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## EL 5384 AND EL 5387

## PART OF THE PADTHAWAY PROJECT

## JOINT FINAL REPORT TO LICENCES' FULL SURRENDER, FOR THE PERIOD 27/3/2014 TO 26/3/2017

Submitted by
Sherlock Minerals Pty Ltd
2017

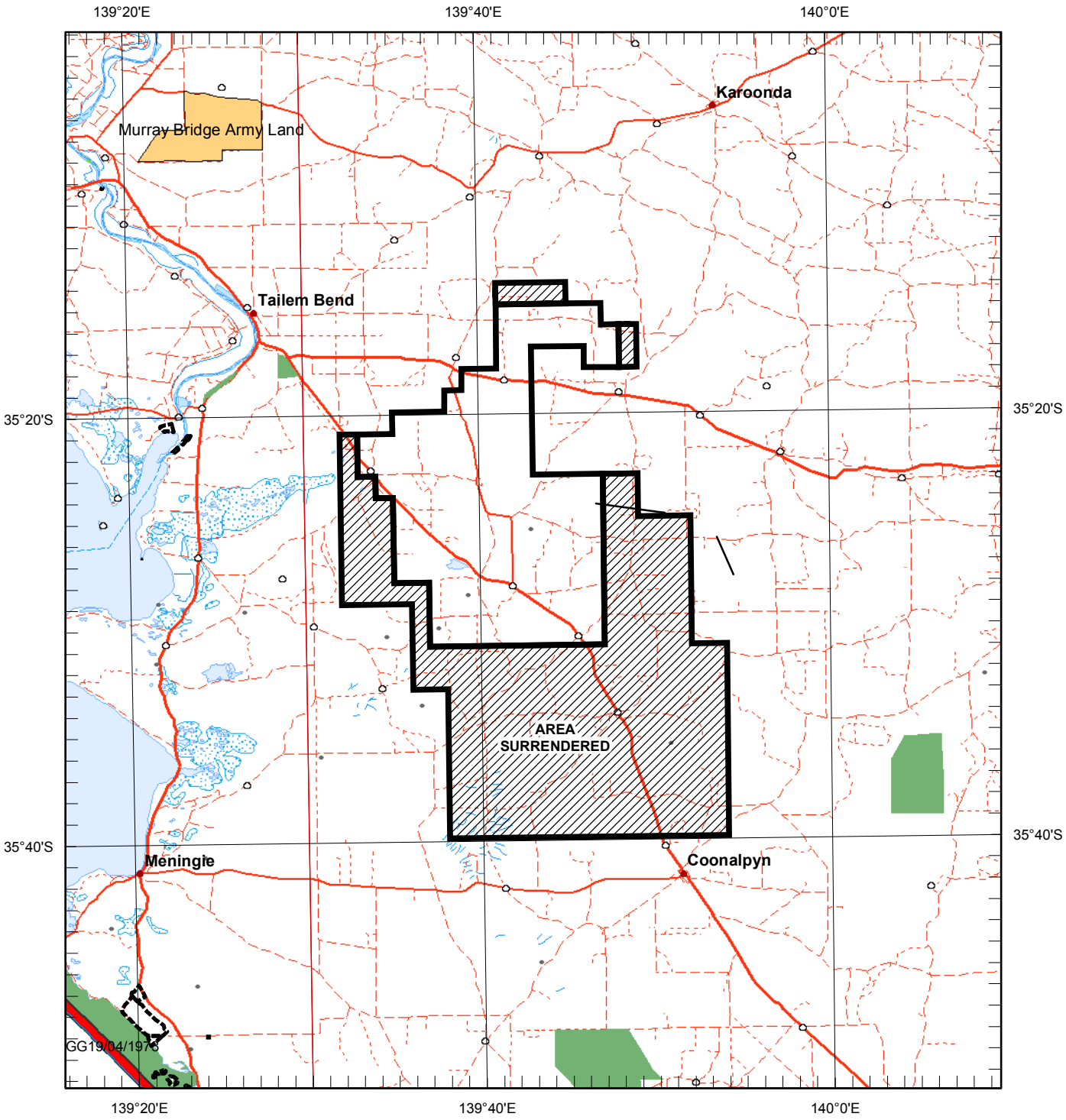


**Enquiries:** Customer Services
Resources and Energy Group
7th Floor
101 Grenfell Street, Adelaide 5000

Telephone: (08) 8463 3000
Facsimile: (08) 8204 1880

Government of South Australia
Department of the Premier and Cabinet

# SCHEDULE A

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Kilometres

GDA
GEOCENTRIC DATUM OF AUSTRALIA

**LICENCE BOUNDARIES IN : DATUM AGD66**

**LOCALITY**


APPLICANT : **SHERLOCK MINERALS PTY LTD**

FILE REF : **2013/00065** TYPE : **MINERAL ONLY**

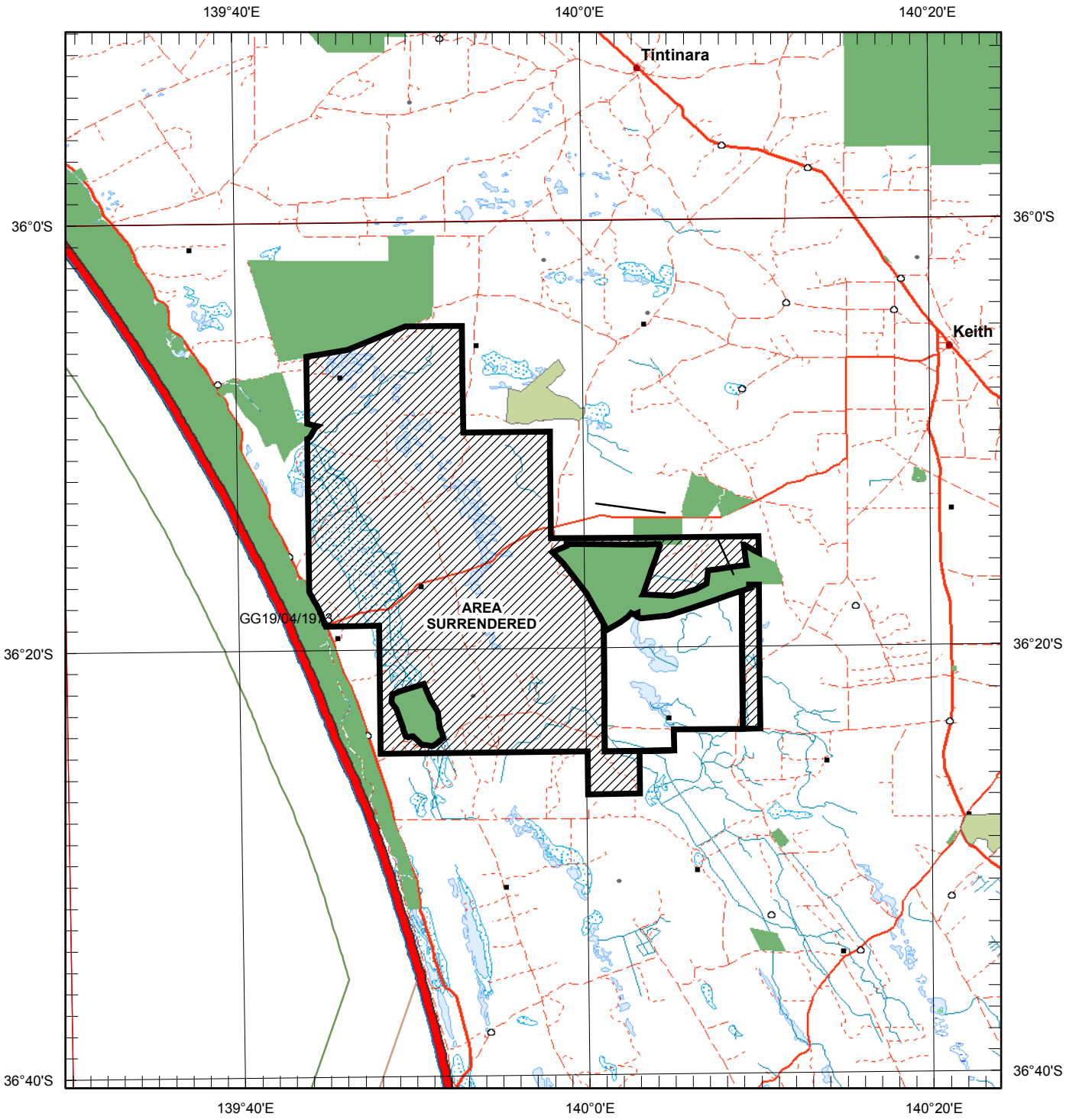
AREA : **406** sq km (approx)

1 : 250 000 MAPSHEETS : **PINNAROO**

LOCALITY : **COOMANDOOK AREA -**
**Approximately 120 km southeast of Adelaide**

DATE GRANTED: **27-Mar-2014** DATE EXPIRED: **26-Mar-2015** EL NO: **5384**

# SCHEDULE A




SCALE 1 : 500 000

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Kilometres

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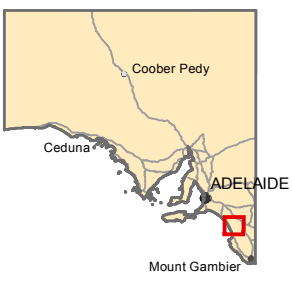
**LICENCE BOUNDARIES IN : DATUM AGD66**

**LOCALITY**




APPLICANT : **SHERLOCK MINERALS PTY LTD**

FILE REF : **2013/00068** TYPE : **MINERAL ONLY**

AREA : **134** sq km (approx)

1 : 250 000 MAPSHEETS : **NARACOORTE**

LOCALITY : **COORONG AREA -**
**Approximately 100 km northwest of Naracoorte**

DATE GRANTED: **27-Mar-2014** DATE EXPIRED: **26-Mar-2015** EL NO: **5387**

ACN 162 743 991

*Sherlock Minerals Ltd*
*C/- 169 Fullarton Rd, Dulwich 5065, South Australia*
*Email: sherlock@sherlockminerals.com.au*

# JOINT FINAL PROJECT REPORT
# FOR
# ELs 5384 & 5387

# PADTHAWAY PROJECT

# SOUTH AUSTRALIA

**For the period 27th March 2014 to 26th March 2017**

**P.W. REID, G.L. ASCOUGH & B.J. VAN DER STELT**
**16TH MAY 2017**

## Abstract

Compilation of existing geological, geochemical and geophysical data indicates the Padthaway area is fertile for volcanogenic massive sulphide (VMS) style mineralisation. VMS terrains typically contain clusters of deposits, however to date no modern systematic regional targeting exploration has occurred in the region. Geophysical targeting work has identified 41 first pass anomalies over the tenement group for ground field follow-up. During the period the Company undertook extensive land access works in three focus areas. A Keilira 35 Km northeast of the township of Kingston, ground magnetic surveys defined 8 targets requiring further follow up. Drill testing of the best 4 targets is proposed in the next year of ground activities along with further surface geophysical survey works over other airborne targets.

