

**GEOPEKO**

A DIVISION OF PEKO EXPLORATION

**MICROFILMED**

FICHE No.012416 -

**EL 40/89 KEITH RIVER**

REPORT ON

EXPLORATION ACTIVITY

JANUARY 1990 TO NOVEMBER 1990

91-3219

EL40/89



LETTER  
8-1-'91  
REFERS

Katrina Virgoe  
Ian Mathison  
December, 1990

T250

Distribution: Geopeko, Parkes  
Geopeko, Rosebery  
DMMR, Hobart

AMG REFERENCE POINTS ADDED

DATA ENTRY

Project ARTHUR RIVER DB Number \_\_\_\_\_ Date \_\_\_\_\_  
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 Company Geopark  
 Title EL40/89 Keith River Report on Exploration Activity January 1990 To November 1990  
 Author Katrina Virgoe, Ian Mathison  
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 Near Town Wareah Country AUS State TAS Volumes 1  
 Commodities Cu Pb Zn Au Pages 6  
 Tenements EL40/89 Plans 0  
 Comments 1 Structure \_\_\_\_\_  
 Comments 2 Text, Appendixes, plan

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 Longitude Deg 145 Min 25

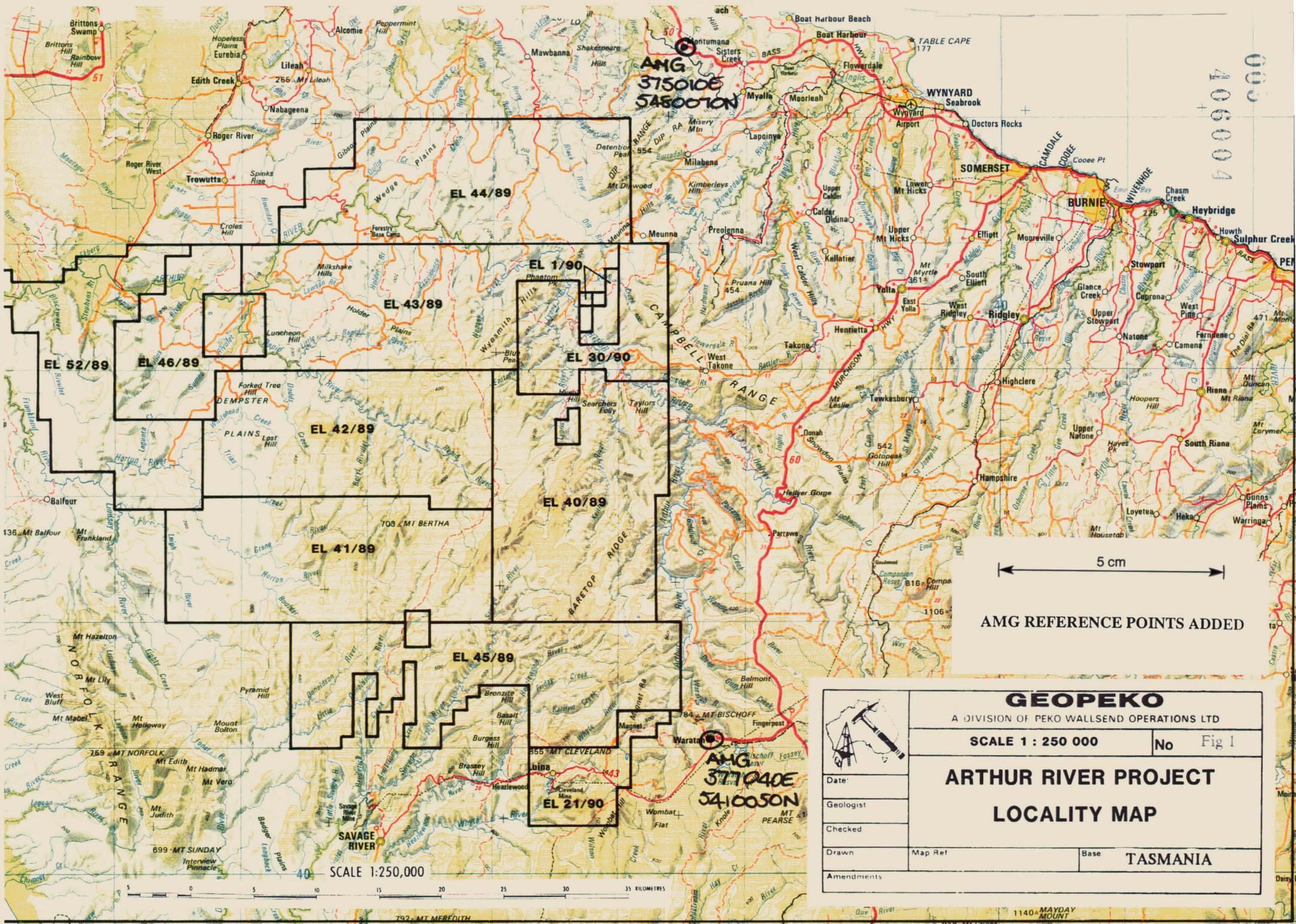
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5 cm

AMG REFERENCE POINTS ADDED



**GEOPEKO**

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SCALE 1 : 250 000

No Fig 1

**ARTHUR RIVER PROJECT  
LOCALITY MAP**

Date:

