

CRA EXPLORATION PTY. LIMITED  
ACN 000 057 125

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FICHE No. 014085-87

EL 64/94  
See folio 45

**First Annual Report  
For The Period Ending 2 February 1996  
EL 64/94 Swift Creek, Tasmania**

**OPEN FILE**

**Author:** SA Menpes  
S Maher

**Date:** December 1995

**Licence Holder:** CRA Exploration Pty. Limited

**Submitted to:** Chief Geologist, Vic/Tas

**Copies to:** Mineral Resources Tasmania  
CRAE - Vic/Tas District  
CRAE - ETIG

**Submitted by:** *A Sedross (for SA Menpes)  
S Maher.*

**Accepted by:** *M. Caranby*

**96-3868**

FIRST ANNUAL REPORT TO FEBRUARY  
1996 EL 64/94 SWIFT CREEK - CRA  
MENPES SA

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## Abstract

Significant Pb-Zn mineralisation, interpreted to be Irish-style, occurs within the Ordovician Gordon Group carbonates at Oceana and Grieves near Zeehan. Other areas of preserved Gordon Group carbonate are also considered prospective for Irish-style Pb-Zn mineralisation. Hence CRAE acquired EL 64/94 to explore mapped Gordon Group carbonates in the Swift Creek and Newall Creek areas.

A detailed literature review was carried out during the first permit year of EL 64/94, Swift Creek. The review has highlighted the following:

- Carbonate hosted vein style galena-sphalerite mineralisation is noted in the NE of the licence area
- Ordovician growth faults are mapped in the NE of the licence area, indicating potential for Irish-style mineralisation
- A major Ordovician basin bounding fault crosses the licence area
- No systematic bedrock sampling of Gordon Group has been undertaken within the licence area
- There is some evidence for deep weathering of Gordon Group carbonates (Genie EM data, seismic refraction data, absence of outcrop) particularly near the lower contact, suggesting a high sulphide content (comparable to the situation at Grieves near Zeehan)
- Detailed stream sediment data collected over Gordon Group carbonates indicates several areas with elevated Pb-Zn values
- The Gordon Group carbonates on the downthrown side of the major basin bounding fault have only received reconnaissance stream sediment and some rockchip sampling in the past (CRAE and EZ). CRAE's exploration experience in other Gordon Limestone areas suggests that stream sediment sampling is not always appropriate as the unit tends to form valleys with a variable thickness of transported cover.

A reconnaissance exploration grid has been established to allow mapping, rockchip sampling and wacker bedrock sampling of the Gordon Group carbonates in the Swift Creek area (downthrown side of the major basin bounding fault). Zones of anomalous geochemistry identified by this work should be followed up with infill mapping and geochemical sampling to identify targets for drill testing.

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## Plans

Plan No.	Title	Scale
Tv 871	Application for Exploration Licence Swift Creek (ETA 370 in Part)	1:100,000
Tv 1059	Swift Creek EL 64/94 Summary Geology	1:100,000
Tv 974	Swift Creek EL 64/94. Pb ppm -80# SS. All data	1:25,000
Tv 975	Swift Creek EL 64/94. Zn ppm -80# SS. All data	1:25,000
To 1626	Dighem Survey Queenstown Area for Mt Lyell Mining and Railway Co. Ltd. Magnetics	1:10,000
To 1627	Dighem Survey Queenstown Area for Mt Lyell Mining and Railway Co. Ltd. Magnetics	1:10,000
To 1622	Swift Creek EL 31/83. Geology Interpretation	1:10,000
TASh 3638	Swift Creek EL 26/86 Stream Sediment Sampling Au, Ag Assays	1:25,000
TASh 3639	Swift Creek EL 26/86 Stream Sediment Sampling Cu, Pb, Zn, Ba Assays	1:25,000
To 1623	North West Tasmania Lynchford EL 47/83. CRA JV Interpreted Geology	1:10,000
TASh 2869	Lynchford EL 47/83 CRAE Geochemical Sampling and Gold Drainage Geochemistry	1:10,000
TASh 2860	Lynchford EL 47/83 CRAE Geophysical Compilation showing Dighem Anomalies, Genie EM Traverses and Aeromagnetic Features	1:10,000
TASh 2844	Lynchford EL 47/83 CRAE Genie Profiles Lynchford HEC Road West	1:1000
TASh 2845	Lynchford EL 47/83 CRAE Genie Profiles Lynchford HEC Road East	1:1000
To 1624	King River Power Development. Regional Geology Sheet 1	1:5000
To 1625	King River Power Development. Regional Geology Sheet 4	1:5000

## Appendices

Appendix 1      Previous Exploration - EL 64/94 Swift Creek\_\_

## 1. Conclusion and Recommendation

The literature review has shown that an area of mapped Gordon Group carbonates west of a major interpreted basin-bounding fault (known as the Swift Creek area):

- has the potential to host economic, Irish-style Pb-Zn mineralisation
- has been poorly explored to date

A reconnaissance exploration grid has been established to allow mapping, rockchip sampling and wacker bedrock sampling of the Gordon Group carbonates in the Swift Creek area. Zones of anomalous geochemistry identified by this work should be followed up with infill mapping and geochemical sampling to identify targets for drill testing.

## 2. Introduction

Swift Creek EL 64/94 was granted to CRA Exploration Pty. Limited (CRAE) on 3rd March 1995. The EL covers 56 sq km and lies predominantly within the Teepookana State Forest, approximately 7 km south of Queenstown on the west coast of Tasmania (Plan Tv 871).

CRAE acquired the licence area to explore for economic, Irish-style Pb-Zn mineralisation in the Ordovician Gordon Group carbonates. CRAE's preceding exploration of the Gordon Group carbonates in the Zeehan area has resulted in several very encouraging Pb-Zn intersections. Hence CRAE has expanded exploration efforts to other areas of poorly explored Gordon Group carbonates with potential to host economic Irish-style Pb-Zn mineralisation. The Swift Creek licence area satisfies these criteria.

This report details all exploration activities conducted within EL 64/94 Swift Creek by CRAE during the first permit year ending 2 February 1996.

## 3. Review of Previous Work

Exploration carried out prior to the current licence is briefly summarised below. See Appendix 1 for a detailed summary of previous exploration.

### *1970-72 Fimiston Minerals - Cyprus*

- Small orientation stream sediment survey.

### *1983-85 EZ - Cyprus*

- Geological mapping in the Swift Creek and Rinadeena areas
- Reconnaissance stream sediment (plus panned concentrate and rock chip) survey in the Swift Creek area.
- Grid based soil, rock chip, stream sediment, and ground magnetic surveys in the Rinadeena area.

1987-89 CRAE - Aberfoyle

- Patchy stream sediment (plus rock chip) survey in the Swift Creek and Rinadeena areas.
- Re-assay of EZ stream sediment pulps for Au.
- Grid based soil and rock chip surveys in the Rinadeena area.

1985-90 CRAE - Aberfoyle

- Geological mapping in the Newall Creek area.
- Reconnaissance stream sediment (plus rock chip) survey in the Newall creek area.
- GENIE EM traverse in the Newall Creek area.

#### 4. Exploration Completed in the 12 Month Period Ending 2 February 1996

##### 4.1 Literature Review

A comprehensive literature review was carried out prior to the commencement of field exploration.

##### 4.1.1 Geology

Gordon Group stratigraphy in the Swift Creek area comprises a dominantly limestone facies overlain by a dominantly interbedded grey slate and siltstone facies (Mathison, 1984). These units have a north plunging synclinal geometry (see Plan Tv 1059). The western limb of the syncline is truncated by a major NW trending fault which juxtaposes the Cambrian Dundas Group and Ordovician Gordon Group. In the far west, the western limb is a fault bounded allochthonous block. The eastern limb of the syncline is truncated in the Rinadeena area by the Coupon Prospect Fault Structure (Henham, 1989). It is speculated this fault also separates the Gordon Group and underlying Denison Group in the south.

A major N-S trending fault (semi-coincident with the Garfield River) separates the Swift Creek stratigraphy from the Newall Creek stratigraphy. In the Newall Creek area the Denison Group is significantly thinner (typically 200m) than that in the Swift Creek area ( $\geq 1500\text{m}$ ). Hence the major N-S trending fault may be a reactivated growth fault active during deposition of the Denison and possibly Gordon Groups, downthrown to the west.

The Gordon Group in the Newall Creek area comprises impure limestone and micritic limestone (Noonan, 1990). Sequences have a shallowly north plunging (half) syncline geometry. The western limb of the syncline has been truncated in the fold hinge by the major fault separating the Swift Creek and Newall Creek areas. Geological mapping indicates interpreted growth faults displacing Ordovician (and earlier) sequences in the Newall Creek area (Noonan, 1990). An old working exploiting vein style Pb-Zn mineralisation hosted by Gordon Group limestone is located in line with one of these faults at 379800mE, 5330200mN.

Unconsolidated alluvium and colluvium overlies areas of Gordon Group in the Swift Creek and Newall Creek areas.

#### 4.1.2 Conclusions

Prospectivity for carbonate hosted Pb-Zn mineralisation within EL 64/94 is favourable given:

- Pb-Zn mineralisation occurs within the Gordon Group carbonates at Oceana and Grieves near Zeehan. Mineralisation is interpreted to be Irish-style.
- Carbonate hosted vein style galena-sphalerite mineralisation is noted in the NE of the licence area
- Ordovician growth faults are mapped in the NE of the licence area, indicating potential for Irish-style mineralisation
- A major Ordovician basin bounding fault crosses the licence area
- No systematic bedrock sampling of Gordon Group has been undertaken within the licence area
- There is some evidence for deep weathering of Gordon Group carbonates (Genie EM data, seismic refraction data, absence of outcrop) particularly near the lower contact, suggesting a high sulphide content (comparable to the situation at Grieves near Zeehan)
- Detailed stream sediment data collected over Gordon Group carbonates indicates several areas with elevated Pb-Zn values (see plans Tv 974 and 975)
- The Gordon Group carbonates in the Swift Creek area have only received reconnaissance stream sediment and some rockchip sampling in the past (CRAE and EZ). CRAE's exploration experience in other Gordon Limestone areas suggests that stream sediment sampling is not always appropriate as the unit tends to form valleys with a variable thickness of transported cover.

#### 4.2 Swift Creek Regional Exploration

The literature review indicated that the least accessible parts of the Gordon Limestone west in the Swift Creek area are poorly explored. Hence CRAE has established a reconnaissance grid to allow foot access for mapping, rockchip sampling and wacker sampling.

1:25,000 scale colour air photos of the licence area were purchased to help optimise the placement of reconnaissance grid lines. The 6.75 km of grid lines (centre base line with three cross lines at 800m spacing) are designed to enable sampling of a mapped north plunging syncline of Gordon Group sediments. Mapping, rockchip sampling and wacker sampling is currently underway and will be reported in the second annual report.

### 5. Discussion of Results

Irish-style Pb-Zn mineralisation is known at two locations (Oceana and Grieves) within the Gordon Group carbonates in the Zeehan area. Hence other areas of preserved Gordon Group carbonates are considered highly prospective.

The Gordon Group carbonates in the Swift Creek area are poorly explored having only received reconnaissance stream sediment and some rockchip sampling in the past. Ordovician growth faults and a major interpreted basin bounding fault occur in the region indicating potential for Irish-style Pb-Zn mineralisation. Hence a reconnaissance exploration grid has been established in the Swift Creek area to allow mapping, rockchip sampling and wacker sampling of the prospective Gordon Group carbonates.

## 6. Rehabilitation

The following procedures were implemented to reduce environmental impact and enhance rehabilitation:

- Grid lines have been cut with strict adherence to the Mineral Exploration Code of Practice and will revegetate naturally with time
- A small field camp has been established on an existing track. Areas cleared for setting up sleeping tents will revegetate naturally with time. The field camp satisfies guidelines from the Mineral Exploration Code of Practice
- All potentially soil contaminated equipment was cleaned prior to entering the area to prevent the introduction of weeds or the vegetation.