On the completion of the first phase of works and due to the protracted down turn in exploration investment which has slowed ground activities, the Company reduced its land holdings to only include the initial ground magnetic targets of interest. As a consequence EL's 5384 and 5387 were surrendered at the end of the current reporting period.

# TABLE OF CONTENTS



# LIST OF FIGURES

## TABLES

Page



## APPENDICES

## 1. INTRODUCTION

The Padthaway Project encompasses four exploration licences (EL 5384, EL 5385, EL 5386, EL 5387) located in south-eastern South Australia (Figure1). Exploration is being undertaken for volcanogenic massive sulphide (VMS) style base metal deposits hosted in Cambrian volcanogenic terrains. In the Padthaway region these units are masked by Tertiary cover which typically ranges between 40 and 100 metres thick.

Historically the cover has been an impediment to exploration and as a result the region has only been lightly explored. In addition much of the cover is electrically conductive, impeding airborne electromagnetics (EM) as a regional first pass targeting tool. New developments however in ground based EM technology (e.g. B-field) will allow Sherlock to see through this conductive cover and to generate drill targets in this terrain.

This document is the third and final annual technical report for EL 5384 & EL 5387 which were surrendered at the end of the 3rd licence year and summarises exploration activities undertaken by Sherlock Minerals on these licences ending 26th March 2017. All maps supplied use the GDA94 map datum.

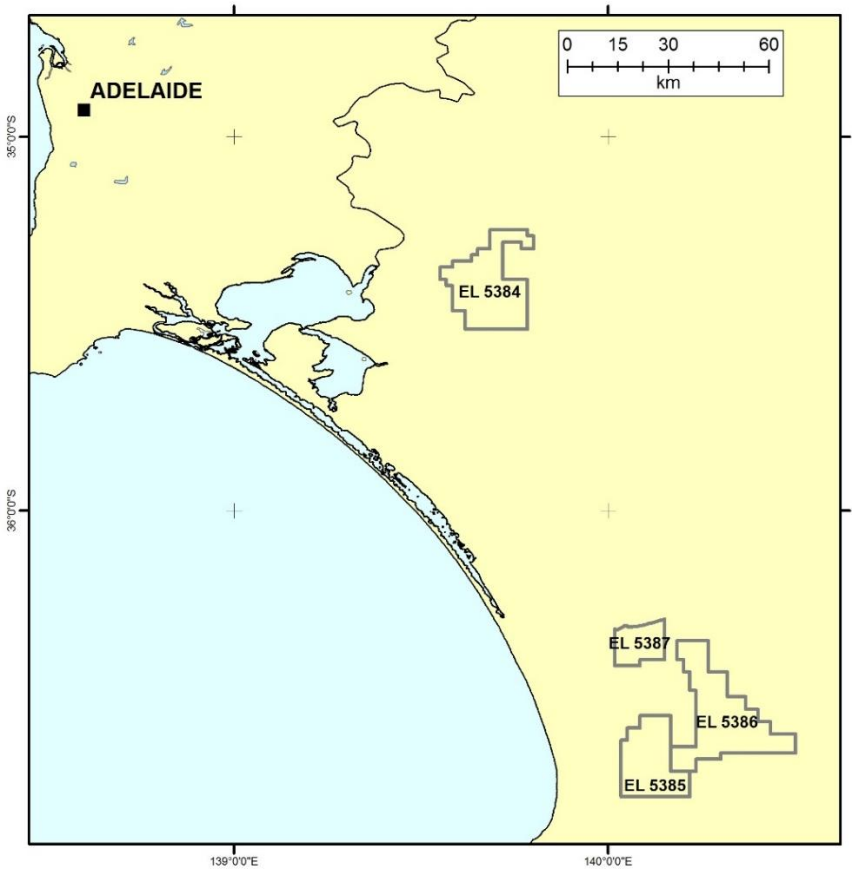



Figure 1: *Padthaway project tenements*.

## 2. TENURE

The Padthaway project is comprised of tenements EL 5384, EL 5385, EL 5386 and EL 5387 which were granted to Sherlock Minerals on 27 March 2014. At initial grant tenure the tenements totalled 3758 $km^2$. After completing preliminary geological work and targeting during the first year, Sherlock made a 65% voluntary reduction to the total project area. At the end of the 3rd reporting year further tenement area reductions were made for EL 5386 and EL5387 and tenements EL 5384 and EL 5387 were surrendered. Tenement details and reduced areas are shown in Figure 2 and Table 1.

Land use for the area is predominantly farming, including a mix of cropping and grazing (sheep and cattle). The region is serviced by good quality roads and tracks, although much of the tenement can only be accessed by station tracks.

| Tenement | Name | Holder | Area ($km^2$) | Grant Date | Expiry Date |
|---|---|---|---|---|---|
| EL 5384 | Coomandook | Sherlock Minerals Pty Ltd | 406 | 27/03/2014 | Surrendered 26/03/2017 |
| EL 5385 | Kingston | Sherlock Minerals Pty Ltd | 160 | 27/03/2014 | 26/03/2021 |
| EL 5386 | Padthaway | Sherlock Minerals Pty Ltd | 44 | 27/03/2014 | 26/03/2021 |
| EL 5387 | Coorong | Sherlock Minerals Pty Ltd | 134 | 27/03/2014 | Surrendered 26/03/2017 |

Table 1: Particulars for Padthaway Project tenements

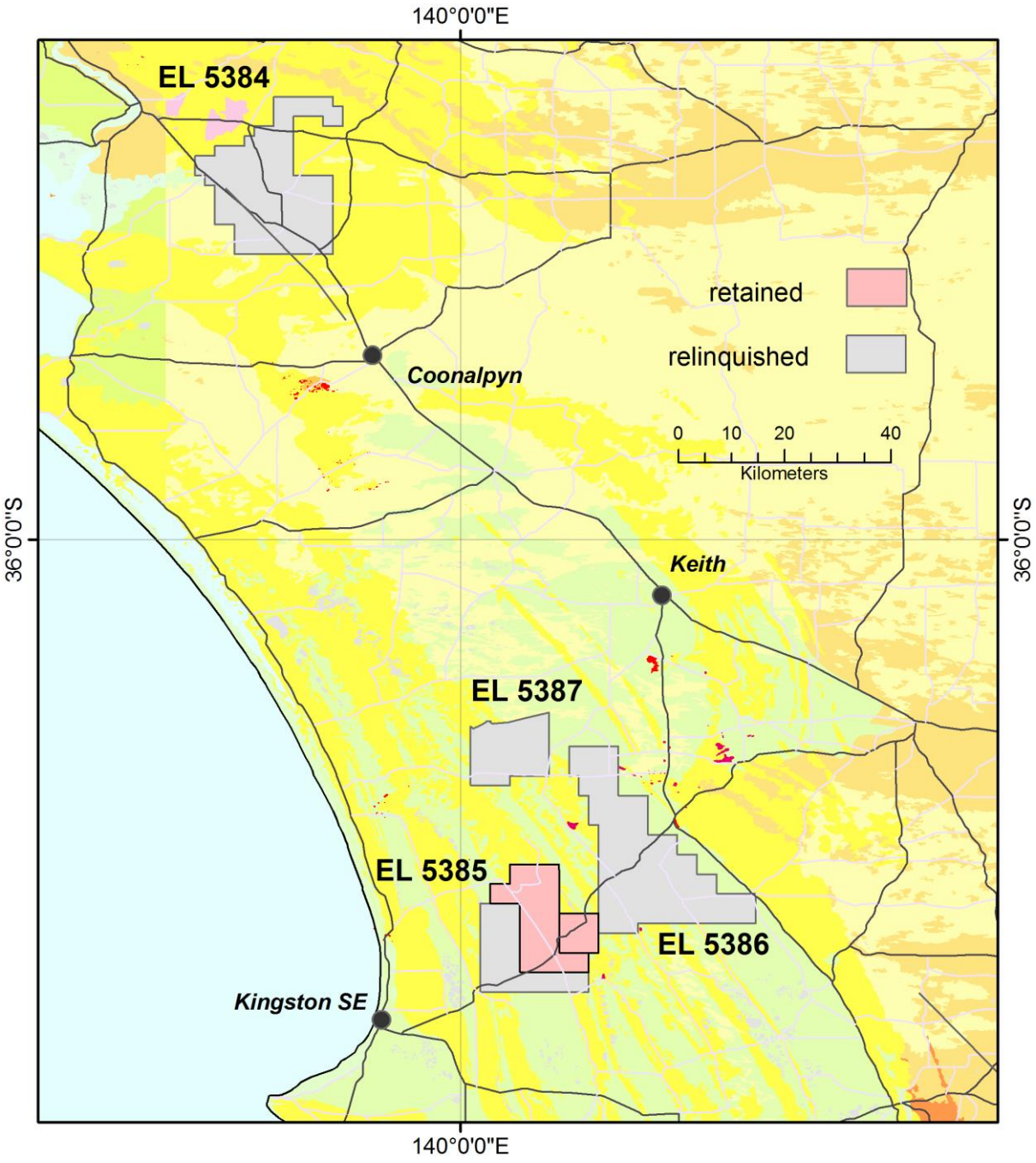



Figure 2: *Padthaway Project tenement reductions*

# 3. SUMMARY OF ACTIVITIES

The Company is searching for poly-metallic volcanogenic massive sulphide style mineralisation in the volcano-sedimentary Kanmantoo Group sequences that underlie shallow Murray Basin Tertiary cover in the Upper Southeast of South Australia. There are two VMS classes currently evident – exhalative style (i.e. Rosebury (TAS.) Pb-Zn-Au and Angus (S.A.) Zn-Pb-Ag and sub-sea floor high sulphidation mineralisation along fault controlled hydrothermal feeder systems (i.e. Mt, Lyell (TAS.) Cu-Au and Kanmantoo (S.A.) Cu-Au).