Geologist

Checked

Drawn

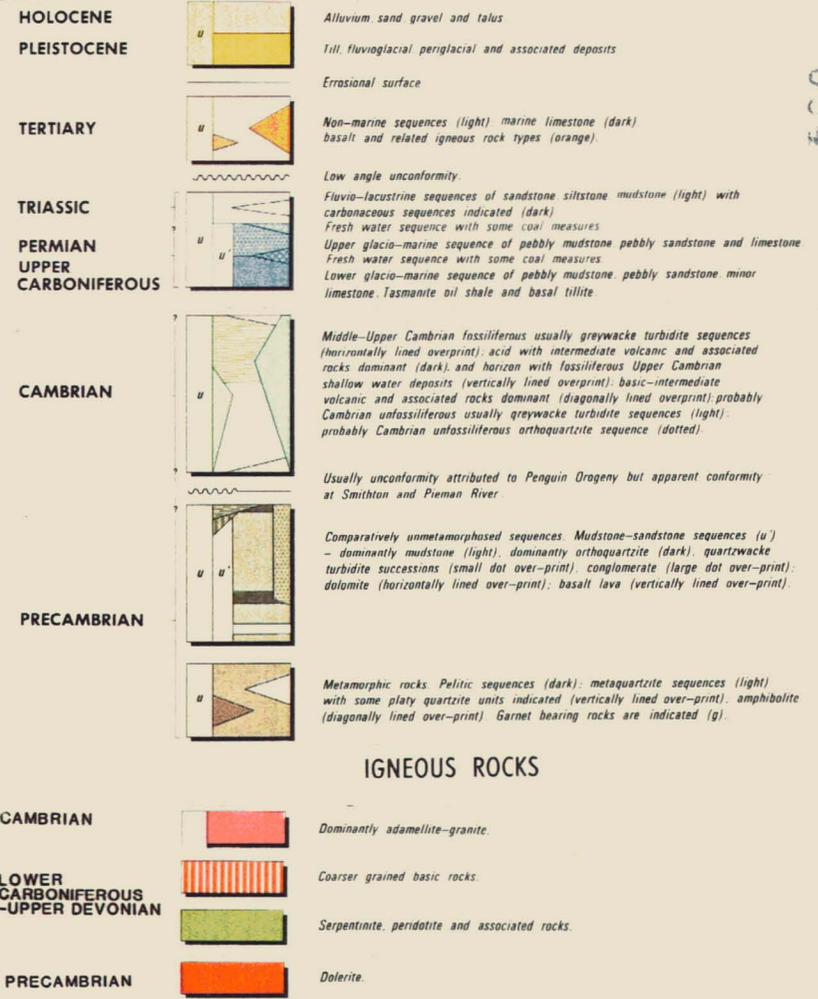
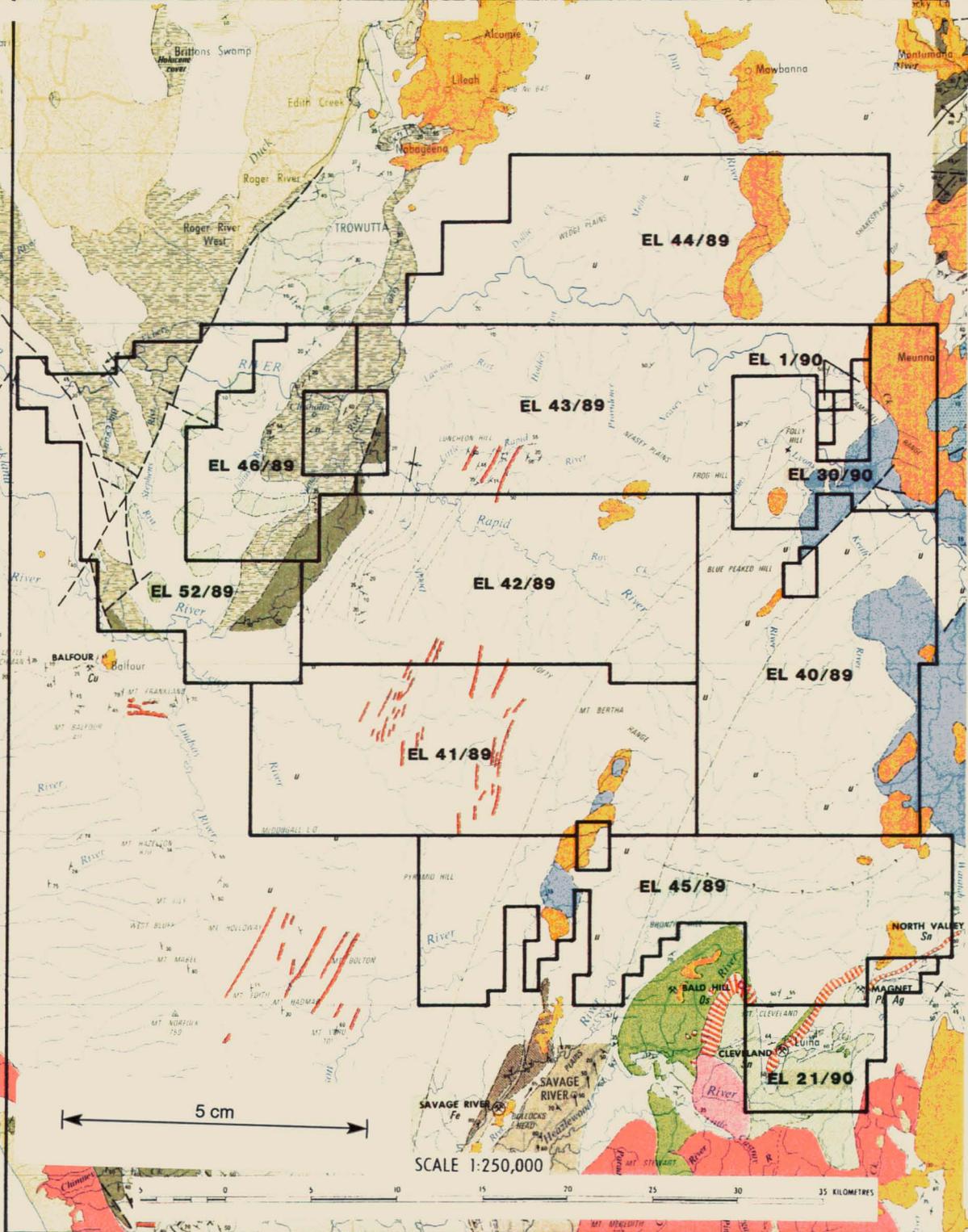
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Map Ref

Base TASMANIA

SCALE 1:250,000

0 5 10 15 20 25 30 35 KILOMETRES



	<b>GEOPEKO</b>	
	A DIVISION OF PEKO WALLSEND OPERATIONS LTD	
Date	SCALE 1 : 250 000	No Fig 2
Geologist	<b>ARTHUR RIVER PROJECT</b>	
Checked	<b>REGIONAL GEOLOGY</b>	
Drawn	Map Ref	Base <b>TASMANIA</b>
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## 1.0 INTRODUCTION

### 1.1 Location and Access (Fig. 1)

EL 40/89 Keith River is located in NW Tasmania approximately 15 km north of the township of Luina.

Access within the EL is very poor and is restricted to the Savage River Pipe Line Road and unsealed logging roads along the western and eastern EL boundaries respectively.

The central portion of the EL is largely inaccessible and access requires the use of cut walking tracks and helicopter support.

### 1.2 Tenure and Land Usage

EL 40/89 of 250 km<sup>2</sup> was granted to Peko Exploration Ltd in January 1990. The EL schedule is outlined in Appendix 1.

The EL consists predominantly of Crown Land with approximately 50 km<sup>2</sup> of State Forest in the northwest corner. The EL area includes part of the Savage River, Australian Heritage Commission Act, Registered Entry.