## 7. Expenditure

Expenditure during current term:      \$110,435

- **Total Expenditure \$110,435**

## 8. References

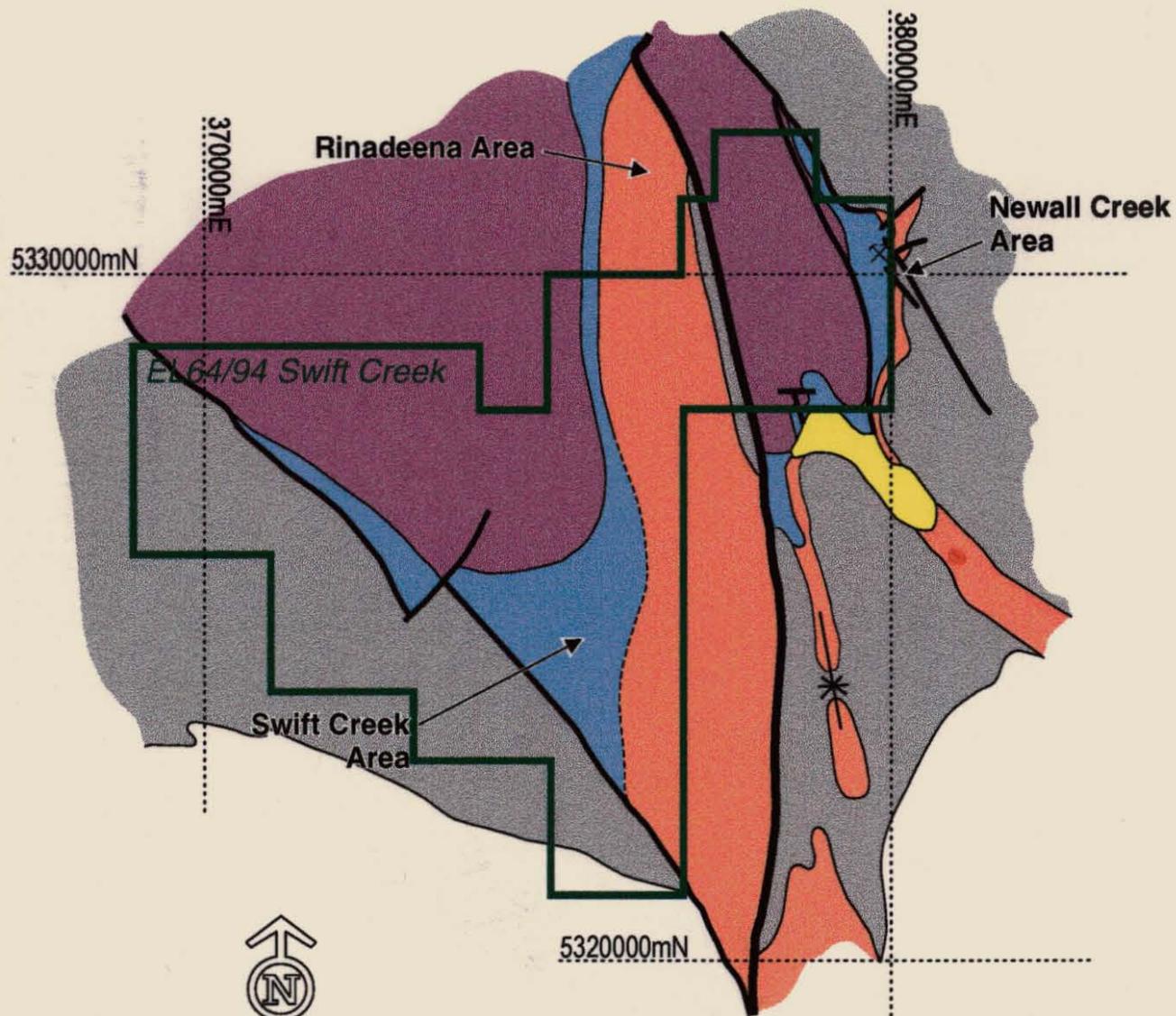
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## 9. Location

Queenstown	SK55-05	1:250,000
Cape Sorell	7913	1:100,000
Franklin	8013	1:100,000
Teepookana	3632	1:25,000
Strahan	3633	1:25,000

**10. Keywords**

Tasmania, Base Metals, Ordovician, Carbonate Hosted, History, Soil Sampling,  
Rockchip Sampling.



## Stratigraphy

- Quaternary gravel-sand-clay
- Undifferentiated Siluro-Devonian
- Ordovician Gordon Group
- Cambro-Ord. clastic sequences
- Undifferentiated Cambrian
- Fault
- Interpreted basin bounding fault (reactivated growth fault)
- X Discordant Pb-Zn working

5 cm



0 1 2 3 5km

Scale 1:100,000  
Projection : AMG Zone 55

# 96-3868

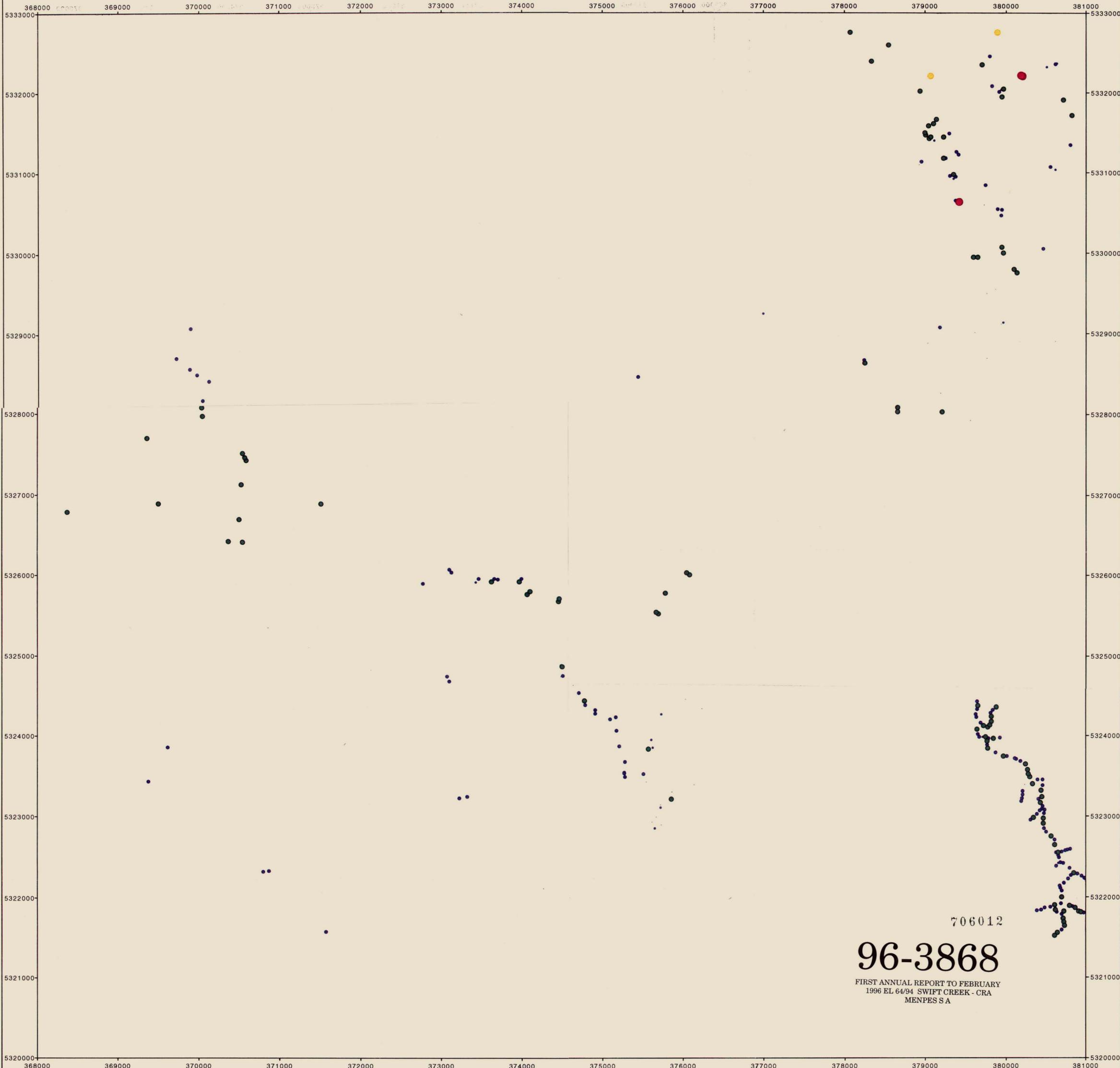
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1996 EL 64/94 SWIFT CREEK - CRA  
MENPES S A

CRA EXPLORATION PTY. LIMITED

Swift Creek EL64/94  
Summary Geology

Author: Sandy Menpes	Reference: SK55-05 Queenstown
Drawn: Tony Sargeant	File Name: Tv1059.cdr
Date: May 1996	Report No: 21978
Scale: 1:100,000	Plan No: Tv1059

706011

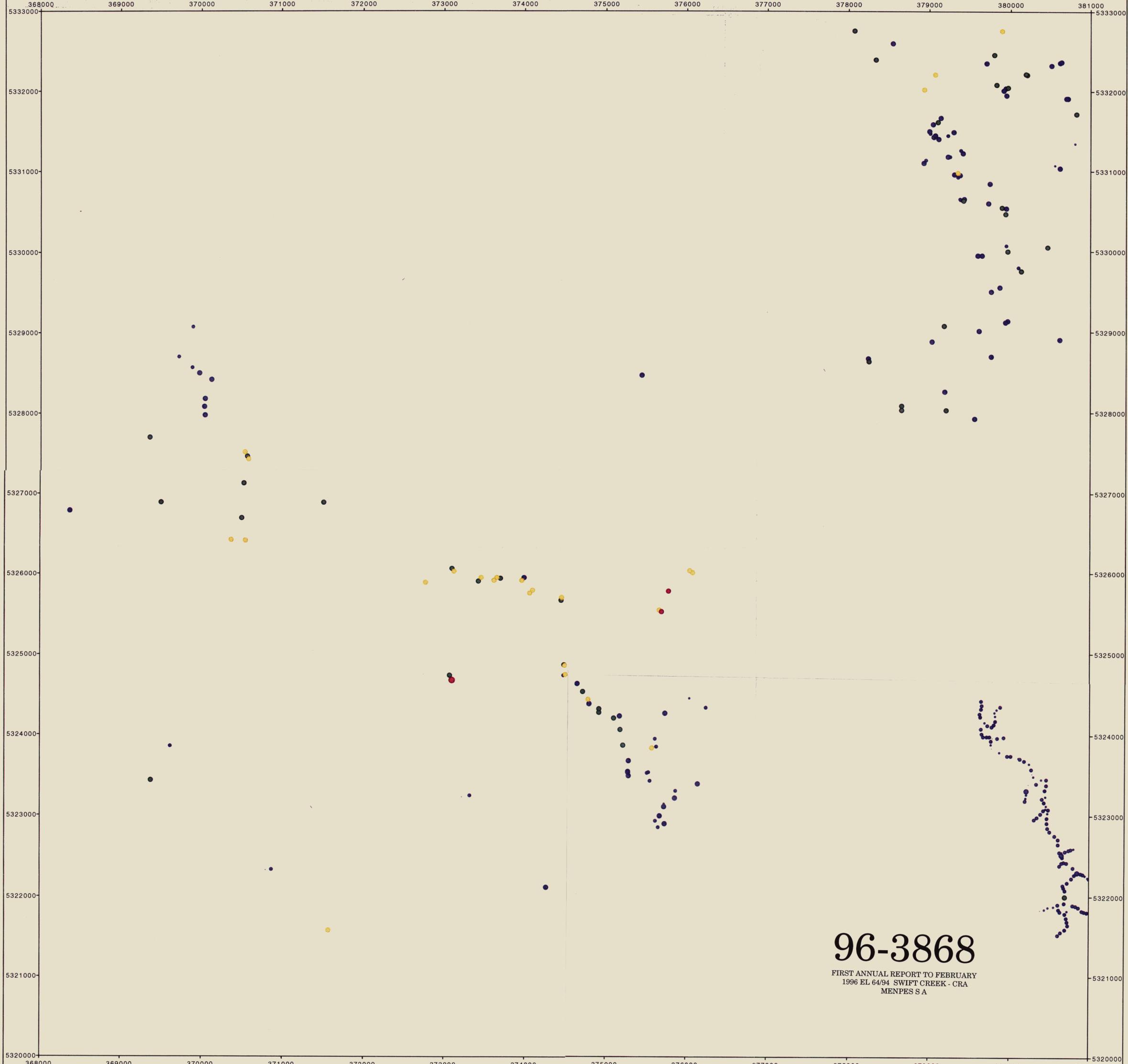


706012  
**96-3868**  
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 1996 EL 64/94 SWIFT CREEK - CRA  
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All data  
 jmap 100m