The Company undertook the following activities during the reporting period:

| Activities | EL 5384 Coomandook | EL 5387 Coorong |
|---|---|---|
| Landholder and stakeholder communications ahead of field activities | ✓ | ✓ |
| Ground magnetic surveys | - | - |
| Geophysical modelling | ✓ | ✓ |

Table 2: Padthaway Project – Summary of activities, year 3

## 3.1 Keywords

Pinnaroo SI 5414 , Naracoorte SJ 5402 , Coomandook, Kingston, copper , zinc, lead, silver, gold, ground magnetic surveys, modelling, Kanmantoo Group, Padthaway Ridge, Cambrian, volcanogenic deposits

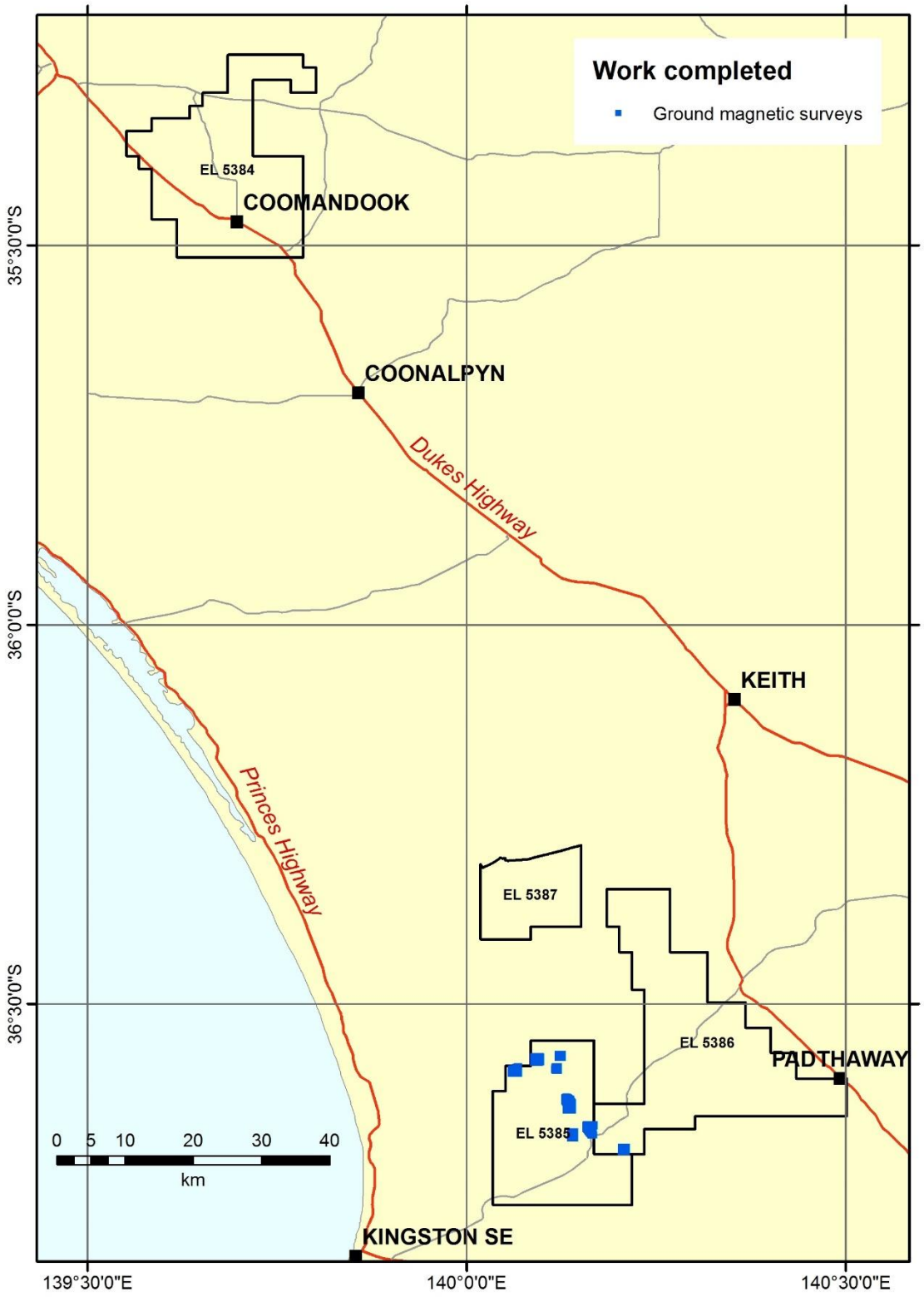



Figure 3: *Exploration Index Map*

## 4. GEOLOGICAL SETTING

Murray Basin sediments, part of a large intra-cratonic fluviatile to shallow marine Tertiary sedimentary basin conceal a northwest-southeast trending, shallowly covered extension of the Kanmantoo Group meta-sedimentary sequence which is granitoid rich along its eastern edge (Figures 4 & 6). The shallowly buried package of strata is termed the Padthaway Ridge. The sequences include extensive bimodal intrusives and extrusives, and may represent the volcanic centre of the belt.

In the project areas, depth to basement ranges from limited outcrop in the southern licences to approximately 150m in the north eastern areas around Coomandook. Average basement cover is 40 metres and 80 metres over the tenement group.

The Cambrian aged Kanmantoo Group is turbidite dominated where it outcrops along the eastern side of the Mt Loft Ranges. These sequences extend along the Padthaway Ridge into Victoria, where they are equivalent to the Cambrian-Ordovician sediments, volcanics and meta-sediments of the Glenelg River Complex and north-eastward into NSW where it is equivalent to the Koonenberry Belt.

The metasedimentary sequences in the Padthaway area differ from the outcropping Kanmantoo Group further west in that they are proximal to volcanic activity and include thick bimodal mafic-ultramafic intrusives and extensive interlayered rhyolitic extrusive volcanic sequences. The eastern edge of this belt is granitoid rich and includes rare outcrops. They comprise Cambro-Ordivician syn to post-tectonic granites and meta-basics.

The Kanmantoo Trough is part of the Stansbury Basin which formed along the eastern Gondwana margin during the Early Cambrian. Turbidite clastic marine sediments where deposited in the rapidly subsiding Back-Arc basin. Changes in plate motion and closures of sutures in the Middle Cambrian resulted in a change from extension to compression along the east Gondwana margin. The resulting deformation and associated metamorphism of the Kanmantoo Group and Adelaide Geosyncline is known as the Delamerian Orogeny.

The rare outcropping siliceous volcanic sequence have been shown to be similar in age, lithology and geochemistry to the Mount Read Volcanics (MRV) of Western Tasmania, which hosts many world class VMS deposits. Where the Kanmantoo Group strata outcrop, base and precious metal VMS style mineralisation has shown to be abundant.

