east of Red Hut Point.

The anomaly was interpreted as possibly due to a contact between granitic material and sediments and was considered the south west extension of magnetic anomaly 12.

Ground surveys in this area showed large outcrops of granite on the south of the linear trend but the northern side was covered by thick sand.

Based on the results obtained from the drilling at Magnetic Anomaly 12, the anomaly was reinterpreted as possibly due to a continuation of the quartz feldspar porphyry dyke swarm located at Investigator 6 west and tested at MA 12.

No further work was carried out at this prospect.

Magnetic Anomaly 10

This broad circular shaped magnetic high, located during the airborne geophysical survey, lies within Drysdales Block some 1.5 km north west of Grassy township. The anomaly is located within the underlying siltstones and shales some 1600m north of the Grassy Granite Contact. This anomaly was initially interpreted as possibly being

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due to a small buried granite body, the anomaly showing a basic similarity to that recorded over the Bold Head Adamellite.

Auger drilling and percussion drilling (P53/51.82m) encountered only poorly hornfelsed pyritic siltstones and shales interpreted as belonging to the underlying siltstone - quartzite group.

The area is considered to have no economic potential.

Magnetic Anomaly No. 11

This broad low intensity circular magnetic anomaly which occurs just south of Naracoopa was initially located during the airborne geophysical survey.

One line of gemco auger holes was drilled across the anomaly in an approximate north-south direction along the Naracoopa Road. All samples were analysed for Cu, Pb, Zn, Ni, Mo, and W, but no anomalous results were recorded. Good rock chips predominantly of a grey quartzite were recorded from most holes. Vein quartz was present both as float and as chips in two holes.

A percussion drill hole P.D.H. 52 was drilled about 11 metres east of the inferred centre of the large, 1500m x 2000m, magnetic anomaly and intersected a sequence of quartzites and siltstones.

Magnetic Anomalies 12 and 13

These two anomalies form the east and west flanks of an elongate magnetic low occurring as a wedge driven from the south west into the overall magnetic pattern formed by the Grassy Granite.

This anomaly had been located by the early 1960's airborne survey as a rather indistinct area of low magnetic character.

Geologic mapping and geochemical sampling carried out in the early 1970's failed to locate any material other than granite in the area, which is mainly overlain by a thick sand cover. Ground magnetic surveys carried out at the same time also failed to locate any significant feature.

The higher resolution of the 1973 airborne magnetic survey allowed a much better picture to be developed and the anomaly was interpreted as possibly due to a roof pendent of sedimentary material lying within the granite body. Evidence for such a scenario was provided by the blocks of partially digested sediment found within the granite where it is exposed on the coast.

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Auger drilling and percussion drilling (P.MA12A/76.2m) of this area encountered Grassy granite and quartz feldspar porphyry. The magnetic low is thought to be due to a concentration of these quartz feldspar porphyries within the granite.

These quartz feldspar porphyries contain anomalous tungsten, up to 130 ppm, and are thought to be the source of the anomalous geochemical results obtained at Investigator 6 West.

2. Geochemical/Geological Prospects

Barrier Creek

This prospect located on the banks of Barrier Creek some 4 km south of Naracoopa was the subject of a report by Blake (1935). Since that time, access has been lost to most of the workings but examination of those accessible indicates the restricted nature of the mineralization.

Work on this prospect was restricted to a minor amount of geochemical sampling.

The Au, Ag, Zn, Pb, mineralization occurs in a few narrow quartz veins and is not considered to have any economic potential.

Irelands Farm Prospect (Joint Venture)

This prospect, which was outlined during a regional soil sampling and Induced Polarization survey in the Pegarah area consisted of strong I.P. anomalies associated with geochemical highs occurring along a gabbro/sediment contact.

A report covering this prospect was made to Costigan Mining Australia Pty. Ltd., the joint venturers with King Island Scheelite 1947 Ltd., by E.R. Leckie dated 10th September 1968.