CRA EXPLORATION PTY. LIMITED		
SWIFT CREEK EL 64/94		
Pb ppm -80#SS		
Geol:	Scale: 1:25,000	Report: 21978
Drawn: S.Maher	Date: 8/5/95	Plan: TV 974



# 96-3868

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 1996 EL 64/94 SWIFT CREEK - CRA  
 MENPES S A

- 20-50
- 50-100
- 100-200
- 200-500
- +500
- -2
- 2-5
- 5-10
- 10-20



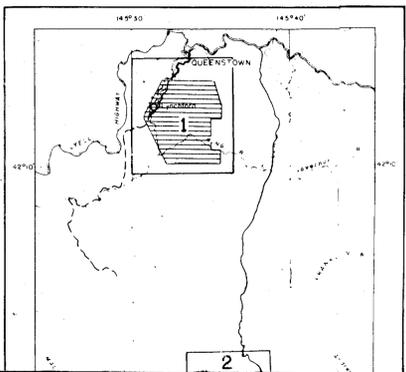
All data  
 jmap 100m

700013

CRA EXPLORATION PTY. LIMITED		
SWIFT CREEK EL 64/94		
Zn ppm -80#SS		
Geol:	Scale: 1:25,000	Report: 21978
Drawn: S.Maher	Date: 8/5/95	Plan: TV 975



LOCATION MAP



# DIGHEM<sup>II</sup> SURVEY

QUEENSTOWN AREA, TASMANIA

ELECTROMAGNETICS

FOR

MOUNT LYELL MINING & RAILWAY CO. LTD.



5 cm

SCALE 1:10,000

Flight line

Fiducials  
and  
numbers



# DIGHEM<sup>II</sup> SURVEY

QUEENSTOWN AREA, TASMANIA

ELECTROMAGNETICS

FOR

MOUNT LYELL MINING & RAILWAY CO. LTD.



SCALE 1:10,000

## 96-3868

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1996 BL 6404 SWIFT CREEK - CRA  
MENPES SA

Plan No. T0226  
Report No. 21978

Flight line

Fiducials  
and  
numbers

506014

ANOMALY GRADE	SM GRADE SYMBOL	WMO RANGE
1	●	20 - 100
2	●	20 - 20
3	●	20 - 40
4	●	10 - 10
5	●	1 - 1
6	○	< 1
7	○	< 1
8	○	< 1
9	○	< 1
10	○	< 1
11	○	< 1
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95	○	< 1
96	○	< 1
97	○	< 1
98	○	< 1
99	○	< 1
100	○	< 1

DIGHEM anomalies are divided into six grades of conductivity — thick-ness product. The product is ratio of the reciprocal of resistance in ohms, the ratio is a measure of conductivity, and a geologic parameter. Most surveys yield grade 1 anomalies but highly conducting clay can give grade 2 anomalies. The multigrade anomalies show other surface conductors to be recognized, and these are indicated by the letter 'S' on the map. The remaining grades 3 and 4 anomalies could be near-surface conductors. The higher grades indicate increasingly higher conductivity. Examples: The one block of the Magnet Hill camp (Ore-belt, Canada) yield grade 4 anomalies, while Magnet Hill and White (Ore-belt, Canada) give grade 5. Crystals and nodules can give all grades but, in this survey area, field work may show that the different grades indicate different types of conductors.

The actual 2000 resistivity is plotted beside the SM grade symbol. The ratio is the anomaly factor. The horizontal ones of 100 indicate normal anomaly grade on the flight record, and the vertical column gives the estimated depth. This depth may be unreliable because the average part of the conductor may be deeper or to one side of the flight line, or because of a shallow dip or conductive overburden effects.

DIGHEM maps are designed to provide a correct impression of conductor quality by means of the conductance grade symbols. The symbols are placed along with geology when planning a follow-up program. The actual 1/20 values are plotted for nodes with quantitative data. The anomaly gain and depth are indicated by non-geological dots which should not be used from the conductance package, and they should be used with the 1/20 values only. The map conductors, an indication of all conductors in terms of anomaly, are indicated by conductance and depth. The accuracy is comparable to an interpretation from a ground EM survey having the same line spacing.

Conductor gain  
Surface resistivity (ohm-cm)  
Surface conductance (ohm-cm)  
Unweathered rock and thin clay (ohm-cm)  
Possible surface response  
Cultural features (ohm-cm)  
A block of conductive material (ohm-cm)  
Possible surface response  
Quartzite anomaly  
Aquifer thickness (m)

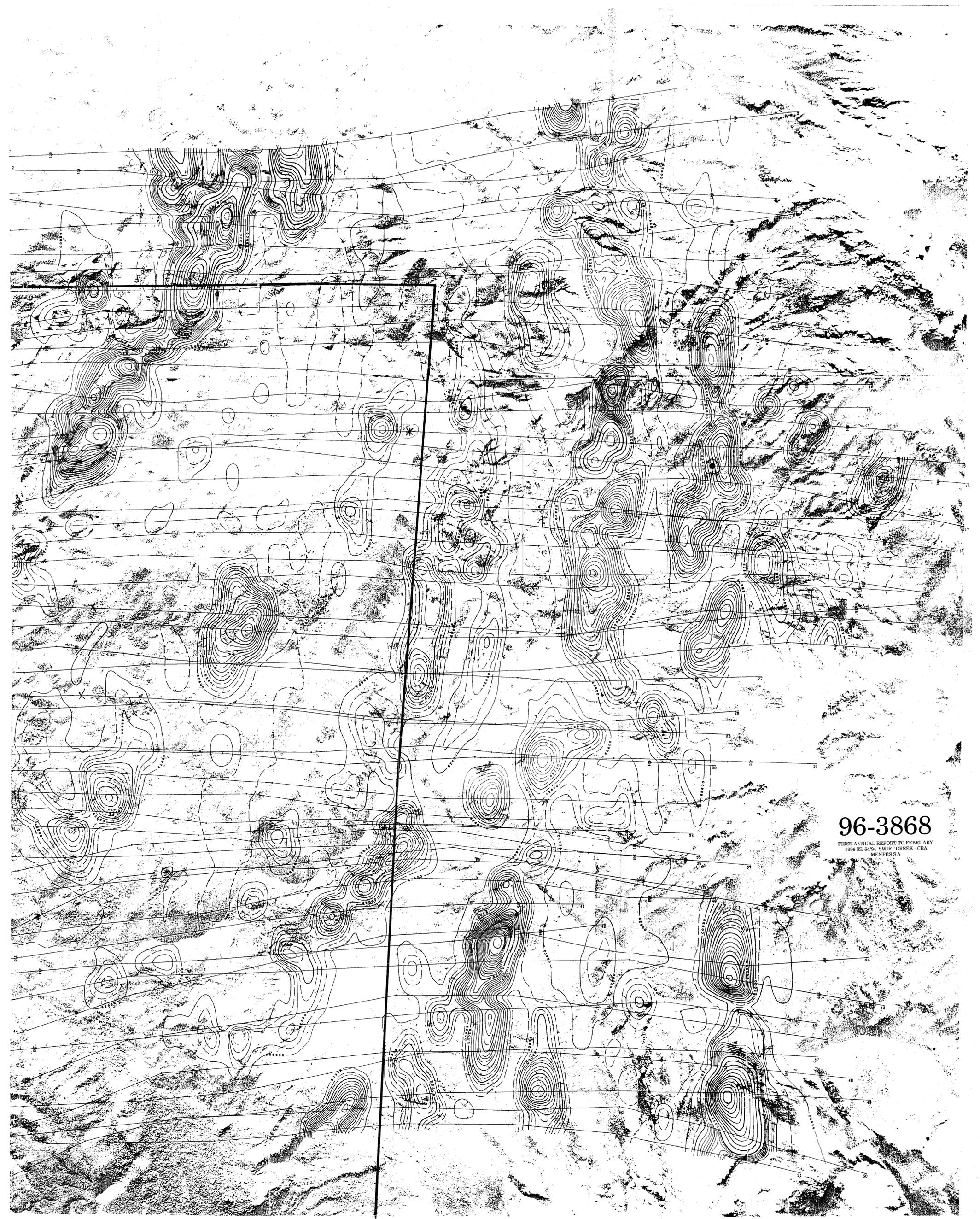


LOCATION MAP



# DIGHEM<sup>II</sup> SURVEY

QUEENSTOWN AREA, TASMANIA



96-3868

FIRST ANNUAL REPORT TO FEBRUARY  
1966 EL 64/94 SWIFT CREEK - CRA  
MENPES 5 A

# DIGHEM<sup>II</sup> SURVEY

QUEENSTOWN AREA, TASMANIA

700015 Plan No. To 1627  
Report No. 21978

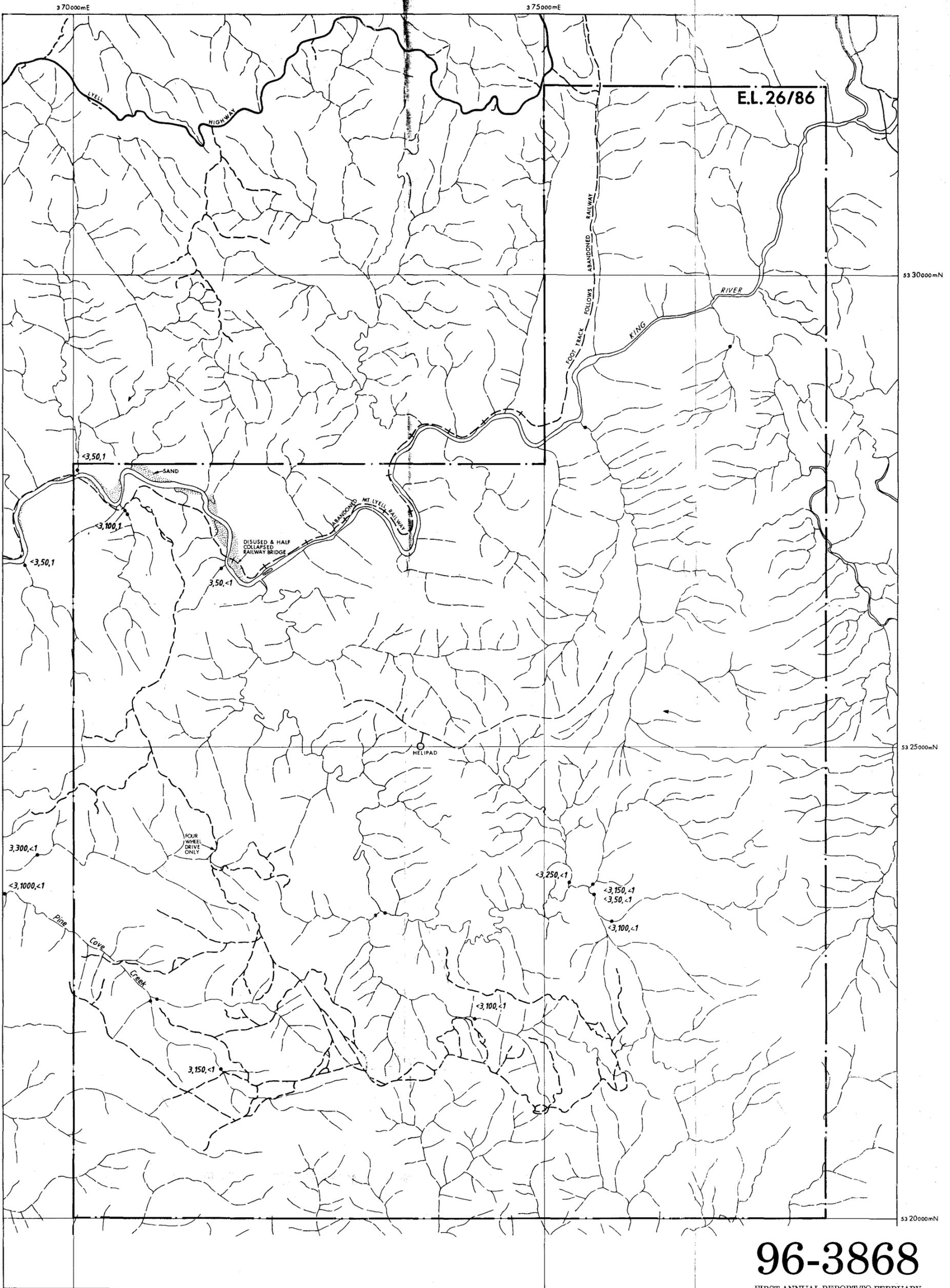
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ISOMAGNETIC LINES  
(enhanced field)