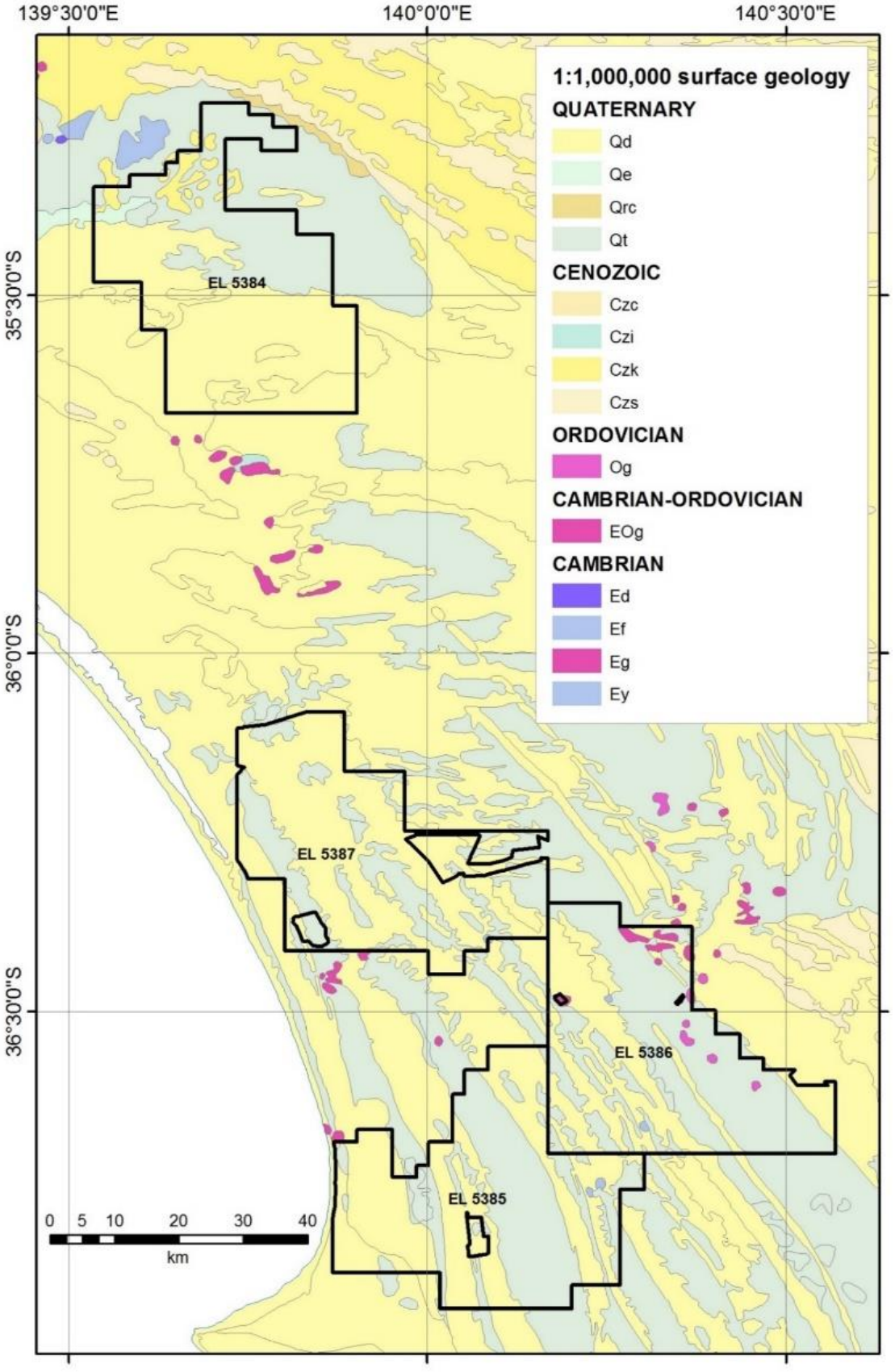



Figure 4: *Padthaway Project surface geology (note: Tenement outline shown before area reduction)*

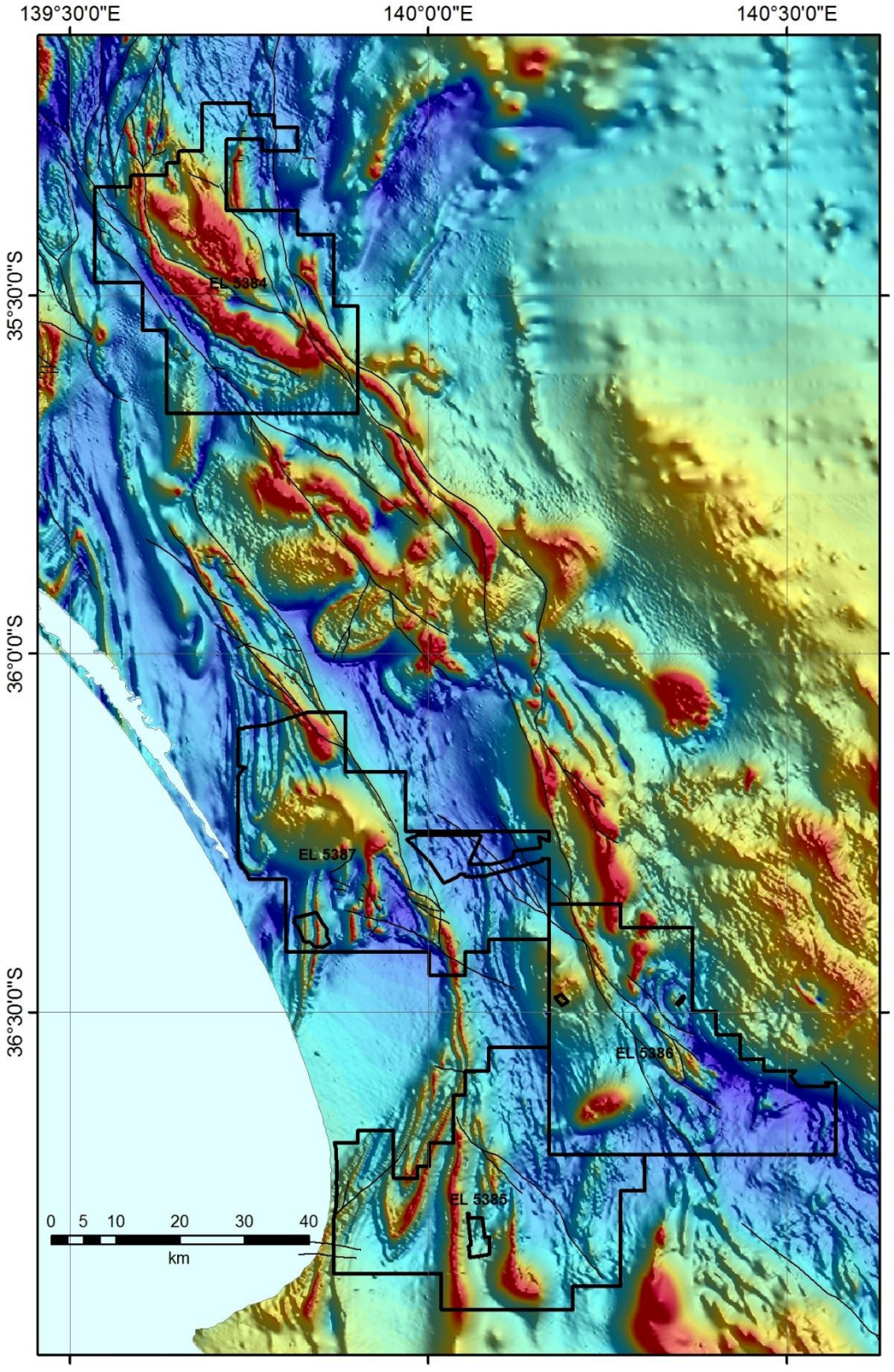



Figure 5: *Padthaway Project Area – Total Magnetic Intensity Image (note: Tenement outline shown before area reduction)*

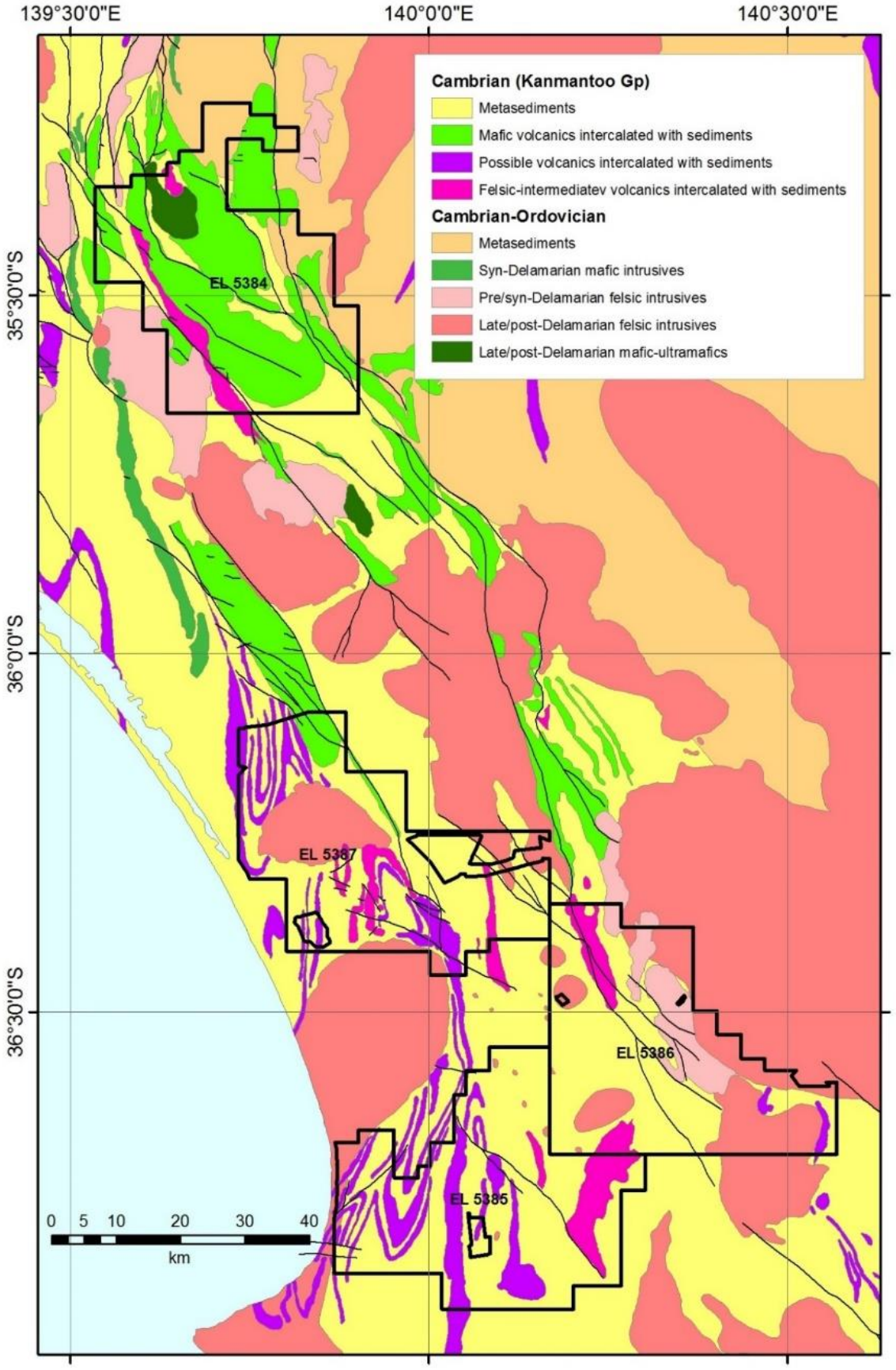



Figure 6: *Padthaway Project basement interpretation (note: Tenement outline shown before area reduction)*

# 5. WORK COMPLETED ON EL 5384 & EL 5387

## 5.1 PREVIOUS WORK

Work undertaken by Sherlock has identified 41 targets within the entire project area (Reid et al, 2015). Work undertaken during 2016 focussed on eight of these targets in the Keilira area (ELs 5385 & 5386), approximately 35 kilometres northeast of the township of Kingston where ground magnetic surveys were completed. Work on EL's 5384 & 5387 has been limited to reconnaissance surveying, landholder negotiations for access and regional targeting based geophysical modelling and interpretation of open file geophysical data. Due to the extensive Tertiary cover, exploration for base metal and gold has been sparse, and Cambrian basement is poorly understood.