Vegetation is generally comprised of wet eucalypt forest with a thick undergrowth. Buttongrass-tea tree plains occur along north-east trending ridge tops in the centre of the EL.

### 1.3 Regional Geology

Geopeko's block of Arthur River ELs lies within the Rocky Cape Region of NW Tasmania. The oldest rocks in the area are those of the Precambrian Arthur Lineament. The Arthur Lineament is a north-east trending metamorphic belt consisting of highly deformed sediments, basic volcanics and dolomite. To the west of this belt lies the Rocky Cape Group, a thick shallow marine shelf sequence and to the east lies the Oonah Formation, a deeper water turbidite sandstone sequence. The Rocky Cape Group contains Precambrian dolerite/gabbro dykes which have been emplaced into north-north west trending faults.

The north western area is underlain by the Eo-Cambrian to Cambrian Smithton Trough which lies with a faulted or unconformable contact on the Rocky Cape Group. The Smithton Trough sequence consists of the basal Forest Conglomerate and Black River Dolomite (Success Creek Group Correlate), volcanoclastic sediments and basalt (Crimson Creek Formation Correlate), the Smithton Dolomite and fossiliferous sediments (Dundas Group Correlate). The south eastern corner of the area is underlain by rocks of the Cleveland-Waratah Association that lie within the Dundas Trough. These rocks have been correlated with the Crimson Creek Formation and consist of basaltic, andesitic and tholeiitic lavas and volcanoclastic sediments.

TABLE 1

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## STRATIGRAPHIC CORRELATION ADOPTED FOR THIS REPORT

	ROCKY CAPE BLOCK	LYONS RIVER (Arthur Lineament)	CLEVELAND - WARATAH	CORINNA	ZEEBRIE (Ord - Dev seds omitted)
<b>TERTIARY</b>	Tb - Tertiary Basalt Tc - Tertiary gravel	Tb - Tertiary Basalt Tc - Tertiary gravel	Tb - Tertiary Basalt Tc - Tertiary gravel	Tb - Tertiary Basalt Tc - Tertiary gravels	Tb - Tertiary Basalt Tc - Tertiary gravels
<b>PERMO-CARB</b>		F - Permian Supergroup Fluviatile sandstone, coal measures, glaci-marine & glacial deposits			
<b>DEVONIAN</b>			Intrusion of Cleveland Granite	Intrusion of Pieshan Granite	Intrusion of Hanson Bell & Heams Kirk Granite
<b>CAMBRIAN</b>	Cs - Unnamed Quartzwacke, siltstone, mudstone, conglomerate				Dundas Group
			Intrusion/emplacement of ultramafic bodies		Intrusion/emplacement of ultramafic bodies
<b>EO-CAMBRIAN</b>	Ed - Smithton Dolomite  Em - Smithton Basalt Mafic volcanoclastics and tholeiitic basalts  Eb - Black River Dolomite Dolomite, silicified dolomite, chert  Ef - Forest Conglomerate and Quartzite		Ev - Unnamed mafic volcs. volcanoclastics and turbidites with some carbonates	?? Ecd - Corinna Dolomite  Ebv - Barnafai Volcanics  Esd - Savage Dolomite	Crimson Creek Formation   Success Creek Group
<b>PRE-CAMBRIAN</b>	Prj - Jacobs Quartzite Quartzarenite  Pri - Irby Siltstone Black mudstone, minor siltstone, sandstone, & dolomite  Prd - Detention Quartzite Quartzarenite & siltstone  Prs - Cowrie Siltstone Laminated siltstone, pyritic mudstone	??? Pm - Neasy Formation Quartzite-siltstone, minor dolomite and basic volcs	Pr - Burnie Formation Interbedded quartzose quartzwacke & siltstone with minor mafic volcs	Pd - Donaldson Formation Quartzose turbidites  Pi - Interview Slate and Quartzite	Conan Formation Interbedded quartzwacke and siltstone with some carbonates & mafic volcs
		Pa - Keith Metamorphics Pelitic & quartzose schist -some calcic & mafic schist (magnetite & amphibolite)		Timms Group Pelitic & quartzose schist -some calcic & mafic schist (magnetite & amphibolite) - magnetite	

The Precambrian-Cambrian rocks along the eastern edge of the area are in places overlain by Permian fluvio-glacial sediments and/or Tertiary basalt.

#### 1.4 Known Mineral Deposits/Occurrences

There are a number of metallic mineral occurrences adjacent to the western, eastern and southern EL boundaries of Geopeko's Arthur River Project. (Green et al 1988).

These are listed in Table (2) and Figure (3) shows their locations.

The deposits range from small, relatively insignificant workings, e.g. Victory Mine, Atlas Leases to large world class ore bodies e.g. Mt Bischoff, Savage River. In most cases, extensions of the prospective host formations can be continued into Geopeko's Arthur River EL's.

#### 1.5 Previous Exploration

The northwest of Tasmania has seen regional company exploration activity since the mid 1960's. Techniques applied include stream sampling, gridding, soil and rock chip sampling, geological mapping, photogeology, diamond drilling and geophysical surveys. Generally this work has been concentrated in areas within a few kilometres walking distance of vehicular access. As much of the central northwest is remote and inaccessible, this has resulted in many areas having not yet seen intensive modern exploration. (See Appendix 2 for a review of previous exploration)

#### 1.6 Exploration Philosophy

Geopeko consider this portion of Tasmania to have been inadequately explored for base metals and gold mineralization. Since the early prospecting stage, systematic exploration by several companies has relied on airborne geophysics (Aeromagnetics and INPUT) and conventional stream sediment geochemistry with limited ground follow up. These techniques will give readily detectable responses from, "ideal" orebodies under "ideal" conditions. However, the combination of rugged topography and intense leaching of soil profiles; the superimposed effects of Tertiary weathering and surficial deposits; the complications of pyritic black shales and manganese deposits; and the contamination of several river systems by tailings and slimes from old mining operations would have masked many good responses and obscured any subtle responses.

Geopeko consider that the geochemical prospecting method developed by Dr. Baker of the Tasmanian Mines Department whereby the humate content of stream water is analysed for its content of leached metals provides a rapid and inexpensive method of screening large areas of ground.