Flight line

5cm



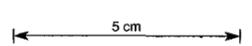


E.L. 26/86

# 96-3868

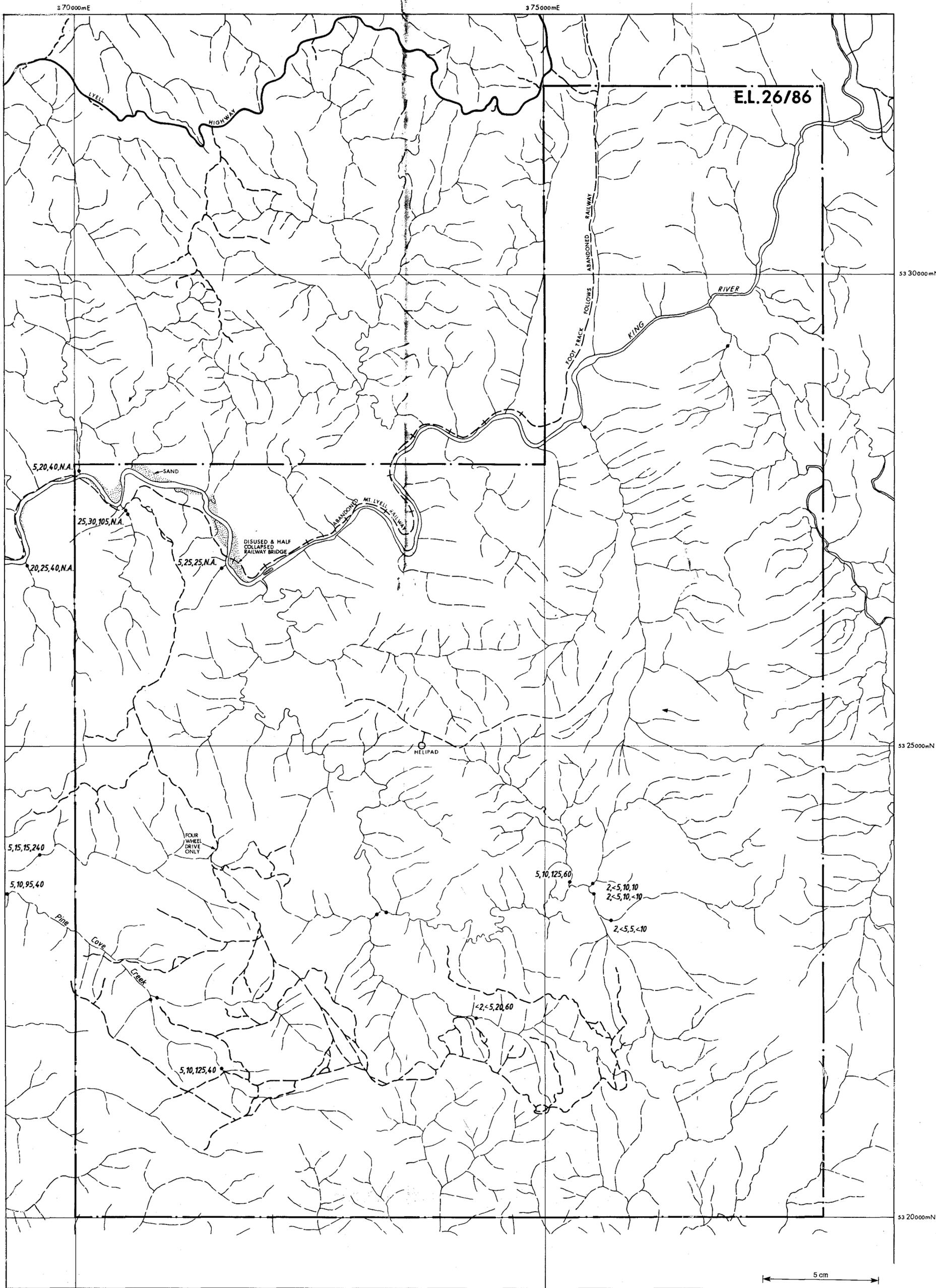
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1996 EL 64/94 SWIFT CREEK - CRA  
MENPES S A

700016



Au, Au, Ag — 80mesh sample, Results expressed in ppm.  
 — 4-mesh Cyanide leach sample, Results expressed in ppt.  
 — 80mesh sample, Results expressed in ppb.

CRA EXPLORATION PTY. LIMITED	
SWIFT CREEK E.L. 26/86 STREAM SEDIMENT SAMPLING Au - Au - Ag ASSAYS	
REF. SK55-5	(7913 - 8013)
SCALE 1:25 000	DRAWN RT.
DATE 9-22-1997	REPORT No. 21978
	PLAN No. TASH 3438



E.L.26/86

# 96-3868

FIRST ANNUAL REPORT TO FEBRUARY  
1996 EL 64/94 SWIFT CREEK - CRA  
MENPES SA

700018

CRA EXPLORATION PTY. LIMITED

SWIFT CREEK E.L. 26/86  
STREAM SEDIMENT SAMPLING  
Cu - Pb - Zn - Ba ASSAYS

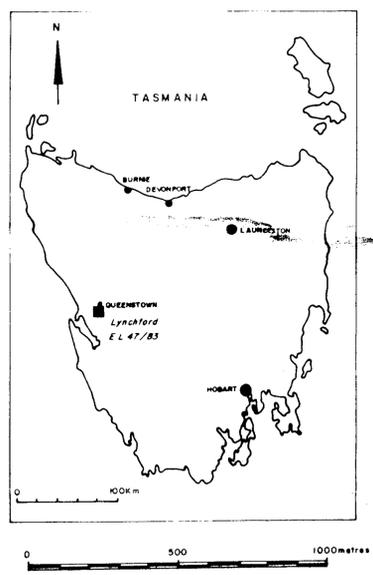
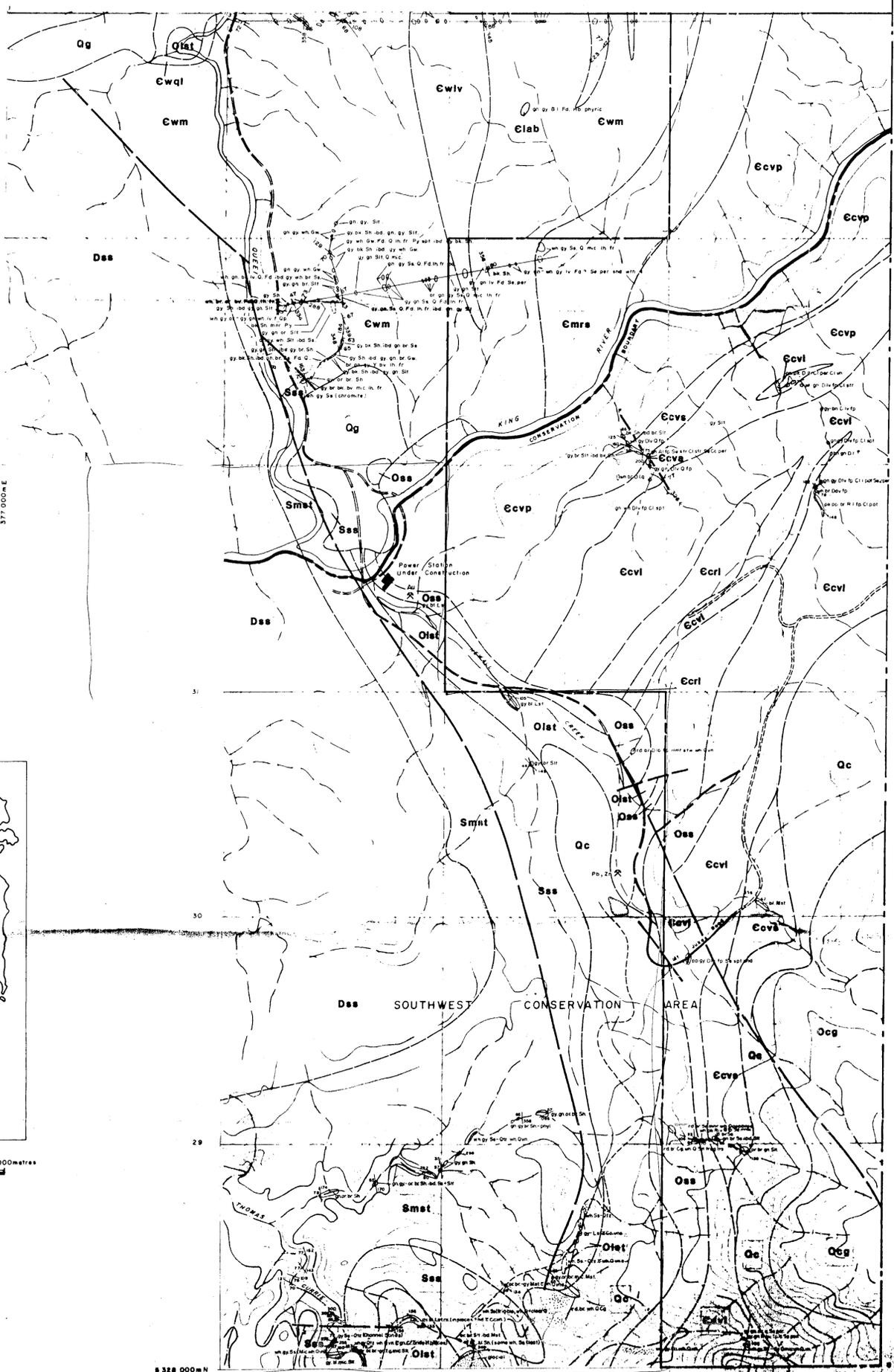
All assay results expressed in ppm.