A search of government databases indicates that 46 historical exploration tenements coincide with the area currently under tenure (Table 3). Exploration has been undertaken for a wide variety of commodities including gold, base metals, nickel, platinum group elements, uranium, mineral sands and coal.

Highlights for exploration of basement-hosted mineralisation are summarised below. Selected company report abstracts are provided in Appendix 1.

| TENEMENT | LICENSEE/OPERATOR | GRANTED | EXPIRY | ENVELOPE | COMMODITY | WORK COMPLETED |
|---|---|---|---|---|---|---|
| SML 198 | North Broken Hill Ltd | 17/6/1968 | 31/3/1969 | 1048 | Base metals | Geochemical sampling through cover ineffective |
| SML 303 | North Broken Hill Ltd | 12/5/1969 | 11/5/1970 | 1154 | Base metals | Geochemical sampling through cover ineffective |
| SML 435 | Abadon Holdings NL | 18/6/1970 | 17/6/1971 | 1411 | Molybdenum, tungsten | Mapping of granitoids |
| SML 540 | Abadon Holdings NL | 4/2/1971 | 3/2/1972 | 1581 | Molybdenum, tungsten | Mapping, geochemical sampling, ground magnetic surveys, auger drilling |
| SML 541 | Abadon Holdings NL | 4/2/1971 | 3/8/1971 | 1581 | Molybdenum, tungsten | Mapping, geochemical sampling, ground magnetic surveys, auger drilling |
| SML 650 | Pacminex Pty Ltd | 9/12/1971 | 8/12/1972 | 1869, 2032 | Uranium | Airborne radiometric surveys, drilling (outside EL) |
| SML 693 | Pacminex Pty Ltd | 27/4/1972 | 26/10/1972 | 3029 | Uranium | Airborne radiometric surveys, drilling (outside EL) |
| EL 169 | Jennings Mining Ltd | 20/1/1975 | 19/7/1975 | 2518 | Mineral sands | Mapping, surface sampling, auger drilling |
| EL 194 | Carpentaria Gold Pty Ltd | 26/5/1975 | 19/8/1975 | 2577 | Mineral sands | Magnetic modelling, surface sampling |
| EL 403 | Theiss Bros Pty Ltd | 7/6/1978 | 6/6/1980 | 3317 | Base metals, coal | Groundmag, gravity, resistivity surveys, drilling |
| EL 426 | BHP Billiton Nickel West Pty Ltd | 3/11/1978 | 2/11/1980 | 3383 | Coal | |
| EL 518 | BHP Billiton Nickel West Pty Ltd | 21/8/1979 | 20/8/1981 | 3383, 3624 | Coal | |
| EL 569 | BHP Billiton Nickel West Pty Ltd | 10/1/1980 | 9/1/1982 | 3383 | Coal | |
| EL 596 | BHP Billiton Nickel West Pty Ltd | 29/2/1980 | 28/2/1982 | 3383 | Coal | |
| EL 662 | Rio Tinto Exploration Pty Limited | 7/7/1980 | 6/7/1982 | 3957, 4254, 4783 | Coal, diamonds, base metals | Airborne geophysics, drilling |
| EL 669 | Rio Tinto Exploration Pty Limited | 7/7/1980 | 6/7/1982 | 3957, 4254, 4783 | Coal, diamonds, base metals | Airborne geophysics, drilling |
| EL 707 | Theiss Bros Pty Ltd | 27/8/1980 | 26/8/1981 | 3317 | Base metals, coal | Groundmag, gravity, resistivity surveys, drilling |
| EL 791 | BHP Billiton Nickel West Pty Ltd | 12/2/1981 | 15/12/1982 | 3383, 4795 | Coal | EOH basement samples returned no significant mineralisation |
| EL 907 | BHP Billiton Nickel West Pty Ltd | 19/10/1981 | 18/10/1982 | 3383, 4795 | Coal | EOH basement samples returned no significant mineralisation |
| EL 908 | CSR Ltd | 19/10/1981 | 18/10/1983 | 3317, 3962 | Base metals, coal | Reprocess & interp mag |
| EL 976 | BHP Billiton Nickel West Pty Ltd | 18/3/1982 | 15/12/1982 | 3383, 4795 | Coal | EOH basement samples returned no significant mineralisation |
| EL 984 | BHP Billiton Nickel West Pty Ltd | 29/3/1982 | 15/12/1982 | 3383, 4795 | Coal | EOH basement samples returned no significant mineralisation |
| EL 1093 | BHP Billiton Nickel West Pty Ltd | 20/12/1982 | 19/12/1987 | 3383, 6769 | Coal | EOH basement samples returned no significant mineralisation |
| EL 1213 | CSR Ltd | 5/1/1984 | 19/9/1985 | 3317 | Gold, base metals | Geophysical interp, groundmag, drilling |
| EL 1468 | BHP Billiton Nickel West Pty Ltd | 23/2/1988 | 22/2/1993 | 8056, 8418 | Coal | |
| EL 1628 | Olliver Geological Services Pty Ltd | 22/12/1989 | 21/12/1991 | 8281 | Gypsum | |
| EL 1874 | North Mining Ltd | 18/10/1993 | 17/10/1997 | 8941 | Gold, base metals | Surface sampling, groundmag, drilling |

| | | | | | | |
|---|---|---|---|---|---|---|
| EL 1998 | Pecan Holdings Pty Ltd (50%); Carnegie Minerals Nl (50%) | 18/8/1994 | 17/8/1996 | 8947 | Gold, base metals | Geophysical interp, groundmag, drilling |
| EL 2039 | Pasminco Australia Ltd | 16/12/1994 | 15/6/1998 | 9016 | Gold, base metals | Groundmag, gravity surveys, drilling |
| EL 2040 | Pasminco Australia Ltd | 16/12/1994 | 15/6/1998 | 9014 | Gold, base metals | Groundmag, gravity surveys, drilling |
| EL 2041 | Pasminco Australia Ltd | 16/12/1994 | 15/6/1998 | 9015 | Gold, base metals | Groundmag, drilling, surface and downhole EM |
| EL 2607 | Newmont Minerals Pty Ltd | 16/6/1999 | 15/6/2001 | 9721 | Copper-gold | Drilling |
| EL 2612 | Newmont Minerals Pty Ltd | 16/6/1999 | 15/6/2001 | 9721 | Copper-gold | Drilling |
| EL 2625 | Normandy Gold Exploration Pty Ltd | 26/7/1999 | 25/7/2004 | 9667 | Copper-gold | Groundmag, drilling |
| EL 2655 | Red Metal Ltd | 14/10/1999 | 13/10/2004 | 9845 | Copper-nickel-PGE | Geophysical interp, drilling |
| EL 2890 | Santexco Pty Ltd | 14/2/2002 | 13/2/2003 | | All Minerals | No work undertaken |
| EL 3013 | Rosscraft Minerals Pty Ltd, UXA Resources Limited | 23/9/2002 | 22/9/2007 | 10122 | Base metals, gold | Surface sampling, groundmag, gravity, TEM, drilling |
| EL 3106 | Southwestern Mining Company Pty Ltd | 4/7/2003 | 3/7/2005 | 10804 | Base metals, gold | Interpretation, targeting |
| EL 3295 | Vintage Exploration and Mining Pty Ltd; Red Metal Limited | 18/1/2005 | 17/1/2009 | 9845, 11048 | Copper-nickel-PGE | Geophysical interp, drilling |
| EL 3371 | BHP Billiton Minerals Pty Ltd | 8/7/2005 | 7/7/2006 | 11067 | Base & Precious Metals | No work undertaken |
| EL 3635 | Red Metal Limited (95%); Vintage Exploration and Mining Pty Ltd (5%) | 16/10/2006 | 15/10/2008 | 11492 | Copper-nickel-PGE | Geophysical interp, drilling |
| EL 3870 | Red Metal Limited | 30/7/2007 | 29/7/2010 | 11628 | Base metals, gold | No work undertaken |
| EL 3881 | Capital Mining Limited | 6/8/2007 | 5/8/2010 | 11666, 11989 | Base metals, gold, uranium | Processing & interp of satellite data |
| EL 3953 | Rosscraft Minerals Pty Ltd | 10/10/2007 | 9/10/2008 | 10122 | Base metals, gold | Surface sampling, groundmag, gravity, TEM, drilling |
| EL 4038 | South East Energy Limited | 30/1/2008 | 29/1/2010 | 11854 | Uranium, heavy minerals | Relogging old core, roadside drilling |
| EL 4055 | South East Energy Limited | 25/2/2008 | 24/2/2010 | 11854 | Uranium, heavy minerals | Relogging old core, roadside drilling |

Table 3: Summary of historic exploration licences

During the late 1960's BHPB (then North Broken Hill Limited) became the first company in the Padthaway region to utilise modern exploration techniques for blind deposits. Exploring on Special Mining Lease (SML) 198, and then SML 303, they attempted an experimental geochemical technique utilising low detection mercury analysis in an attempt to identify a mineralisation halo through sedimentary cover rocks. Over 8000 soil samples were collected to identify and to follow-up 50 anomalous areas. Unfortunately, follow-up of anomalous area indicated that many of the identified mercury highs were not persistent, and it was eventually concluded that the sandy soils in the area were not appropriate for the analytical technique.