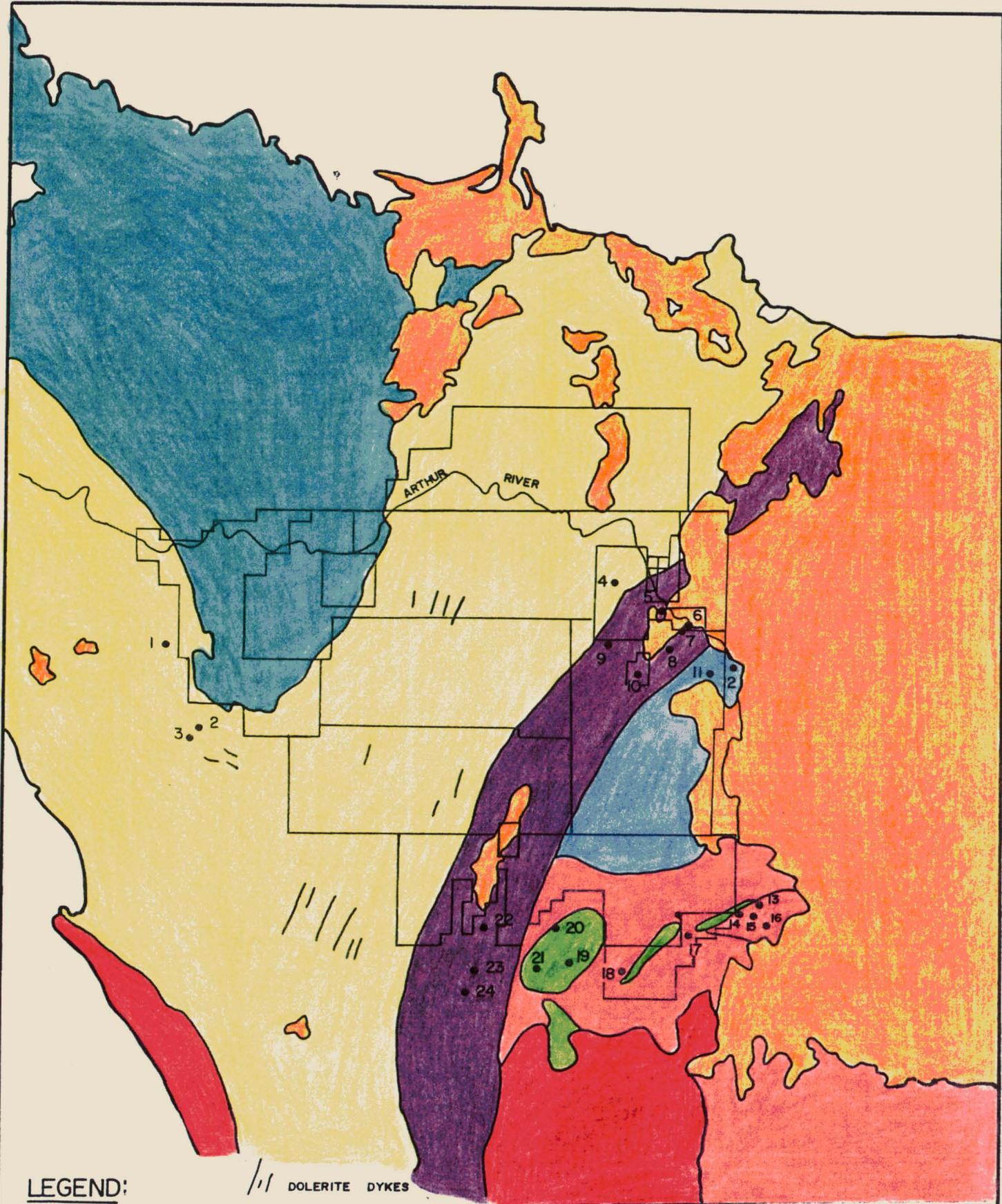
TABLE (2) METALLIC MINERAL OCCURRENCES/DEPOSITS

Map No.	Name	Commodity	Geology & Mineral Style	
1	The Clump	Cu	Rocky Cape Group	V
2	Murrays Reward	Cu	Rocky Cape Group	V
3	Specimen Hill	Sn Cu	Rocky Cape Group	V
4	Folly Hill	Au	Rocky Cape Group	A
5	Campbell Hydraulic	Au	Arthur Lineament	A
6	Victory	Cu	Arthur Lineament	V
7	Arthur River	Magnesite	Arthur Lineament	S
8	Keith River Gossan	Magnesite Py (Cu)	Arthur Lineament	MS
9	Pike's	Au	Arthur Lineament	A
10	Lyons River	Magnesite	Arthur Lineament	S
11	Atlas Leases	Ag Pb	Arthur Lineament	V?
12	Kay's	Au	Arthur Lineament	A
13	North Valley	Sn	Oonah Formation	A
14	Silver Cliffs	Pb Ag	Oonah Formation	V
15	Mt Bischoff	Sn	Oonah Formation	SCR
16	Fooks Load	Sn Pb Zn Ag Sb	Oonah Formation	V
17	Magnet	Pb Ag Zn	Crimson Ck Equiv.	V
18	Cleveland	Sn (Cu W Bi Mo)	Crimson Ck Equiv.	SCR
19	Lord Brassey	Ni	Cambrian Ultramafic	M
20	Bald Hill	Os Ir Au	Cambrian Ultramafic	A
21	Caudry's	Os Ir	Cambrian Ultramafic	?
22	Specimen Reef	Au	Arthur Lineament	V
23	Savage River Nth	Magnetite (Py)	Arthur Lineament	MS
24	Savage River Cent.	Magnetite (Py)	Arthur Lineament	MS

Mineralization Styles

A - Alluvial Deposit  
V - Vein Deposit  
M - Magmatic Deposit

S - Stratiform  
MS - Massive Stratiform  
SCR - Stratiform Carbonate Replacement



**LEGEND:**

- HOLOCENE - CARBONIFEROUS COVER
- DEVONIAN GRANITE
- SMITHTON BASIN
- DUNDAS TROUGH SEDIMENTS
- BASIC INTRUSIVES
- OONAH FORMATION
- ROCKY CAPE GROUP
- ARTHUR LINEAMENT

DOLERITE DYKES

	<b>GEOPEKO</b>	
	A DIVISION OF PEKO WALLSEND OPERATIONS LTD	
Date <b>SEPT. 1990.</b>	1:500,000	No Fig. 3
Geologist <b>K. J. V.</b>	<p style="margin: 0;"><b>MINERAL OCCURRENCES.</b></p> <p style="margin: 0;">(See Table 2 also)</p>	
Checked	Drawn	Base
Amendments	Map Ref <b>TAS. DEPT. MINES.</b>	<b>PARKES NSW</b>

Selected areas with a combination of suitable geological environment and geochemical characteristics could subsequently be further explored using expensive and slow techniques such as detailed geological mapping, grid based geochemistry and modern geophysical techniques.