After hand auger geochemical sampling and a more detailed I.P. survey in which two separate anomalous areas were delimited, two diamond drill holes were drilled. These holes intersected quartzites, mudstones and shales showing evidence of very low grade regional metamorphism. Short intersections of feldspar porphyry were intersected in both holes. Analysis of the split core showed that low anomalous values (up to 700ppm Cu, 400ppm Zn and 80ppm Mo) were present in the bands of pyrite carbonaceous shale.

It was concluded that the source of the I.P. anomalies were sedimentary pyrite while the soil geochemical

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anomalies were due to high trace metal variations in the rocks, and not to any form of economic mineral concentration.

Work carried out by Geopeko Ltd. on an adjoining area (Investigator 15) would tend to substantiate these results.

Investigator 15

This area of lateritic ironstone lies in the northern portion of the licence area at Pegarah Road, and is characterised by the large number of ironstone boulders occurring at the surface.

The ironstone appears to be a relatively thin horizon developed due to Tertiary weathering of shallow dipping dolerite sills, which intrude the sediments in this area, and the sediments themselves.

Although the ironstone contains quite high values of iron (up to 53.4%) and Magnesium (up to 5.08%) the distribution of these higher values is very erratic and this, together with the discontinuous nature of the lateritic horizon, severely reduces its economic potential.

Sampling work has been restricted to 15 bulk chip samples from the ironstone outcrops and a line of ten auger drill holes across the area along Pegarah road. Some earlier work was carried out under the Irelands farm joint venture and is reported by Costigan Mining Australia in 1968.

Investigator 4

This prospect is located close to the northern contact of the Bold Head granite and covers a portion of Block F2 (Clark's) which was purchased by the company on the 10th April, 1970 for \$25,000.

Geologically the area consists of quartzites and spotted shales with an area of tremolite hornfels occurring in the south.

The area was gridded (I.S.G.), mapped and read for magnetics prior to gemco auger drilling.

A detailed report on this prospect by J.J. Gresham was completed in May 1972.

The following conclusions were recorded:

1. No mine series or volcanic rocks, similar to those at No. 3 Orebody exist in the area.

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2. No anomalous geochemical results indicative of mineralization have been recorded in the area.
3. The high tungsten values recorded in some samples were due to contamination during storage.
4. The tremolite hornfels in the area are considered to have originally been a siliceous carbonate rich horizon, which has undergone some degree of remobilization and been strongly metamorphosed. The structural and stratigraphic relationship of this rock type to the spotted sediments, quartzites and sandstones is unknown.
5. No potential exists in the area for economic mineralization and it is considered that no further work is necessary in the area.

No further work has been conducted on this prospect, results of exploration in adjacent areas (Investigator 16 and 17) have tended to substantiate the above conclusion.

Investigator 16 and 17

These prospects cover the contacts of the Bold Head granite excepting the southern area. The southern area is designated Investigator 1 and is the subject of a separate report.

In both Investigators 16 and 17, the Bold Head granite is in contact with siltstones and quartzites of the eastern sediments, those on the western side (Investigator 17) being brought into contact with the granite by movement on the Grassy River fault. For this reason only, those sediments on the northern and eastern sides of the granite body show signs of contact metamorphism (Investigator 16).

Examination of the Grassy River fault zone in the region of the Bold Head Granite (Investigator 17) has shown that this is a relatively wide zone of brecciated and recemented (silica) material. Auger drilling and photo-interpretation has shown that the Grassy River fault is offset in a series of small steps by lesser east-west trending faults which have been shown to cut the Bold Head granite in three places.

The only areas of anomalous tungsten recorded in Investigator 17 are located where the southern two of these faults intersect the main Grassy River fault, the geochemical anomalies showing a distinct east-west trend. The anomalies are restricted in size up to 50m x 100m and have maximums of only 350ppm WO_3 and 150ppm WO_3 .

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It is considered that the lack of suitable host rocks associated with these anomalies as well as the restricted surface expression of the fault zone, would preclude the existence of economically significant deposits.

On the eastern and northern contacts of the Bold Head granite (Investigator 16), the siltstones and quartzites have been affected by contact metamorphism which is evidenced by the development of spotting in the siltstones.