From mid-1970 to mid-1971 Abadon Holdings undertook a brief program to explore for granite hosted molybdenum and tungsten over the southern part of the Padthaway Project area (SMLs 435, 540 & 541). A bedrock auger sampling program and ground magnetic surveys in conjunction with surface mapping were completed in an attempt to characterise various intrusions but results were not encouraging and no targets were generated. Minor fluorite-chalcopyrite-molybdenite mineralisation associated with hydrolytic alteration of outcropping rhyolite at Minecrow was not considered significant.

Subsequent exploration in the region focussed on exploration for uranium (Pacminex Pty Ltd), mineral sands (Jennings Mining, Carpentaria Gold) and coal (BHPB, operating as Western Mining Corporation) in cover sequence rocks until Thiess Brothers began exploration for basement hosted base metal mineralisation in mid-1978 (ELs 403 & 707). After undertaking an interpretation of regional airborne and gravity data they conducted 70 line-km of ground magnetic and gravity surveys plus 38 line km of resistivity soundings, mainly over Sherlock's EL 5384. Eight holes (RH1-RH8) drilled within EL 5384 intersected un-mineralised basement including basic to intermediated intrusives and volcanics. From the end of 1980 CSR Ltd took over the tenement ownership (ELs 707, 908 and 1213) and concentrated on following up brown coal which had been intersected in drill hole RH6, and no further base metal exploration was undertaken until 1984. 873 line km of airborne magnetic and radiometric data was flown (300m line-spaced) with ground magnetic follow up and rotary-mud/diamond drilling. Nine holes (Y1-Y9) were drilled in 1985, eight reaching basement. A variety of igneous intrusives and extrusives were logged, including andesite, basalt and diorite, most displaying some degree of chlorite or chlorite-epidote alteration. No significant base metal analyses or sulphides were reported and the tenement was relinquished in September 1985.

Also in the region of EL 5384 Rio Tinto Exploration (then CRA) undertook a broad ranging exploration program including coal, diamonds and base metals on partly adjoining tenements EL 662 & EL 669. Exploration was conducted for two years from mid-1980, and included regional airborne geophysical surveys followed by rotary mud drilling, including two holes within the Padthaway Project. Drill hole 81MBR3 intersected barren quartzite at 66m depth, and hole 81MBR8 intersected a similar unit at 192m (although the basement cuttings for this hole do not appear to have been geochemically analysed).

BHP (then Western Mining Corp) undertook an extensive program of exploration and evaluation of coal deposits in the region between 1978 and 1993. Thirteen coal exploration holes were drilled within EL 5385 (SE- series) with most reaching basement, however no mineralisation or alteration was reported.

In the mid-1990's the South Australian Government embarked on a series of initiatives to increase mineral exploration in South Australia. In the Padthaway region this included flying large-scale aeromagnetic and radiometric surveys, completing ground magnetic and gravity traverses and undertaking scout roadside drilling programs to characterise basement geology. In 1994 the Department of Mines and Energy drilled 31 reverse circulation holes in this program (MOO- series), 27 within EL 5384. Drill hole MOO24, approximately 5km outside of the boundaries of EL 5384, intersected significant mineralisation: 14m @ 0.6% Cu from 72m (inc. 2@ 0.9%) and 17m @ 0.3% Zn from 72m (inc.2m @ 0.9%) at what has come to be known as the Sherlock Prospect. Zoned carbonate spherules in the mineralised meta-limestone were said to compare to those in VMS deposits such as Rosebery and Hercules (Tasmanian) and Thalanga (Queensland). The results of the drilling and geophysical surveys led to a significant increase in gold and base metal exploration in the southeast.

Between 1993 and 1998 Pasminco Exploration, along with various joint venture partners (ELs 1874, 1998, 2039, 2041 and 2041), undertook a broad scale exploration program for gold and base metals over the majority of Sherlock's Padthaway Project holdings. Work undertaken included geophysical interpretations, surface sampling, ground magnetic and gravity surveys, drilling and surface and downhole EM surveys. 32 holes were drilled within Sherlock's tenements (COP-, KIN-, KTH-, MTR- & SHR- series), although none of them intersected significant mineralisation. Pasminco also undertook follow-up drilling at the Sherlock Prospect and intersected (SHR-07) 8m @ 0.8% Cu, 0.2% Zn from 74m (including 4m Cu @ 1.3%) and (SHR-08) 2m @ 1.7% Zn, 0.8% Pb, 24 g/t Ag from 91.5m and 1m @ 6.1% Cu, 0.6% Zn from 101m.

Following Pasminco's departure, Normandy Gold (now Newmont Minerals) picked up or farmed-in to much of the area to explore for copper-gold mineralisation (ELs 2607, 2612 & 2625). From mid-1999 to mid-2004 they undertook ground-magnetic surveys and drilling, including 2 rotary-mud/diamond drill holes within EL 5387. Drill hole PADD32 intersected porphyritic granodiorite and metasomatised skarn from 69m. Drill hole PADD33 intersected chlorite altered basalt from 108.9m. No significant assays were reported.

Concurrent to Normandy's work, Vintage Exploration (later joined by Red Metal Limited) was exploring the southern part of Sherlock's EL 5384 for mafic-ultramafic hosted nickel-PGE mineralisation (ELs 2655, 3295 & 3635). After completing data compilation and geophysical interpretations they were awarded government co-funding to drill a large magnetic anomaly known as the Kiki Prospect in 2005. Drill hole KK01 intersected basement comprising unaltered amygdaloidal basalt at 144m. Drill hole KK02 intersected layered ultramafic and amphibolite with visible pentlandite, confirming their interpretations. Subsequent detailed gravity surveys were used to identify additional drill targets and resulted in three rotary-mud/diamond holes being drilled within EL 5384. Drill hole KKD-07-03 intersected quartz-chlorite-biotite schist passing in to highly sheared talc-chlorite schist and then highly sheared quartz-muscovite-biotite metasediments containing abundant disseminated and sheared pyrrhotite. Drill hole KKD-07-04 intersected quartz-biotite-chlorite ± graphitic metasediments with up to 3% pyrite. Drill hole KKD-07-04 intersected interbedded shale and amphibolite, banded metasediments and talc-chlorite schist. No significant mineralisation was reported and due to the lack of significantly dense lithologies it was concluded that none of the holes could explain the residual gravity feature targeted. The tenements were subsequently allowed to expire with no further work undertaken.

Between September 2002 and October 2008 Rosscraft Minerals held ELs 3013 and 3953 which substantially covered Sherlock's EL 5386. Exploring for VMS style mineralisation they undertook surface sampling, magnetic, TEM and gravity geophysical surveys. No targets were generated within the Sherlock Padthaway Project area.

Subsequent company exploration in the project area has been restricted to interpretation of geophysical and satellite data and no significant field operations have been undertaken.

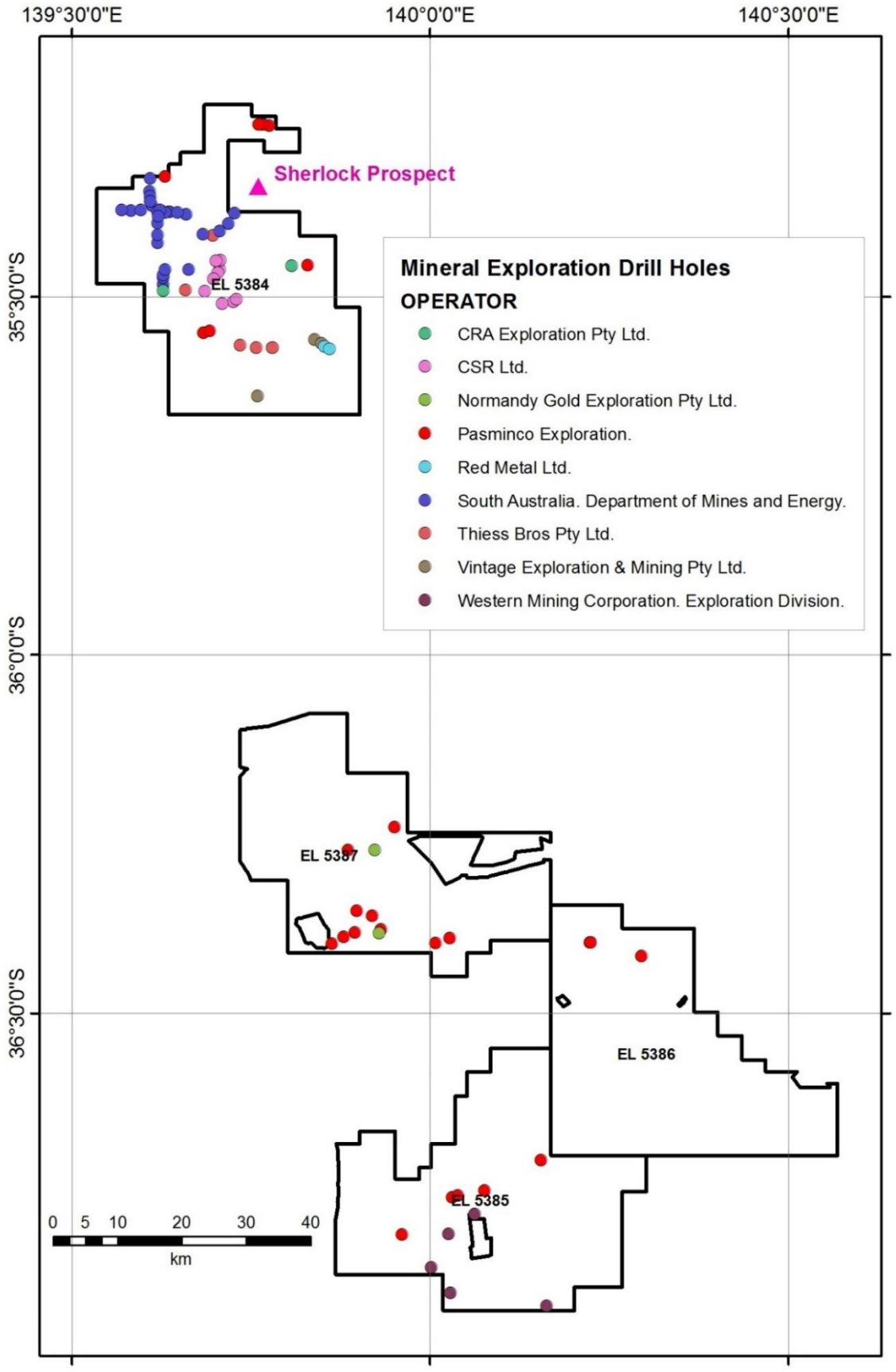



Figure 7: *Historical mineral exploration drill holes (note: Tenement outline shown before area reduction)*