As the proposed technique is both rapid and relatively cheap, it should be possible to define prospective areas at an early stage. Consequently Geopeko anticipate that it will be possible to relinquish a large proportion of the area following the first year of tenure.

### 1.7 Target Models

Geopeko consider the Precambrian rocks of NW Tasmania to be prospective for stratiform Pb, Zn, Ag deposits of the Mt Isa-McArthur River type and for stratiform Cu-Zn (Au) deposits of the Besshi Type. The mineralization at the Atlas Leases can be assigned to the first group while the Keith River Gossan can be compared to the Besshi Type.

Several occurrences of alluvial gold along the Arthur River highlight the potential of the area for gold only mineralization. Applicable models for gold mineralization include shear related gold deposits and volcanogenic gold deposits associated with basic volcanics.

## 2.0 EXPLORATION ACTIVITY

### 2.1 Aims

Exploration in EL 40/89 is aimed at delineating through grass root techniques prospective and geochemically anomalous areas within the EL. Areas worthy of further investigation would be followed up with detailed exploration.

As a result of lack of access within the EL and company commitments to other licences in the area, little field work has been carried out in this EL during most of 1990.

Work included a geophysical review, a geochemical stream sediment compilation and preparation for the 1990-91 summer field season.

### 2.2 Geochemistry

#### Work Completed

Regional stream sediment data obtained by previous exploration companies in the area were compiled. This allowed delineation of anomalous areas recognized by traditional stream sampling methods as well as providing a comparison for the Huminex technique.

### *Stream Sediment Compilation*

A compilation of stream sediment base metal data within EL 40/89 by previous companies in the area has been undertaken.

At least thirty five samples were collected by CRA in EL 1/79. These were sieved to -80# and assayed for base metals using AAS techniques.

Overall the base metal results were very low. The highest results were 35 ppm Cu and 184 ppm Zn from Pinner Creek (sample 989908) and 87 ppm Pb from a tributary of the Lyons River (sample 989902).

### *2.3 Geophysical Review*

A geophysical review of the Rocky Cape Block using regional gravity and magnetic data was undertaken by D.E. Leaman. This work is detailed in a separate report. (Leaman, 1990) Discussions specific to this EL are appended as Appendix 3 and summarized in figures 4 and 5.

Both sets of data indicate the presence of two belts of intense north-east trending anomalies. The north-west belt occurs in rocks of the Arthur Lineament and the south-east belt in the Oonah Formation.

The intersection of such belts with smaller east-north-east trending structures may be crucial locations for alteration and mineralization.

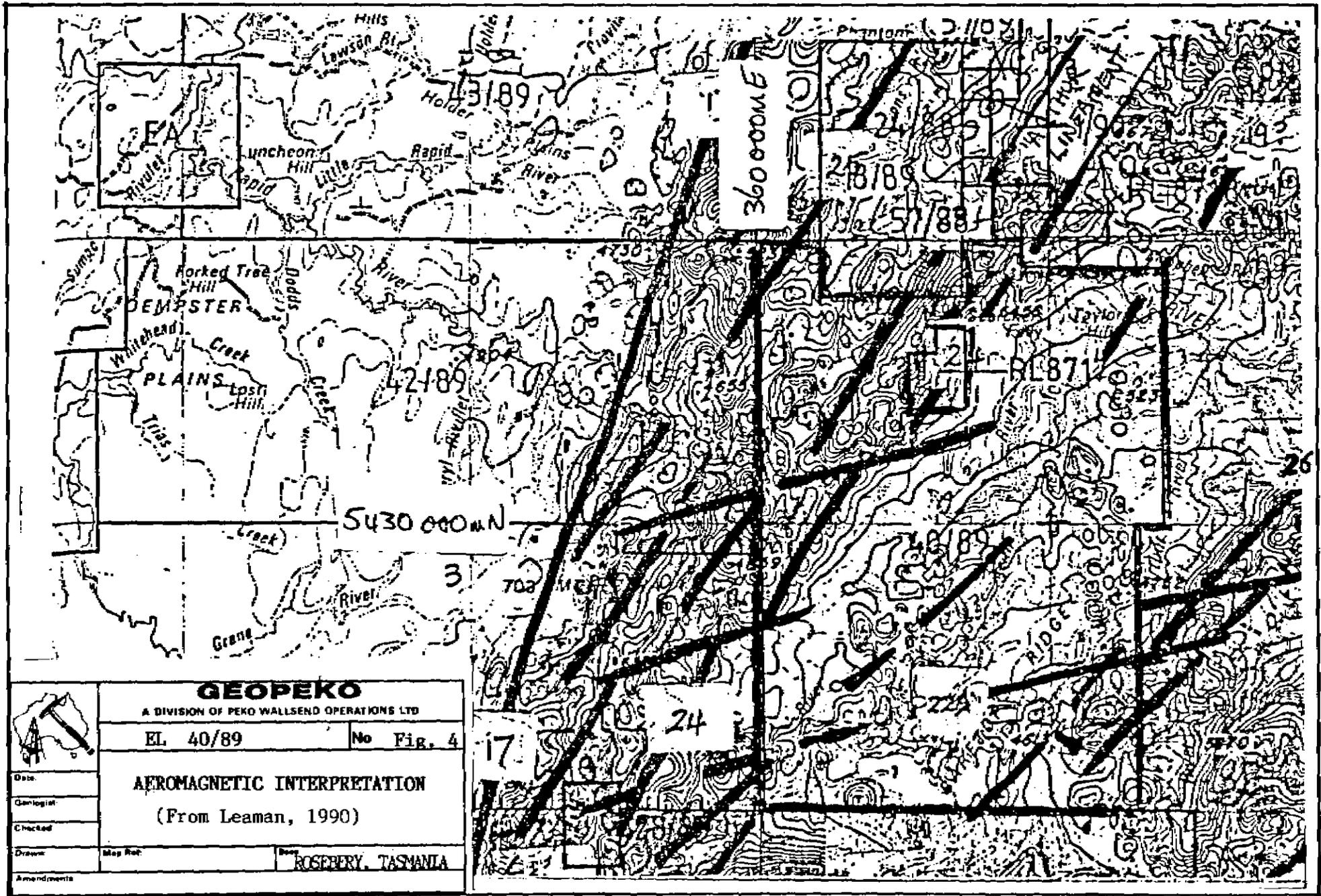
Any trace geochemistry located in these areas is worth of follow up with more detailed work.

### *2.4 1990-91 Field Season Preparations*

During the 1990-91 field season Geopeko plans to stream sample EL 40/89 using the Huminex water technique, at a density of 1 sample per 2-3 km<sup>2</sup>.