N.A. - Not Assayed For

REF. SK55-5	(7913-8013)
SCALE 1:25 000	DRAWN R.T.
AUTHOR F.R.F.	REPORT No. 21978
DATE 2-28-1997	PLAN No. TASH 3639

- QUATERNARY**
  - DEYONIAN**
  - STURIAN**
  - ORDOVICIAN**
- Qa** Recent alluvial Deposits
  - Qc** Colluvial Scree
  - Qg** Glacial till and outwash gravels
  - Das** Fine grained quartz rich sandstone and minor interbedded siltstone and mudstone.
  - Smat** Mudstone, siltstone and minor sandstone
  - Ssa** White quartz rich chromite bearing sandstone
  - Olat** Impure limestone and micritic limestone (Gordon Limestone)
  - Oss** Grey quartz sandstone minor conglomerate and chromite layers (Pioneer Beds)
  - Ocg** Undifferentiated Conglomerate and sandstones (Owen Conglomerate)

- Cambrian**
  - Tyndall Group**
  - Que-Hellyer Equivalents?**
  - Central Volcanic Complex**
  - Western Sequence**
- Clf1** Felsic lapilli volcanoclastic
  - Clm** Sandstone and Mudstone
  - Clf** Quartz, lithic fragment rich lapilli volcanoclastic
  - Clbv** Breccia volcanoclastic (Quartz, Hematite rich)
  - Clvb** Polymict Basaltic lapilli volcanoclastic
  - Clbb** Andesitic - Basaltic lavas & lava breccias and minor dacitic lava indicated.
  - Ecvi** Dominantly Dacitic lapilli volcanoclastic & Dacitic lavas with minor felsic porphyries and odd Andesitic lava (Cova) indicated.
  - Ecva** Black mudstone, siltstone and micaceous sandstone
  - Ecrl** Quartz feldspar phyrlic rhyolitic lava
  - Ecvp** Intrusive and extrusive quartz feldspar porphyry.
  - Cwql** Quartz rich lapilli volcanoclastic
  - Cwm** Dominantly black shale, siltstone, sandstone & lapilli volcanoclastics with some units dominantly lapilli volcanoclastic (Cwv) indicated.
  - Cmrs** Quartz rich sandstone (Miners Ridge Sandstone)
  - Cmrb** Tholeiitic Basalt (Miners Ridge Basalt)



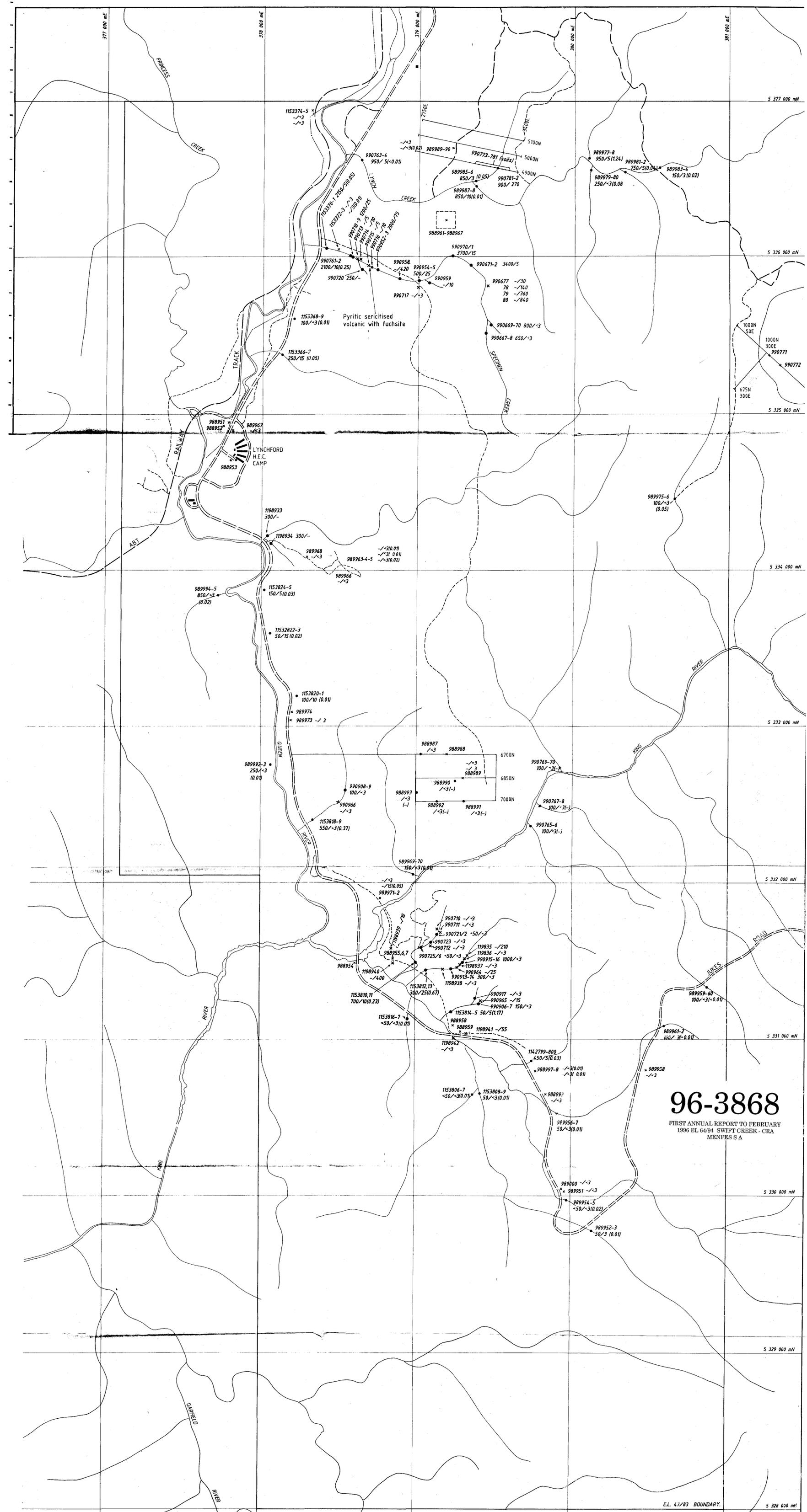
706019  
**96-3868**  
 FIRST ANNUAL REPORT TO FEBRUARY  
 1996 EL 64/94 SWIFT CREEK - CRA  
 MENPES SA



**Aberfoyle Resources Limited**  
 EXPLORATION DIVISION

SOUTH WEST TASMANIA  
 LYNCHFORD, EL. 47/85 - CRA  
 INTERPRETIVE GEOLOGY

Scale: 1:10,000  
 Date: February 1990  
 Plan: 1623



# 96-3868

FIRST ANNUAL REPORT TO FEBRUARY  
1996 EL 64/94 SWIFT CREEK - CRA  
MENPES SA

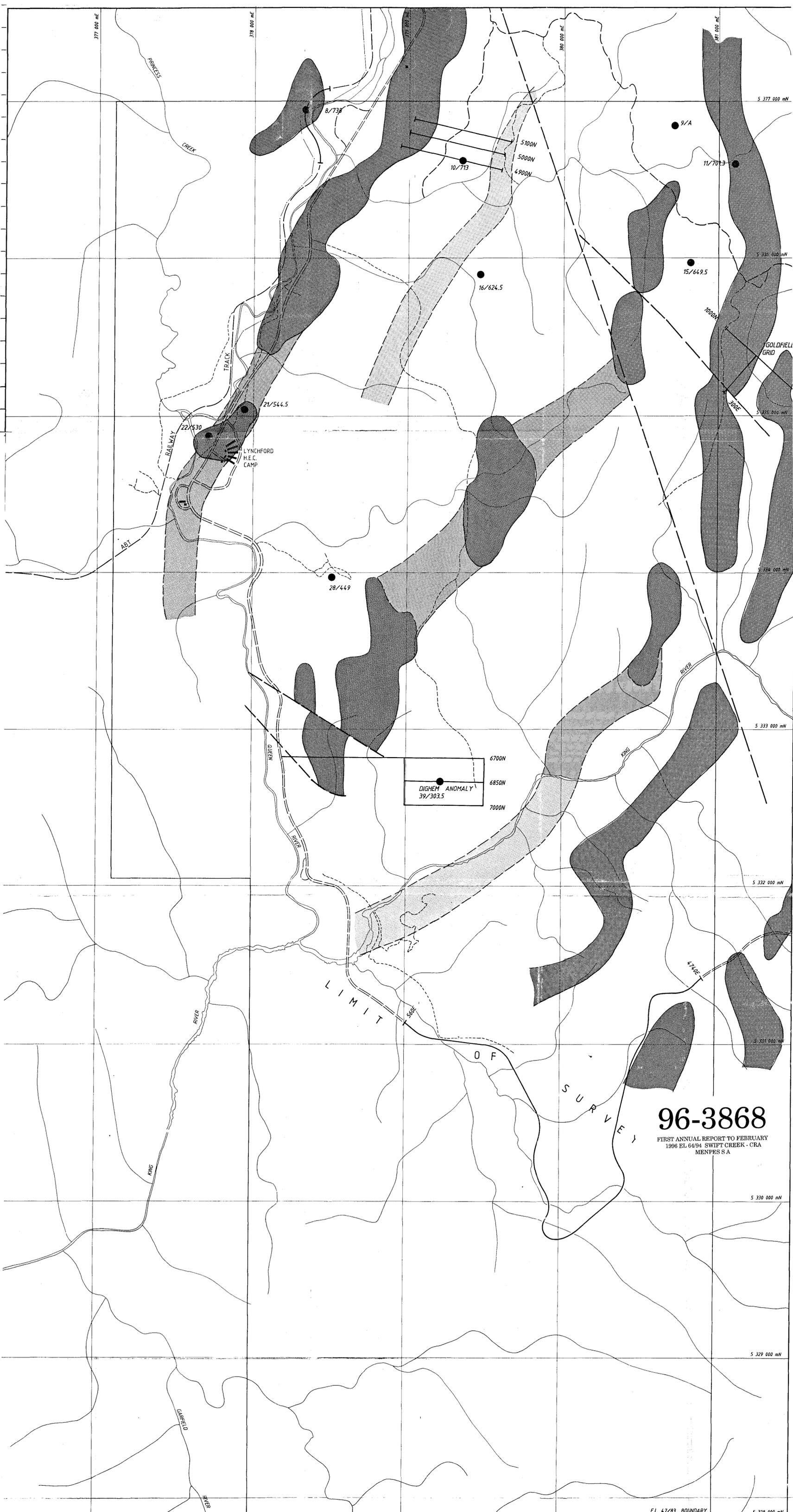
- KEY**
- 98977-8 STREAM SEDIMENT SAMPLE  
Au ppt / Au ppm (Au ppm)
  - 900/5 CN leach / -80 mesh AAS (-80 mesh Fine assay)
  - \* 98951 ROCK SAMPLE
  - 90073 SOIL SAMPLE

706020

5 cm

EL. 47/83 BOUNDARY

CRA EXPLORATION PTY. LIMITED	
LYNCHFORD E.L. 47/83	
CRAE GEOCHEMICAL SAMPLING AND GOLD DRAINAGE GEOCHEMISTRY	
REF. SK55 - 5 (803)	DRAWN R.T.
SCALE 1 : 10,000	REPORT No. 21978
AUTHOR I.M.C.	PLAN No. 1A/83
DATE 29-1-1996	2860



# 96-3868

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**REFERENCE**

- 10/731 Digheim Anomaly and Line / Fiducial No.
- Genie - E.M. Traverses.

Aeromagnetic Features Interpreted from Digheim Enhanced Magnetic Contour Plan.

- Strong Magnetic Response
- Moderate Magnetic Response
- Weak Magnetic Response or inferred continuation of magnetic unit.