## 5.2 Review of mineralisation model

Principal target mineralisation styles are syn-genetic exhalite style mineralisation (i.e. Angas Pb-Zn-Pb-Ag-Au Mine) which occurred during tectono-rift extension and associated volcanism, with modification and/or remobilisation during Delamerian shortening. Other styles of mineralisation may be related to sub-sea floor high sulphidation events along extensional fault controlled hydrothermal feeder systems or vents (i.e. Kanmantoo Cu-Au mine), and related to intrusive heat sources. These two styles of VMS mineralisation occur in the world-class metallogenic, Mt Read Volcanic Belt (MRV) of Western Tasmania.

The MRV has been a significant producer of base metals, hosting 5 major deposits with accumulated resources of > 350 Mt of ore (McNeill, 2013). The deposit classes are ascribed as volcanogenic hosted massive sulphides (VHMS), however there is a fundamental metallogenic divide within the MRV either side of the Henty Fault. To the northwest polymetallic exhalative VHMS Zn-Pb-Au-Ag-Cu massive sulphide deposits dominate (Hellyer, Que River, Rosebery, Hercules). Southeast of the Henty fault, disseminated copper-gold and gold deposits dominate, exemplified by the Mt Lyell field and the Henty gold deposit respectively. Research into the Mt Lyell field (i.e. Huston et al 2000) demonstrated that the deposit style was a deeper level, higher temperature, high sulphidation deposit with a clearly discernible alteration halo. There is evidence of a close magmatic source for the heat driving the metallogenic event.

## 5.3 Geophysical assessment

As part of historical compilation of geological and geophysical data, work was undertaken to determine geophysical characteristics of known mineralisation in the Kanmantoo Group and determine the applicability of various geophysical methods for future exploration. The outcropping Angas Pb-Zn-Pb-Ag-Au and Kanmantoo Cu-Au mines of the eastern Adelaide Hills along with the covered Sherlock Cu-Zn-Pb-Ag-Au Prospect on the Padthway Ridge were the key mineralised areas assessed.

### 5.3.1 Magnetics

Mineralisation is weakly to moderately magnetic or spatially linked to magnetic alteration units. With exhalite forms (i.e. Angus) the ore itself is only weakly magnetic with minor pyrrhotite but is closely linked to magnetic alteration units (i.e. thin BIF and other magnetite bearing units proximal to the

ore). These magnetic anomalies are discontinuous showing strata bound to slightly discordant structural form and whilst subtle can be found within the essentially non-magnetic meta-sedimentary packages (Figure 8) with appropriate processing.

Both the Kanmantoo Mine and the Sherlock Prospect ore is moderately magnetic due to anomalous concentrations of pyrrhotite (Figures 8 & 9) with magnetite veins also present in part with the ore itself. In the case of Kanmantoo the ore is highly discordant with bedding, demonstrating the pipe like alteration along structures/vent feeders. The Sherlock Prospect was first discovered after mines department reconnaissance drilling targeted a small discrete magnetic anomaly associated with a broader gravity anomaly (Figure 9). Subsequent work undertaken by Pasminco in the mid 1990's at Sherlock Prospect recognised the ore shoots are highly magnetic and that ground magnetics is a useful targeting tool.

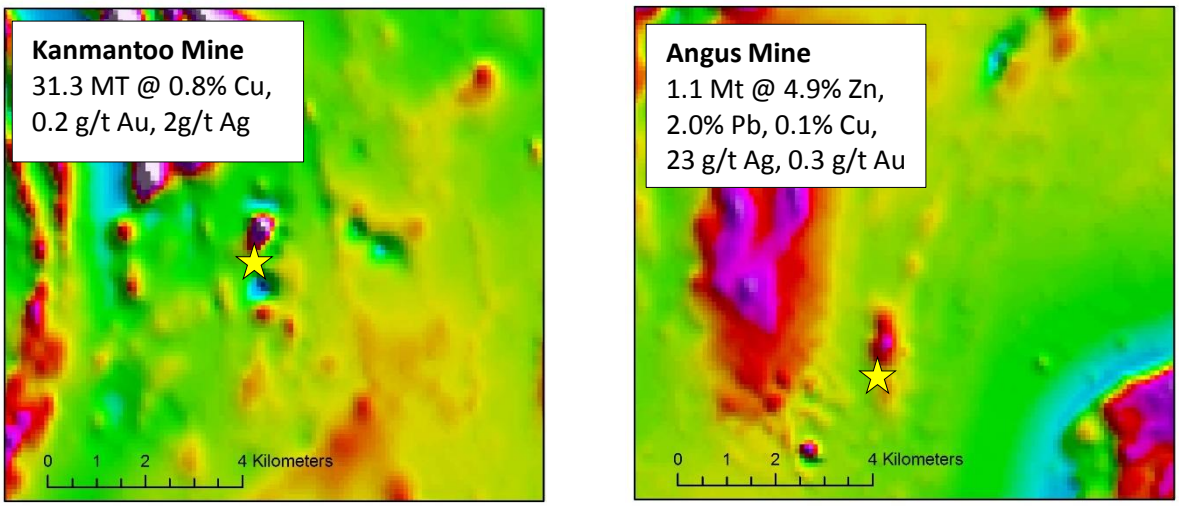



Figure 8: *Reduced to pole residual aeromagnetic images over the Kanmantoo and Angus Mines highlighting discrete magnetic targets within the metasedimentary package associated with mineralisation.*

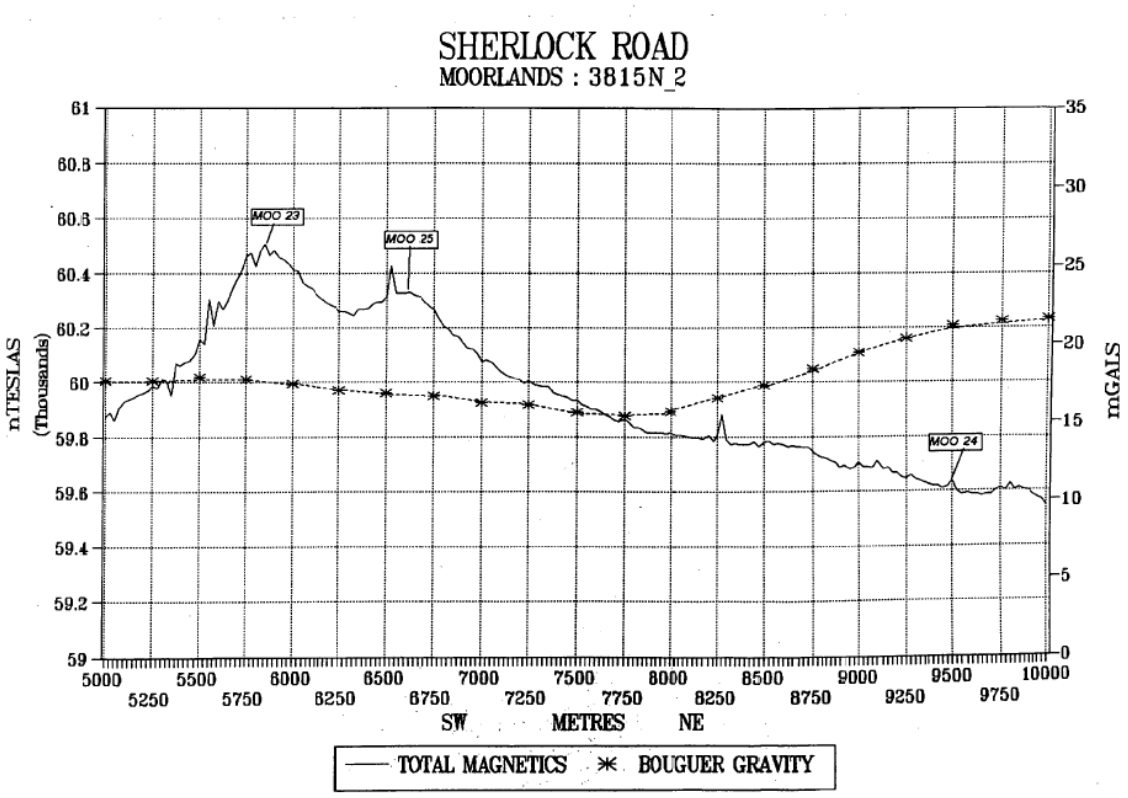



Figure 9: *Magnetic and gravity profile over Sherlock Prospect (Hill 1995). Copper and zinc mineralisation was intersected in MOO24 hosted within a para-amphibolite and is rich in pyrrhotite. Note small magnetic anomaly directing targeting the ore. MOO24 – returned 14m @ .62% Cu from 72m, inc. 2m @ 0.93% Cu & 17m @ 0.28% Zn from 72m, inc. 2m @ 0.94%)*

Regional State Government Survey aeromagnetic data (1994 SAEI Survey B22 – 400m EW lines, 80m flight height) was reprocessed to produce a reduced to pole residual magnetic image. This data was used to help identify subtle to moderated magnetic responses which characterise known mineralisation and then used to identify new targets with a similar magnetic signature. In all, 41 first pass anomalies have been located over the tenement group.