As most of the EL is inaccessible Geopeko have had 15 km of walking tracks cut within the area. Two helipads, one on Baretop ridge and one between the Keith and Lyons River, have also been prepared.

All camping and field supplies have been purchased.



**GEOPEKO**

A DIVISION OF PEKO WALLSEND OPERATIONS LTD

EL 40/89

No. Fir. 4

**AEROMAGNETIC INTERPRETATION**

(From Leaman, 1990)

Date:  
Geologist:  
Checked:  
Drawn:  
Amendments:

Map Ref:

ROSEBERY, TASMANIA

11

406013



### 3.0 CONCLUSIONS

- \* Insufficient exploration has been conducted in this EL.
- \* The association of known mineralization, distinct magnetic and gravity features, and unusual geology highlight the anomalism of the Arthur Lineament and the rocks east and west of the lineament.

### 4.0 RECOMMENDATIONS

It is recommended that the exploration program in this area should be delayed until the DMMR's problems with the Huminex analytical technique have been resolved. All of EL 40/89 should be retained until reconnaissance exploration has been completed.

## REFERENCES

- BROWN, A.V. (1989), "Geological Survey Explanatory Report, 1:50 000 series Sheet 21 - Smithton". Tas. DMMR.
- BURRETT, C.F., Martin E.L. (1989) "Geology & Mineral Resources of Tasmania" Geological Society of Australia 15 (Burrett et al 1989)
- GREEN, G.R., BOTTRILL, R.S., BACON, C.A., TURNER, N.J. (1988) - Mineral Deposits and Metallogenic Map of Tasmania 1:50 000, Tas. DMMR.
- LEAMAN, D.E., (1990) - Geophysical - Structural Review - Rocky Cape Block NW Tasmania. Unpublished report for Geopeko.
- MATHISON, I.J. (1990) - Arthur River Project - 1990 Summer Field Season Water Sampling.

APPENDIX 1  
EL SCHEDULE

TASMANIA

No. EL 40/89

(Regulation 6A)

The Mining Act 1929**EXPLORATION LICENCE**

Issued to PEKO EXPLORATION LTD of PO BOX 180, ROSEBERY, TASMANIA, 7470 in respect of 250 square kilometres of land in the Land District of MONTAGU vicinity of KEITH RIVER as described in the schedule hereto.

This licence shall remain in force until the TWELFTH day of JANUARY 1991.

This licence is subject to the following conditions:-

1. That the licensee shall immediately on the issue of this licence take steps to commence preliminary works necessary for the investigation of the area.
2. That the licensee shall carry out investigations as may be necessary to determine the mineral potential of the area, and in particular will fulfil the proposals set out in the exploration programme and approved by the Director of Mines.
3. That the licensee shall employ such technical and other staff and equipment as may be necessary effectively to carry out such investigations.
4. This licence shall apply to all minerals.
5. The licensee shall notify the owner and occupier of private land, in writing, at least three days before entering such land.
6. That the security (Private Land Deposit) provided by Section 15E (1) (a) & (b) of the Mining Act, 1929, (see below) shall be lodged with the Director of Mines before entering private land.
7. The licensee shall observe, perform and fulfil the conditions as set forth in Schedule 'A' (Revised) attached hereto.
8. The licensee shall be liable to pay the cost of any work carried out to remedy any damage arising from any breach of the conditions of this licence.

9. The licensee shall deposit an amount of \$10,000 (Performance Deposit) as security that the conditions contained herein shall be observed. Upon expiry or sooner determination of the licence, if the licensee satisfies the Director of Mines that such conditions have been complied with, the Director of Mines shall refund such deposit or such portion thereof, as he may determine.
10. If it is found, that the operations hereby authorised, are causing any undue damage to, or erosion of, the subject land or other land in the vicinity thereof or are unnecessarily disturbing the environment, the Minister may cancel the licence without compensation to the licensee by giving seven days' notice in writing of his intention so to do.
11. The licensee shall obtain the written permission of the Director of Mines before carrying out any work in a Forest Reserve.
12. The licensee shall arrange and keep in good standing public liability insurance to the minimum of \$1,000,000. Evidence of currency shall be produced on demand.

#### SCHEDULE

Commencing at the southwest corner of the area whose grid co-ordinates are 360 000 metres E. 5 420 000 metres N. thence grid north to 5 440 000 metres N. grid east to 362 000 metres E. grid south to 5 438 000 metres N. again grid east to 367 000 metres E. again grid north to 5 440 000 metres N. aforesaid again grid east to 369 000 metres E. again grid south to 5 439 000 metres N. again grid east to 374 000 metres E. again grid south to 5 430 000 metres N. grid west to 373 000 metres E. again south to 5 420 000 metres N. aforesaid thence again grid west to the point of commencement.

The area excludes 5 skm as described below:

Commencing at the south west corner of the area applied for whose grid co-ordinates are 365 000 metres E. 5 434 000 metres N. thence grid north to 5 436 000 metres N. grid east to 366 000 metres E. again grid north to 5 437 000 metres N. again grid east to 367 000 metres E. grid south to 5 434 000 metres N. aforesaid thence grid west to the point of commencement.

Land Tenure:

The area comprises:           State Forest  
                                  Crown Land

The area includes part of the Savage River; Australian Heritage Commission Act, Registered Entry.

(Note: This land tenure table is a guide only).

APPENDIX 2

REVIEW OF PREVIOUS EXPLORATION

## APPENDIX 2

REVIEW OF PREVIOUS EXPLORATIONA2.1 EL 12/65 Pieman Project

During the mid 1960s Pickands Mather & Co International held EL 12/65 over a large part of northwest Tasmania. An extensive regional stream geochemical survey was conducted and although a number of geochemical anomalies were detected, and some resampling occurred later, no further work was undertaken. (Anon. 1966 in Cromer, 1988a). Unfortunately records of this sampling program are no longer held by the Tasmanian DMMR.

A2.2 EL 48/70 and EL 49/70

Two exploration licences to the southwest of Geopeko's Arthur River Project were granted as a joint venture to Australian Consolidated Industries Ltd and Consolidated Goldfields Australia Ltd. Field investigations included an aeromagnetic survey, stream sediment sampling, geological mapping and soil and rock chip sampling. This was designed to detect any tin mineralization that may be associated with the three Devonian granites in the two licence areas. Detailed evaluation was carried out in areas of geochemical and geomagnetic anomalies and known mineralization.