706021

CRA EXPLORATION PTY. LIMITED	
LYNCHFORD E.L. 47/83	
GEOPHYSICAL COMPILATION SHOWING DIGHEM ANOMALIES, GENIE E.M. TRAVERSES AND AEROMAGNETIC FEATURES	
REF. SK55 - 5	( 8019 )
SCALE 1 : 10,000	DRAWN R.T.
AUTHOR T.V.S.	REPORT No. 21978
DATE 0 2 1986	PLAN No. TASH 2860

3037/112 HZ

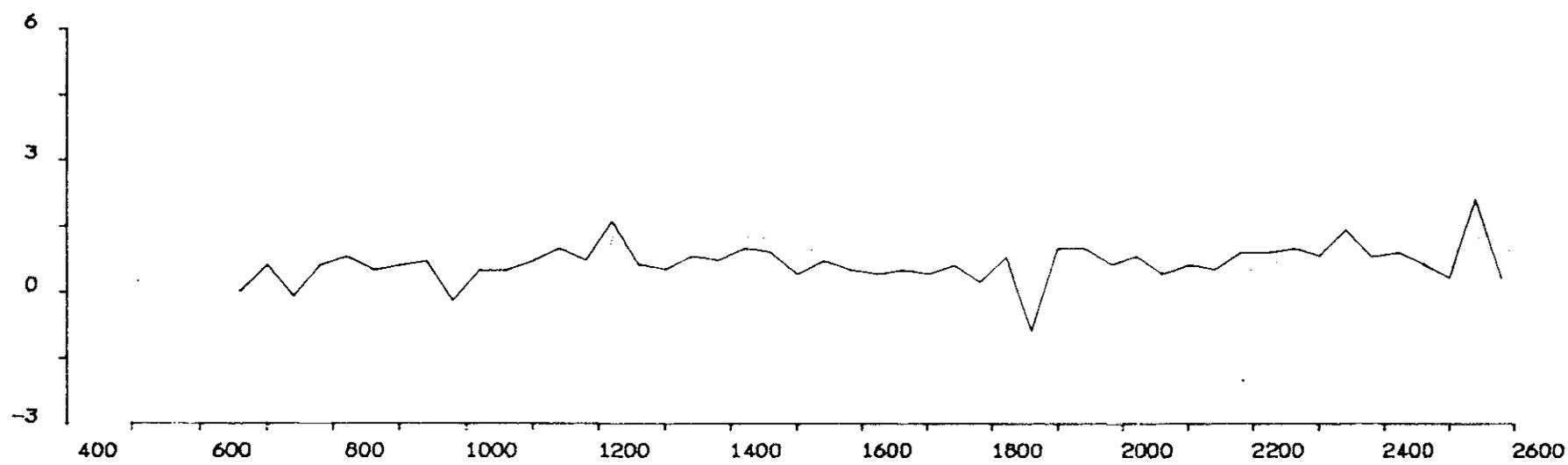
LYNCHFORD HEC ROAD



3037/112 HZ

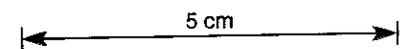
# 96-3868

FIRST ANNUAL REPORT TO FEBRUARY  
1996 EL 64/94 SWIFT CREEK - CRA  
MENPES SA



337/112 HZ

706022

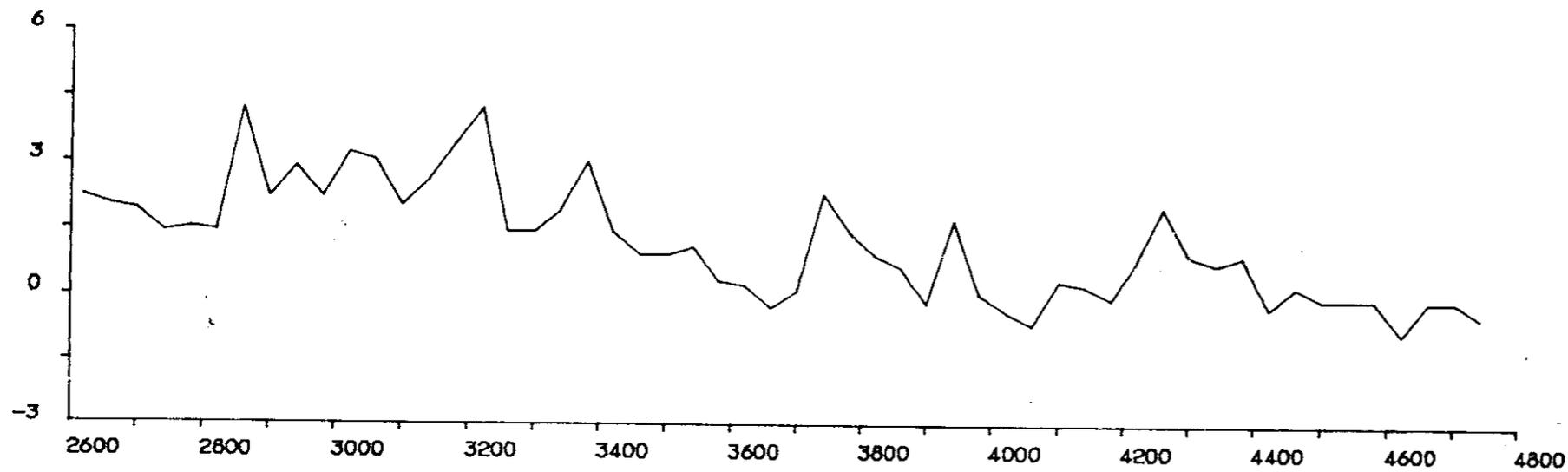


Metres East

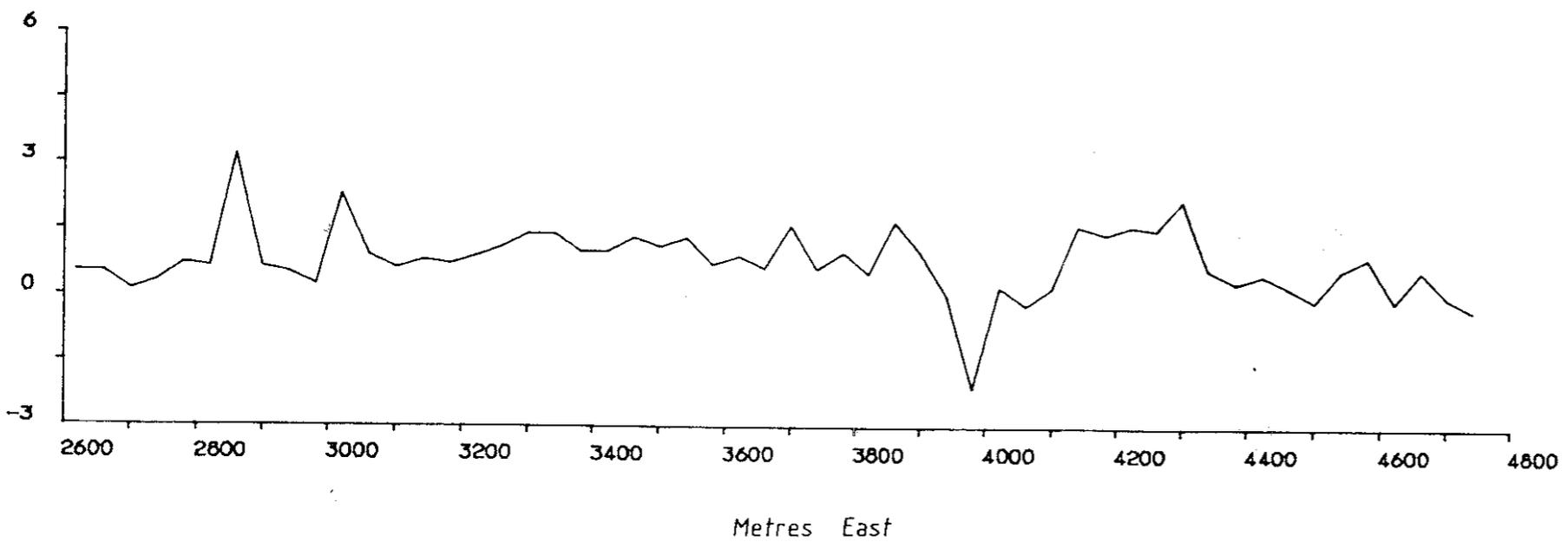
\* N.B. \*  
100m Separation  
Tx in East

CRA EXPLORATION PTY. LIMITED			
LYNCHFORD E.L. 47/83			
GENIE PROFILES			
LYNCHFORD H.E.C. ROAD WEST			
REF.	SK55 - 5	( 8013 )	
SCALE	1 : 10000	DRAWN	T.v.S.
AUTHOR	T.v.S.	REPORT No.	21978
DATE	JAN 1986	PLAN No.	TASh 2844

LYNCHFORD HEC ROAD

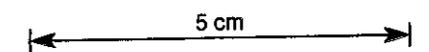


3037/112 HZ



337/112 HZ

706023



CRA EXPLORATION PTY. LIMITED

LYNCHFORD E.L. 47/83  
GENIE PROFILES  
LYNCHFORD H.E.C. ROAD EAST

\* N.B. \*  
100m Separation  
Tx in East

REF.	SK55 - 5	( 8013 )
SCALE	1 : 10000	DRAWN T.v.S.
AUTHOR	T.v.S.	REPORT No. 21978
DATE	JAN 1986	PLAN No. TASH 2845

96-3868

FIRST ANNUAL REPORT TO FEBRUARY  
1996 EL 64/94 SWIFT CREEK - CRA  
MENPES SA

QUATERNARY

Qra Talus, Alluvium & Fluvio-glacial deposits

SILURIAN

Sc Crotty Quartzite

ORDOVICIAN

Og Gordon Limestone

Op Pioneer Beds - Sandstone & Conglomerate

Oo Owen Conglomerate

CAMBRIAN

MT READ VOLCANICS - Central Sequence

Ecr RHYOLITE (Ecr) & minor ash-fall TUFF (Ecat)

Ecc Volcanic & sedimentary sequence of Feldspar-phyric TUFF (Ectf), fine-grained Vitric TUFF (Ecvf) & GREYWACKE (Ecgr)

Ecb Volcanic & sedimentary sequence of fine-grained Vitric TUFF (Ecvf), Tuffaceous AGGLOMERATE (Ecta) & interlaminated, silicified, Feldspar-phyric TUFF, fine-grained Vitric TUFF & SILTSTONE (Ecm)

Ectf Feldspar-phyric TUFF

MT READ VOLCANICS - Western Sequence

Ewqt Quartz-Feldspar-phyric TUFF

Ewp Quartz-Feldspar PORPHYRY

Ews SILTSTONE & SLATE

Ewmr Miners Ridge SANDSTONE

Ewm Mixed Quartz-Feldspar-phyric TUFF (Ewqt), Quartz-Feldspar PORPHYRY (Ewp), SILTSTONE & SLATE (Ews) & lithic TUFF or GREYWACKE (Ewt)

Ewz Mixed Quartz-Feldspar-phyric TUFF (Ewqt), Quartz-Feldspar-lithic TUFF (Ewtl), Feldspar-phyric TUFF (Ewft), Tuffaceous AGGLOMERATE (Ewta), SILTSTONE & SLATE (Ews) with intrusive Quartz-Feldspar PORPHYRY (Ewp)

Ecb Bold type - interpretative  
Ewp Small type - mapped outcrop

STRUCTURE

- Fault
- Joint
- Bedding
- Cleavage
- Foliation
- Unconformity
- Anticline } Plunge direction shown
- Syncline }