Southern E.L. 15/66

The area designated southern E.L. 15/66 was that portion of the eastern granite contact lying south of Millers block leases.

The area was initially held by Naracoopa Rutile until 1973, when King Island Scheelite obtained Exploration Licence 13/73 covering the area.

Exploration here was difficult due to an extremely thick dunal sand cover and only bedrock auger drilling and reconnaissance mapping were carried out.

The area lies south of the fault encountered in southern INV. 24 which has a major down throw on the southern side so that the only rock types occurring at the surface south of the fault are hornfelsed upper pelitic sediments which form a north south trending topographic ridge. The rocks are also mapped in contact with the granite on the coast at Red Hut.

On the basis of the present evidence it is suggested that the quartz biotite hornfels, (which contain haemitite) are the southern extension of the upper pelitic sediments, encountered at Investigators 22, 21, and 24. The upper volcanics, if present, would probably exist as fine beds within the sediments.

To the west of the ridge of hornfelsed siltstones the ground level falls away very steeply and the sand cover increases to about 25m. Drilling in this area has produced rock chips which are probably weathered mine series, and scheelite was recovered in some panned samples.

It is considered possible that the steep slope previously interpreted as a fault scarp could be due to weathering of carbonate rich mine series rocks in contact with the harder overlying siliceous sediments. If the mine series do occur here they would be a considerable distance from the granite and would have been subjected to less contact metamorphic effects.

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The Northern Contact Area

The area covers the extensive northern limb of volcanics extending northward from Tank Hill where the television relay station is sited.

Exploration here has been limited because of its apparent low potential due to its location over 1500m from the Granite contact.

The area was covered by regional mapping in the early 1960's and one diamond drill hole D.D.H. 214 was drilled in the forestry section south east of Tank Hill. This hole intersected a thick sequence of very slightly hornfelsed mine series rocks underlying the upper volcanic sequence. The hole terminated at 931 feet (283.77m) in siltstones. Granites were not encountered and no scheelite or molybdenite were present.

It is apparent from examination of the cores from this hole, that although the rocks show some signs of contact metamorphism they are little affected by metasomation.

Auger drilling carried out during 1972 - 74 indicated that the hornfelsed pelitic sediments encountered in this area are in part members of the upper pelitic sediments rather than the underlying siltstones and shales with which they were originally correlated.

It is interpreted, on the basis of field mapping and auger drilling, that the long north west trending 'finger' of volcanics in this area is due to a down faulted block of volcanics.

Probable mine series rocks showing very weak hornfelsing outcrop in the eastern portion of this area and these are interpreted as the up dip extension of the mine series rocks encountered in the Investigator 23 area.

It is unlikely that the northern contact area contains any economic mineral deposits within the mine series due to the distance from the granite contact. However, the occurrence of mine series under a relatively thin (130m) cover of volcanics and upper sediments means that percussion drilling, if carried out here, could help to define the mine series distribution in Investigators 18 and 23 where the volcanic cover is much thicker.

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REHABILITATION

The area of King Island covered by EL 15/66 was, even at the maximum extent of that licence, predominantly agricultural land.

The land is used for grazing either of cattle or sheep and no significant areas of crops were encountered during the exploration programme.

The use of the land for grazing purposes meant that even when drilling was being carried out on a close spaced grid pattern, minimal disturbance was caused.

In all cases where auger or auger core drilling was undertaken, the holes were backfilled upon completion. No reports of any holes collapsing were ever recorded.

Where diamond drilling or percussion drilling were carried out the holes were generally capped with 12 inch square cover placed at about 200mm below surface. All percussion drill holes and diamond drill holes were marked with a star picket. Since some 90% of these holes are on company property, this did not, in general, present a problem.

Due to the wet conditions prevailing at the time of the percussion drilling programme, ground damage was incurred during vehicular access to some sites. Where this occurred, the damage was made good in the following spring by disking and re seeding of the pasture grasses in the areas affected.

In summary, the areas disturbed during exploration have been restored to essentially their original condition with the exception that the positions of buried hole collars are marked by numbered star pickets.

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