Results were not encouraging enough to justify further exploration and the two ELs were dropped in 1972. (Bell, 1972)

A2.3 EL 6/72 North West Tasmania

Australian and New Zealand Exploration Company was granted EL 6/72 in January 1972. This EL covered an area of the Smithton Trough to the north of the Arthur River. It was considered by ANZECO to be prospective for tungsten due to the similarity of the dolomites to those hosting the King Island Scheelite ore body. A panned concentrate and stream sediment sampling programme was completed over the EL with 94 samples taken and analysed for W, Cu, Pb, Zn, Mo, Sn and Cr. ANZECO received a number of anomalous assays for all the elements tested but found it difficult to interpret the results. Though some follow up was recommended, no further exploration was attempted. (Kinnane, 1972).

A2.4 EL 2/73

Following a study of the mineral potential of Australia during 1971, ESSO took out EL 2/73 in the northwest of Tasmania and conducted an airborne geophysical survey (INPUT) over the licence area. Sixty two anomalies were detected, however, dense vegetation restricted examination to thirty six targets and only thirteen had outcrop. Most of the anomalies were attributed to black slates and lithological contacts. ESSO

considered that no further exploration was warranted and the EL was relinquished in 1974. (Neale, 1973)

#### A2.5 EL 43/70 Keith River

Magnesite was first discovered in the Lyons River-Keith River area in 1925 by P.B. Nye. Since Mineral Holdings Australia was granted EL 43/70 over the area, numerous companies have explored the licence under joint venture agreements. A joint venture between Mineral Holdings Australia and CRAE Pty Ltd in 1982 delineated two deposits of moderate-high grade magnesite. These are known as the Lyons River and the Keith-Arthur River Prospects. (Mackenzie, 1984). Retention Licences 8717 and 8718 cover these two magnesite reserves.

#### A2.6 EL 1/77 Rocky Cape

EL 1/77 was initially taken up by CRAE Pty Ltd to investigate the possible tin potential of the area. Following a joint venture with Geopeko in 1979 and recommendations by P. Legge in 1980 that the Rocky Cape rocks showed similarities to the Selwyn Basin, Canada, the target was extended to shale hosted lead zinc deposits.

Statistical evaluation of regional drainage data indicated that the Trowutta Dempster plains district showed elevated values of Cu, Pb, Zn and Co. (Weir, 1982). Follow up of this area included stream sediment sampling, geological mapping and rock chip sampling. A photogeological interpretation (by Carey, 1981) covered the whole EL. The stream sediment sampling revealed lead anomalies from the Julius River, the Meryanna area, Wents Creek and Stephens Rivulet and an arsenic anomaly from Sumac Rivulet.

Follow up in the Julius River and Meryanna area included detailed stream sampling, gridding, soil sampling and ground geophysics. It was concluded that the Julius River anomaly was derived from a disseminated source or shears within the dolomite and that the Meryanna anomaly was the results of erosional basaltic remnants on topographic highs.

Resampling of the other 3 anomalous areas failed to repeat the initial high values.

CRA Exploration relinquished the northern part of EL 1/77 in 1983 concluding that the black shale sequences exposed at the eastern margin of the trough were too thin to have produced economic mineralization from brines (Weir, 1983).

Exploration continued in the western coastal parts of the EL including diamond drilling at the Alpine and Red prospects for tin before total EL relinquishment in 1985.

#### A2.7 EL 1/79 Rapid River

A detailed program of exploration was carried out over the Rapid River EL by Geopeko and/or CRAE Pty Ltd from 1979 to 1987. Commodities searched for included gold, platinum, shale hosted base metals and Mittershill type tungsten as well as extensions to the Lyons River magnesite trend. The work included airborne magnetic and radiometric surveys, ground follow up of all major magnetic anomalies, geological mapping and stream sediment sampling in selected areas. No significant mineralization was located. (Dickson, 1987)

#### A2.8 EL 10/79

EL 10/79 was operated as a joint venture by CRAE and Mineral Holdings Australia Pty Ltd. The target was initially dolomite, but when some anomalous gold and platinum values were obtained, greater emphasis was given to the metals aspect of exploration. Grades of 3.09 g/t [410732] and 4.06 g/t Au with 0.46 g/t Pt [408726] were obtained from dolomite chip sampling and, although resampling returned results of only 0.04 g/t Pt, the partners concluded that there was a significant gold occurrence in the dolomites. However, EL 10/79 was relinquished in 1984 with no follow up work. (Anon 1985 in Cromer, 1988a)

#### A2.9 EL 12/80 Leigh River and EL 61/83

EL 12/80 was granted to CRAE Pty Ltd in order to investigate two tin stream sediment anomalies located during previous reconnaissance by CRAE in 1977. The EL was also considered for shale hosted lead zinc and gold mineralization and this was supported by the presence of a number of INPUT anomalies obtained by ESSO in 1973. Work carried out included a computer study of all previous stream sediment geochemistry, infill stream sediment sampling, regional scale mapping, follow up of nine aeromagnetic anomalies defined by the Mines Dept. West Coast survey and investigations into the gold potential of altered Cambrian basalts. No significant base or precious metals were detected and the EL was relinquished in 1985. (Dickson, 1985).

EL 61/83 was taken up by CRAE to cover a large aeromagnetic anomaly located on the eastern margin of EL 12/80. A grid was established over the anomaly and Genie EM traverses carried out. No base metal or gold anomalism was detected and the EM failed to locate any conductors. The aeromagnetic anomaly was attributed to unmineralized Precambrian basic volcanics and the EL was dropped in 1985. (Dickson, 1986)

#### A2.10 EL 18/80 Arthur River and EL 18/83 Lake Chisholm

EL 18/80 was taken up by BHP Co Ltd and thought to be prospective for a skarn or massive sulphide hosted tin tungsten deposit of the Renison/Cleveland style. Carlin style gold, diamonds, Mississippi Valley lead-zinc and sedimentary copper

deposits were secondary targets. Work completed includes stream sediment and pan concentrate sampling, rock chip sampling, petrology, a photogeological and Landsat Image study, geological mapping, and evaluation and follow up of existing INPUT and aeromagnetic data. In view of the disappointing results and difficult access, the EL was relinquished in 1983. (Anon, 1983).

EL 18/83 lies adjacent to EL 18/80 and was taken by BHP to cover a broadly coincident INPUT/Aeromagnetic anomaly. An extensive grid was cut over the main zone of interest at Lake Chisholm and soil sampling, geophysical surveys and geological mapping were carried out. Pan concentrate sampling was used to follow up anomalous tin geochemistry reported from earlier work. The INPUT/Aeromagnetic anomaly was attributed to a small amphibolite body and magnetically susceptible basalts. No indications of potentially economic mineralization were encountered. (Anon, 1984).