ATTITUDE OF STRUCTURE

- Dipping
- Vertical
- Horizontal

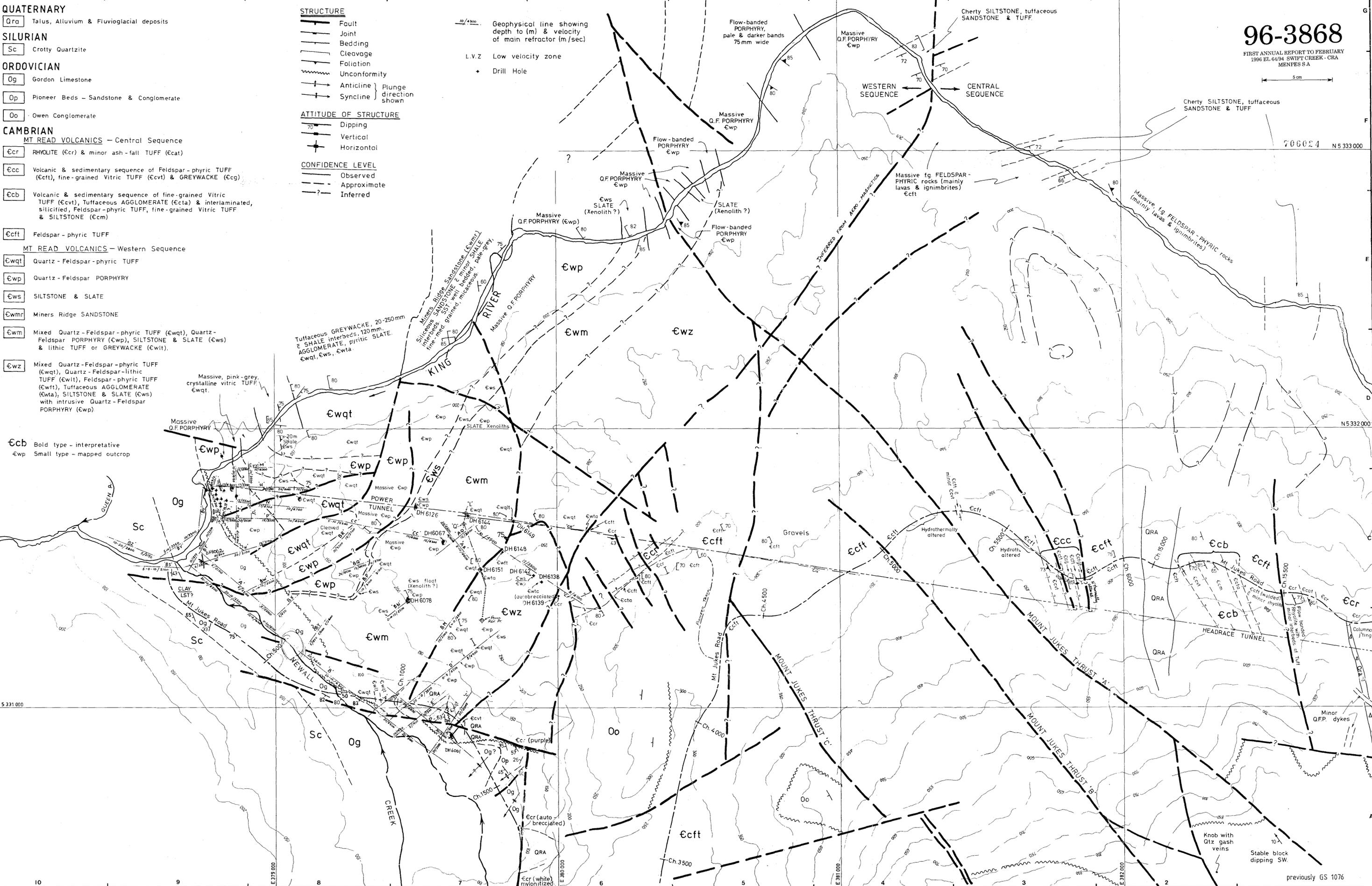
CONFIDENCE LEVEL

- Observed
- Approximate
- Inferred

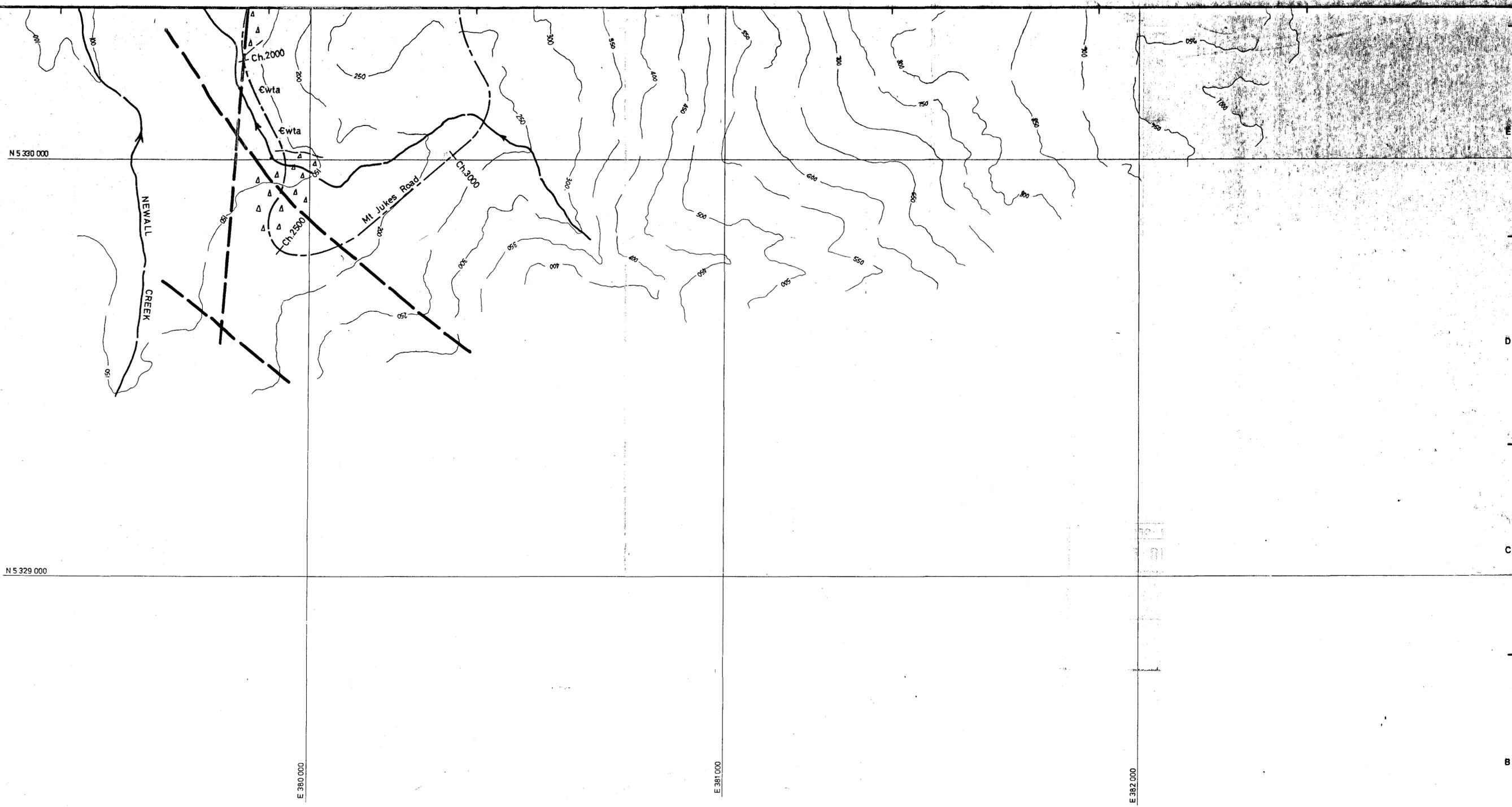
Geophysical line showing depth to (m) & velocity of main refractor (m/sec)

L.V.Z Low velocity zone

Drill Hole



ALTERATIONS	DESIGNED	CHECKED	SCALES	THE HYDRO-ELECTRIC COMMISSION, TASMANIA		B1-5399
	TRACED	CHECKED	1:5000	KING RIVER POWER DEVELOPMENT		
	SUBMITTED	D.O.		REGIONAL GEOLOGY - SHEET 1		
	RECOMMENDED			Report No. 21978 Plan No. To 1624		
	APPROVED			DATE		



706025

**96-3868**

FIRST ANNUAL REPORT TO FEBRUARY  
1996 EL 64/94 SWIFT CREEK - CRA  
MENPES SA

5 cm

Plan No. T5 1823  
Report No. 21978

ALTERATIONS	REFERENCE DRAWINGS		DESIGNED	CHECKED	SCALES	THE HYDRO-ELECTRIC COMMISSION, TASMANIA		<b>GS 2042</b>	
			DRAWN	CHECKED	1:5000	KING RIVER POWER DEVELOPMENT			REG.
			TRACED	D.O.		REGIONAL GEOLOGY — SHEET 4			
			SUBMITTED	AGREED					INDEX
			RECOMMENDED						
		APPROVED			DATE				

**Appendix 1**

**Previous Exploration - EL 64/94 Swift Creek**

*Lyell EZ Exploration* 1956-?

In 1956, the Mt. Lyell Mining & Railway Co. Ltd. and EZ combined to form Lyell EZ Exploration (LEE) to carry out exploration in SW Tasmania. The area covered by EL 64/94 was held under SPL and EL by LEE between 1956-?. It is not known whether LEE undertook systematic ground exploration within the area covered by EL 64/94 during this time.

*United States Refining Company* 1964 EL 2/64

The NE corner of EL 64/94 covers part of former United States Refining Company (USRC) EL 2/64 (Barton, 1964). This licence was held in 1964 only. All work undertaken by USRC was outside EL 64/94. This work involved field investigation of historic Cu and Au mineralisation within Cambrian volcanic stratigraphy including the Prince Domain, Findons, Jukes Pty. and Lake Jukes prospects.

*BHP* 1964-1969 EL 13/64 (formerly EL 1/64)

The area covered by EL 64/94 was held by BHP as EL 13/64 (formerly EL 1/64) from 1964 until 1969, when the area was surrendered on partial relinquishment. No systematic ground exploration was undertaken within the area covered by EL 64/94 prior to relinquishment. Significant work was undertaken in the contiguous Jukes-Darwin area which includes Cambrian volcanic sequences.

*RGC* 1982 EL 9/66

Former RGC EL 9/66 included part of the area covered by EL 64/94. A DIGHEM II (plus airborne magnetic) survey was undertaken for RGC in 1982 covering selected areas within EL 9/66. Data from this survey covers 3 sqkm in the NE of EL 64/94 (approximately 18 line km). No EM or magnetic anomalies were interpreted in data from this area by RGC (see plans To 1626 & 27). Reinterpretation by CRAE (Noonan, 1990) also did not recognise anomalies in data from this area.

A stream sediment survey was undertaken by RGC within EL 9/66. No samples were collected within the area covered by EL 64/94.

*Fimiston Minerals-  
Cyprus Mines Corporation* 1970-72 EL 47/70

EL 47/70, which included the area covered by EL 64/94, was held under ?JV between Fimiston Minerals and Cyprus Mines Corporation between 1970-72 (Roots, 1971). An orientation stream sediment survey was undertaken by Fimiston Minerals, in part covering EL 64/94. Twelve -80 mesh samples were collected in the NW of the licence area testing Eldon Group and Dundas Group stratigraphy (plus faulted contact), for a sample density of approximately 2.5 samples per sq km. Samples were analysed for Cu Pb Zn by AAS (verified located assays for stream sediment samples are included in CRAE's competitor stream sediment database). Follow-up work focussed on the Au potential of the Lynch Creek prospect, and no further sampling was undertaken within the area covered by EL 64/94.

*EZ* 1975 SPL 140

SPL 140, which covered the NE corner of EL 64/94, was held by EZ in 1975 (Williams, 1975). Work undertaken within this Licence area targeted Cu-Pb-Zn sulphides associated with the Mt. Reid Volcanics, and included stream sediment sampling and geological mapping. All work was undertaken in the Garfield River and Clarke River Valleys outside the area covered by EL 64/94. A stream sediment "size fraction" orientation survey concluded -80 mesh samples gave the best ?compromise.

*EZ-Cyprus*

1983-85

EL 31/83

EL 31/83, which covered most of EL 64/94, was held under JV between EZ and Cyprus between 1983-85. All work undertaken within EL 31/83 was confined to the Swift Creek and Rinadeena areas.