#### A2.11 EL 21/87 Balfour and EL 22/87 Trowutta

Aureole Resources took up ELs 21/87 and 22/87 to explore for platinum group metals, gold and base metals, hosted mainly by receptive rocks along the eastern and southern margins of the Smithton Trough. Work included a regional geophysical evaluation by D.E. Leaman and rock chip sampling for assay and petrological purposes. Despite upgrading the prospectivity of parts of the two ELs, 22/87 was relinquished and 21/87 reduced in 1989 as Aureole shifted their emphasis to other tenements. (Cromer, 1988a + b).

#### A2.12 EL 5/63

EL 5/63 was granted to Comstaff Proprietary Limited in 1963 and covered the area from Rosebery in the south to Wandle Creek in the north. Comstaff divided the EL in 6 areas, ie, Area 1 Arthur River, Area 2 Ramsay, Area 3 Mt Block, Area 4 Chester/Pinnacles, Area 5 Huskisson and Area 6 East Renison. Area 1 covers part of Geopeko's EL 45/89 and is the only area discussed in this summary.

Systematic and detailed exploration of Area 1 commenced in 1970-71 field season and little is reported of any exploration carried out before this time.

Exploration of Area 1 from 1970-75 was based around 2 stream sampling programmes and several widely spaced TURAM EM traverses. The stream sampling surveys produced anomalies in the Tinstone Creek area (Ag,Cu,Zn,Pb,Sn & Ba), Magnet Creek (Sn), Deep Gully (Sn), Rollins Creek (Sn), Dalcos Creek (Sn) and from the Happy Day Creek (Cu, Zn, Ni). Follow up included gridding and soil sampling of the Tinstone Creek area, Happy Day Creek and four other Cu-Zn anomalies. No anomalies indicative of the presence of mineralization were recorded.

The Turam EM survey reported 8 anomalies and 5 of them were gridded and subjected to EM and/or magnetic surveys. No significant results were obtained.

From 1975-78 work was centred on the Magnet-Bischoff grid which was subjected to geological mapping, soil sampling, ground magnetics and EM surveys. Three diamond holes were drilled in the grid area, one to test an EM anomaly and the other two to test the Magnet lode at depth. No mineralization was intersected and no further work on the grid was recommended. (Shaw & Everett, 1985).

In 1980 a programme to investigate the alluvial tin potential of the Arthur River commenced. Initial work was encouraging with a tin volume estimate of 6-8 million m<sup>3</sup> of variable grade outlined. Though follow up work was recommended, no further exploration on this project was reported. (Washausen & Wilding, 1980).

In 1983-85 a DIGHEM survey was carried out over Area 1 using flight lines with a NW-SE direction. Five anomalies were recommended for follow up. Comstaff attributed them to Tertiary basalt cover.

In 1985 Comstaff was required to reduce EL 5/63 and most of Area 1 was relinquished. (Shaw & Everett, 1985).

#### *A2.13 EL 1/68 Heazlewood*

In 1968 EL 5/63, held by Comstaff Pty Ltd, was subdivided to form EL 1/68. EL 1/68 covered an area north of Luina which is drained principally by the Savage and Heazlewood Rivers.

Initially exploration of this licence focussed on the ultramafics and their potential for nickel mineralization. Gridding, soil sampling, geological mapping, geophysical surveys and some trenching failed to identify any new mineralization.

Regional reconnaissance projects were then implemented in the Savage, Whyte and Heazlewood drainages. The upper Heazlewood drainage basin emerged as the most prospective with anomalous values of zinc and copper. Two grids (HAB, HAC) were cut and geologically mapped and soil sampled. No mineralization was found and geochemical responses were weak.

In 1980, a DIGHEM survey over the total licence area was commissioned and exploration for the next 3 years centred around the follow up of 13 resultant anomalies. All anomalies were gridded, geologically mapped, soil sampled and subjected to ground magnetic and EM surveys. In all cases no mineralization was observed. In late 1983 two EM targets were selected for drill testing. Both holes failed to intersect mineralization and the EM responses were attributed to black graphitic slate and phyllite.

In 1984 Comstaff considered that all avenues for locating mineralization had been exhausted and the EL was relinquished. (Shaw, 1984).

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APPENDIX 3  
GEOPHYSICAL REVIEW

## EL 40/89 KEITH RIVER

The location of the area is shown in Figure 1. Figure 24 presents a partial overlay of gravity and magnetic data specific to this area.

Much of the area is magnetically quiet but two belts of intense anomalies trend NE across the EL. Each of these consists of fault or shear- bounded mafic rich blocks. Each displays dextral offsets against ENE trending features.

The residual gravity anomalies are also stable but this may be an artifact of coverage. The general anomaly character reflects the dense rocks uncovered along the lineament and which occurs east of the Rocky Cape Block thrust. The densest rocks in the area are concentrated in this zone.

Several major blocks have been defined magnetically. It is interesting to note that many of the mineralised occurrences known along the lineament have been found in this area - perhaps due to access and knowledge. Two retention licences directly overlie the eastern boundary of the lineament shear (24). Less is known of the western side. There is clear potential for tracing (24) to the SW. If the ENE offset system has any mineralising role it would be established near 363 000 mE, 5432 000 mN where such a feature intersects (24).

Comparable structures are concealed in the far NW and far SE of the EL. A geochemical or prospecting search for gold and copper in these limited areas would indicate if any primary mineralisation has been covered by the Rocky Cape thrust in the first instance and Permian materials in the second.

It should be noted that anomalies (24), (25), (26) and (27) are associated with gravity anomalies indicating more mafic accumulations locally. Most of the Arthur River mineralisation known directly correlates with the largest anomaly. The association suggests that the western closure of this feature and anomaly (23?) may be prospective.

The gravity anomalies south of Lyons River are not well defined and assessment of the continuity of the mafic assemblage requires improved coverage in order to properly evaluate the implication of the extension of (24) magnetically.

Much of the EL is not anomalous. The low amplitude magnetic anomalies dispersed south of (24) may be due to basalt remnants on high ground. The relevance of these features cannot be assessed until more is known of the surface geology. The isolated feature near the southern boundary of the EL at 363 000 mE may be of interest. It is out of character and more intense than other features. It also lies near the intersection of two primary gravity trends.

Detailed inspection of the magnetic data, followed by ground magnetics will be able to define the location of the principal boundaries. If any of the internal anomalies can be assigned to rocks other than Tertiary basalt then available profiles should be carefully re-examined for negative alteration responses.