The Swift Creek area covers most of the Gordon Group mapped in the centre of EL 64/94 (Mathison, 1984). Exploration by EZ in this area tested the Gordon Group for "Irish-style carbonate hosted Pb-Zn deposits". This stratigraphy was considered particularly prospective given the mapped (Bailey et al, 1977) thick carbonate sequence, bounded in the SW by a prominent fault.

Field mapping by EZ subdivided the mapped undifferentiated Gordon Group into dominantly limestone and dominantly interbedded grey slate and siltstone units. These units have exposed surface areas within the Swift Creek area of 2.5 sqkm and 4.0 sqkm respectively (Plan To 1622). No indications of syn-sedimentary tectonism (clastic breccias) or base metal mineralisation were noted. Along the SW faulted boundary of the Gordon Group carbonates were intensely veined and frequently contained disseminated pyrite.

A reconnaissance -80 mesh stream sediment (plus panned concentrate & rock chip) sampling survey was undertaken testing the Gordon Group within the Swift Creek area south of 5326500mN. 55 samples were taken for a sample density of approximately 7 samples per sq km. Additionally, 42 rock and 18 panned concentrate samples were collected. Stream sediment, rock, and two panned concentrate samples were analysed for Cu Pb Zn Fe Mn Ba by AAS. Most panned concentrate samples were submitted for heavy mineral identification. Four rocks were additionally submitted for petrological description.

Verified located assays for stream sediment samples are included in CRAE's competitor stream sediment database. Base-metal and Ba values are generally low. In the east, this may be due to dilution of Gordon Group detritus by quartz detritus from the Denison Group (consistent with low Fe values for samples from this area). One sample taken from a creek draining the Denison Group returned anomalous Ag (1.5 ppm). The two best Zn values (>200 ppm) came from a creek draining 0.4 sqkm of siltstone with minor sandstone within the dominantly interbedded grey slate and siltstone unit (Gordon Group) 500m from the faulted contact with the Denison Group in the NE of the survey area. A siltstone rock chip sample assaying 245 ppm Zn was taken from this area.

Panned concentrates from the central portion of the survey area contained trace pyrite. Some carbonate rocks sampled in this area contained trace pyrite.

Four "limestone" rock samples from the dominantly limestone unit (Gordon Group) submitted for petrology were described as dolomites. It is therefore not appropriate to assume that rocks logged by EZ as limestone have not been dolomitised. Rocks contained fine grained syngenetic pyrite. One sample was described as oolitic or algal-pelletal limestone. Some samples contained ankeritic dolomite overprinted by dolomite.

Base metal values for rock-chip samples are generally low. Best Zn assay was 245 ppm (see above). A pyritic (10-20%) black siltstone along the eastern faulted boundary of the Gordon Group assayed 1760 ppm Ba.

The Rinadeena area is located on the northern boundary of EL 64/94 and covers Denison Group (Owen Conglomerate), Gordon Group, and Eldon Group stratigraphy (Hopton & Mathison, 1985). Exploration by EZ in this area followed up an airborne magnetic anomaly which was concluded to probably be related to a tuffaceous conglomerate unit within the Denison Group. Minor Au mineralisation associated with quartz veining in siliceous sediment was identified from stream sediment, rock chip, soil, and ground magnetic surveys.

A 10m station spaced ground magnetic survey was undertaken along two gridlines crossing Gordon Group stratigraphy. No sampling (or mapping) was undertaken testing Gordon Group Stratigraphy. For this reason, EZ Rinadeena data was not compiled.

*CRAE, CRAE-Aberfoyle*

*EL 26/86*

*1987-1989*

EL 26/86, which covered most of EL 64/94 (same area as 31/83 north of 5320000mN), was held by CRAE between 1987-88, and under JV between CRAE and Aberfoyle between 1988-89

Exploration by CRAE (Funnel, 1987) in this area was aimed at structurally controlled gold mineralisation. Reconnaissance and follow-up stream sediment (plus float) sampling was undertaken. 18 -80 mesh and -4 mesh stream sediment samples were collected. -80 mesh samples were analysed for Cu Pb Zn Fe Mn Ag As by IC582, Au by PM209, and Ba by XRF. -4 mesh samples were analysed for Au by PM216. Verified located assays for stream sediment samples are included in the CRAE stream sediment database. CRAE Plans TASH 3638-40 show located assay results.

Sample coverage was patchy and incomplete. Most samples tested the Cambrian Dundas Group in the south of EL 64/94. Elevated Au values (>1000 ppt BCL) were concluded to probably be related to Tertiary gravels. Five samples were taken from creeks draining Gordon Group stratigraphy. Of these, four samples completely test the dominantly limestone unit at the apex of the bounding faults, with a sample density of one sample per sqkm. A sample testing the Gordon Group adjacent the SW bounding fault (also Dundas Group) returned a Zn value of 125 ppm.

Exploration undertaken by Aberfoyle (Henham, 1989) was aimed at testing the Coupon Prospect Fault Structure (CPFS) in the Rinadeena area for Au mineralisation. The CPFS is the boundary between Gordon Group and Denison Group sequences. Sampling by Mont Royal Mining north of EL 26/86 (and EL 64/94) returned significant Au values (rock 21.0 ppm, soil 3.4 ppm) which were thought to be related to the CPFS. In the Rinadeena area, the CPFS does not outcrop and is characterised by prominent quartz veining and a change in bedding orientation across structure.

The Gordon Group in this area, represented by the Rinadeena Mudstone, comprises interbedded slaty siltstone and shale with minor quartzite. Trace disseminated pyrite, quartz-limonite stockworks and bedding conformable quartz-limonite sheeted veins are noted within the Rinadeena Mudstone.

A total of 22 rock chip and 210 C-horizon soil samples were taken in the Rinadeena area all outside EL 64/94. Samples were analysed for Cu Pb Ag As by AAS, Au by FA AAS, and Sb by XRF. Soil samples were collected at 25m intervals along 10 x 100m spaced, E-W grid lines. Gridlines profiled the Rinadeena Mudstone, and its eastern and western contacts. Verified located assays for soil samples are included in the CRAE's competitor soil and rock database.

A Rinadeena Mudstone rock chip sample taken adjacent to the western contact in the north of the grid assayed 150 ppm Pb and 300 ppm Zn. Most Rinadeena Mudstone rock chip samples taken in the north of the grid had elevated Zn(-Pb) values. No attempt has been made to interpret soil results. Care should be taken when interpreting results from samples taken in the vicinity of the Old Mt. Lyell Railway.

Pulps from EZ stream sediment samples (EL 31/83 - Swift Creek) were re-assayed for Au, Ag, and As. Results from this analysis are appended to EZ results in CRAE's competitor stream sediment database. Elevated Au values are scattered, best Au assay was 0.014 ppm.

EL 50/83, which included the NE corner of EL 64/94, was applied for by Amoco and EZ in 1983 (Taylor, 1983). This application appears to have been unsuccessful (preference given to CRAE - EL 47/83).

*CRAE, CRAE Aberfoyle**EL 47/83**1985-1990*

EL 47/83, which included the NE corner of EL 64/94, was held by CRAE between 1985-88, and under JV between CRAE and Aberfoyle from 1988 until 1990 when the area was surrendered on partial relinquishment (Noonan, 1990). The area covered by EL 64/94 was referred to as the Newall Creek Area. The geology of the Newall Creek Area is shown on Plan To 1623. The Gordon Group in the Newall Creek Area comprises impure limestone and micritic limestone. Geological mapping indicates ?growth faults truncating Ordovician (and earlier) sequences in this area. An old working exploiting vein style Pb-Zn mineralisation hosted by Gordon Group limestone is located in line with one of these faults at 379800mE 5330200mN.

CRAE and Aberfoyle both undertook stream sediment sampling programs within EL 47/83. CRAE collected 13 -4 and -80 mesh samples from accessible drainage's within the Newall Creek Area (Plan TASH 2869). -4 mesh samples were analysed by CRA for Au using a cyanide leach technique. -80 mesh samples were analysed by ALS for Cu Pb Zn Ag Fe As Mn by ICP, and by CRA for Au by FA AAS. Sample coverage was patchy and incomplete. Verified located assays for stream sediment samples are included in the CRAE stream sediment database.

21 -75 mesh and 11 -4 mesh samples were collected within the Newall Creek Area by Aberfoyle to infill CRAE stream sediment sampling. -80 mesh samples were analysed by Analabs for Cu Pb Zn Ag As by AAS, Au by FA AAS, and Ba by XRF. -4 mesh samples were analysed by ALS for Au using a cyanide leach technique. Verified located assays for stream sediment samples are included in CRAE's competitor stream sediment database.

The extent to which the Gordon Group is exposed in mapped drainage is variable and results of stream sediment sampling may not be representative of all limestone bedrock. Gordon Group units are typically not exposed near the lower contact between the Gordon Group and Pioneer Beds of the Denison Group (also to a lesser degree units near the upper contact between the Gordon Group and Eldon Group). This may be an artefact of deep weathering and black pug development. Colluvial scree overlies large areas of Gordon Group stratigraphy and detritus from the steep Cambro-Ordovician hills to the east may significantly dilute Gordon Group detritus in some stream sediment samples.

Several significant Au anomalies were indicated by stream sediment results (up to 0.246 ppm Au). Detailed interpretation of base metal values was not attempted by either CRAE or Aberfoyle. Interpretation is difficult due to the presence of several (geochemically different) lithologies within the catchments of most drainages sampled.

Thirteen regional rock chip samples were collected by CRAE within the Newall Creek Area, and analysed by ALS for Cu Pb Zn (Ag) Fe (As Mn) by ICP, and by CRA for (Pt Pd) Au. A sample of weathered limestone from the Gordon Group (379825mE, 5330650mN) assayed 50 ppm Cu, 165 ppm Pb and 200 ppm Zn. One non-carbonate rock chip sample was collected for geochemical analysis by Aberfoyle. Several non-carbonate rock chip samples were collected for geochemical analysis (plus selected samples for petrological description) by Aberfoyle and CRAE from the King River Power Tunnel within the Newall Creek Area.

Three AMG gridlines (5330549mN, 5329780mN, and 5328875, total 580m), were cut in the east of the Newall Creek area to cross the contact between Cambrian and Ordovician sequences. No record of work undertaken on these lines has been found.

CRAE reinterpreted data from a DIGHEM II (plus airborne magnetic) survey commissioned by RGC in 1982 (EL 9/66). CRAE follow-up of DIGHEM II anomalies included ground (SE-88 GENIE) EM surveys along selected tracks, including one traverse across Gordon Group stratigraphy in the NE of EL 64/94. The location of this traverse and EM profiles are shown on plans TASH 2860, 2844 and 2845. Data from the survey was affected by background noise caused by road works.

Elevated surface conductivity between 1860-2610 was concluded to be the result of surface weathering of Gordon Group limestone. DIGHEM II "Anomaly 22-530" was found to correspond to sphalerite-galena veins in Gordon Group limestone 3 km north of EL 64/94.

*HEC*

*King River Power Station*

Prior to and during construction of the King River Power Station, located at the junction of the King River and Newall Creek, the HEC undertook a detailed geological investigation of the Newall Creek area which is in the NE of the area covered by EL 64/94. This work involved detailed geological mapping, seismic traverses, and diamond drilling. Plans To 1624 and 1625 show the location of work undertaken.

Eleven seismic traverses were undertaken across Gordon Group limestone within the area covered by EL 64/94. Depth to main refractor from traverses across limestone probably indicates depth of weathering and black pug development.

One diamond hole drilled by the HEC (DH6062) intersected Gordon Group limestone. The drill log indicated argillaceous limestone between 17.42 and 21.71m (EOH) overlain by 8m of clay/silt, overlain by unconsolidated sand and gravel. Drill core was not assayed and has been disposed off. The hole was collared at 378735mE 5331525N within the area covered by EL 64/94.