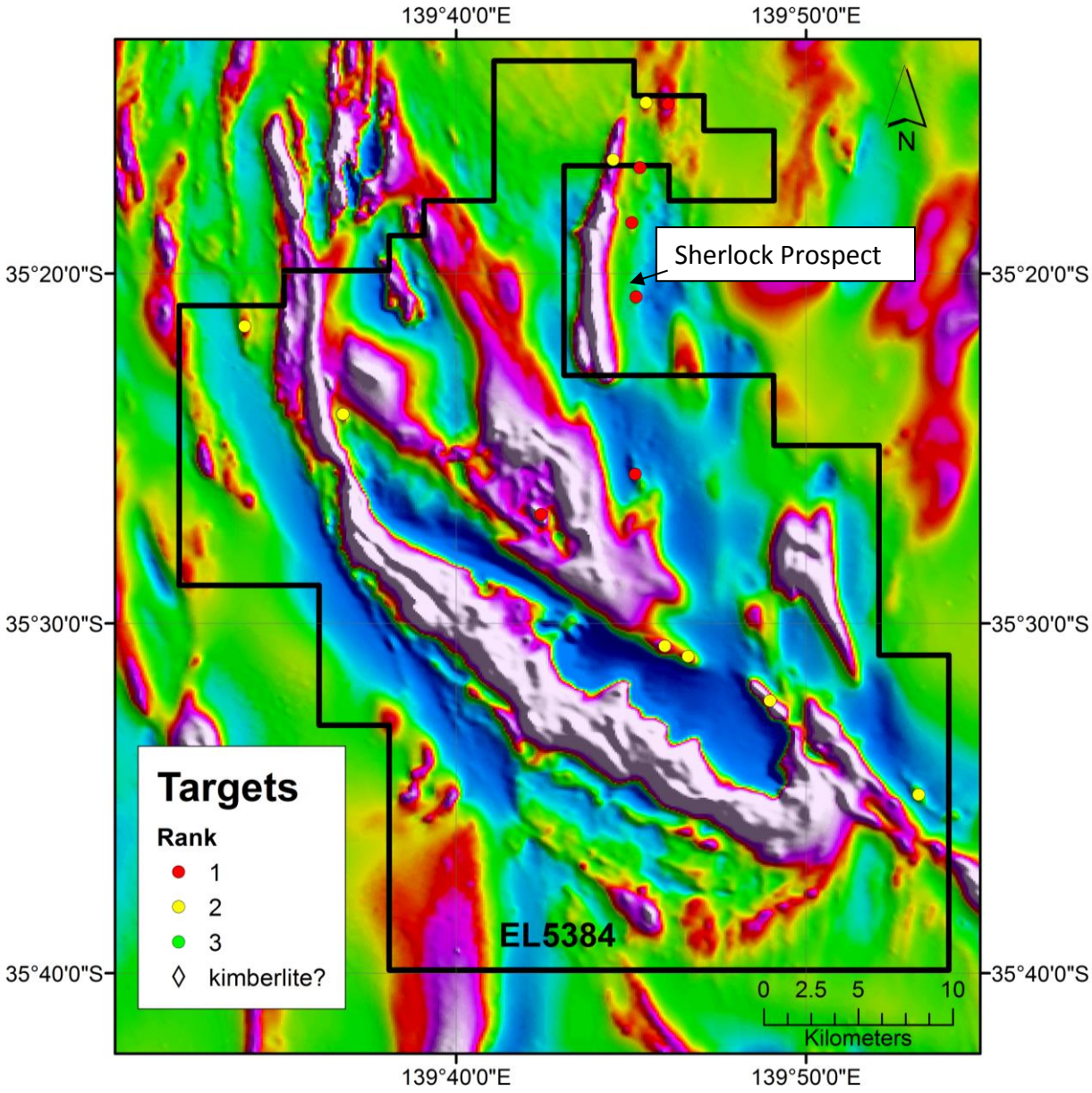



Figure 10: *Magnetic Targets with VMS like magnetic response (note: Tenement outline shown before area reduction)*

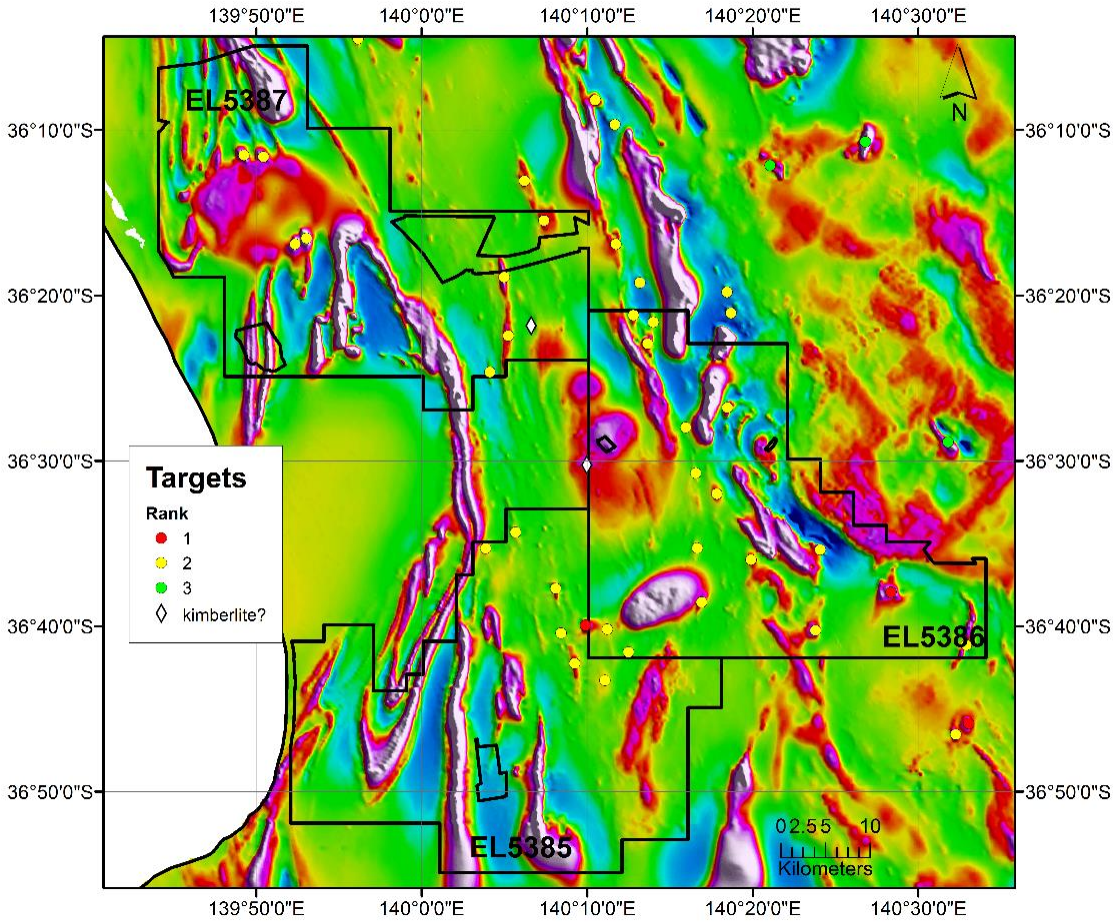



Figure 11: Magnetic Targets with VMS like magnetic response. *(note: Tenement outline shown before area reduction)*

### 5.3.2 Gravity

Limited ground gravity has been historically undertaken. Mineralised zones are associated with garnet sandstone and garnet schist. At the Sherlock prospect as well as garnet, numerous mafic igneous units occur with the ore. The prospective lode sequences have been shown to produce local gravity highs. Regional gravity surveys would be useful to identify prospective lode zones and basement fault architecture to help identify main extensional faults zones, particularly where intersecting conjugate transfer faults occur, that may localise mineralisation. Close spaced ground gravity (i.e. 25m to 50m spacing) could be considered over these gravity targets to directly target mineralised pods. Forward modelling suggests anomalies are likely to be subtle (0.2 to 1 Mgal).

### 5.3.3 Electromagnetic (EM) Surveys

Analysis of historical open file fixed and in-loop ground EM survey results from the Sherlock Prospect was undertaken. The results indicate that airborne EM methods would be largely ineffective in the area if the cover is persistent throughout (~80m thick with low resistivities of 1 to 5 ohm-m). Modern day ground EM systems may be able to map a very conductive (pyrrhotite rich) target beneath the cover but it's unlikely that VTEM or HeliTEM would have much success. It is recommended that airborne surveys may only be applicable on areas of thin (<20m) cover to ensure the potential for success.

Ground EM survey methods have far greater depth penetration are recommended over airborne surveys. Trialing of modern B-field ground EM system is recommended, which has proved successful in penetrating through conductive cover to detect any significant basement conductors. In the southern lease areas basement is often shallower, and review of ground EM traverses undertaken by CRA as part of their lignite exploration program in the early 1980's demonstrated some good late time basement EM responses, indicating ground EM will work on the southern leases.

## 5.4 Geochemical Targeting

Open file historical geochemical data from existing drill holes were compiled into GIS format as a means of characterizing basement fertility and to locate anomalous areas for follow-up. Anomalous Cu, Zn and Pb maps are presented in Figures 12 and 13 draped over the regional aeromagnetic data. Several areas and structures of interest have been identified for follow-up work.

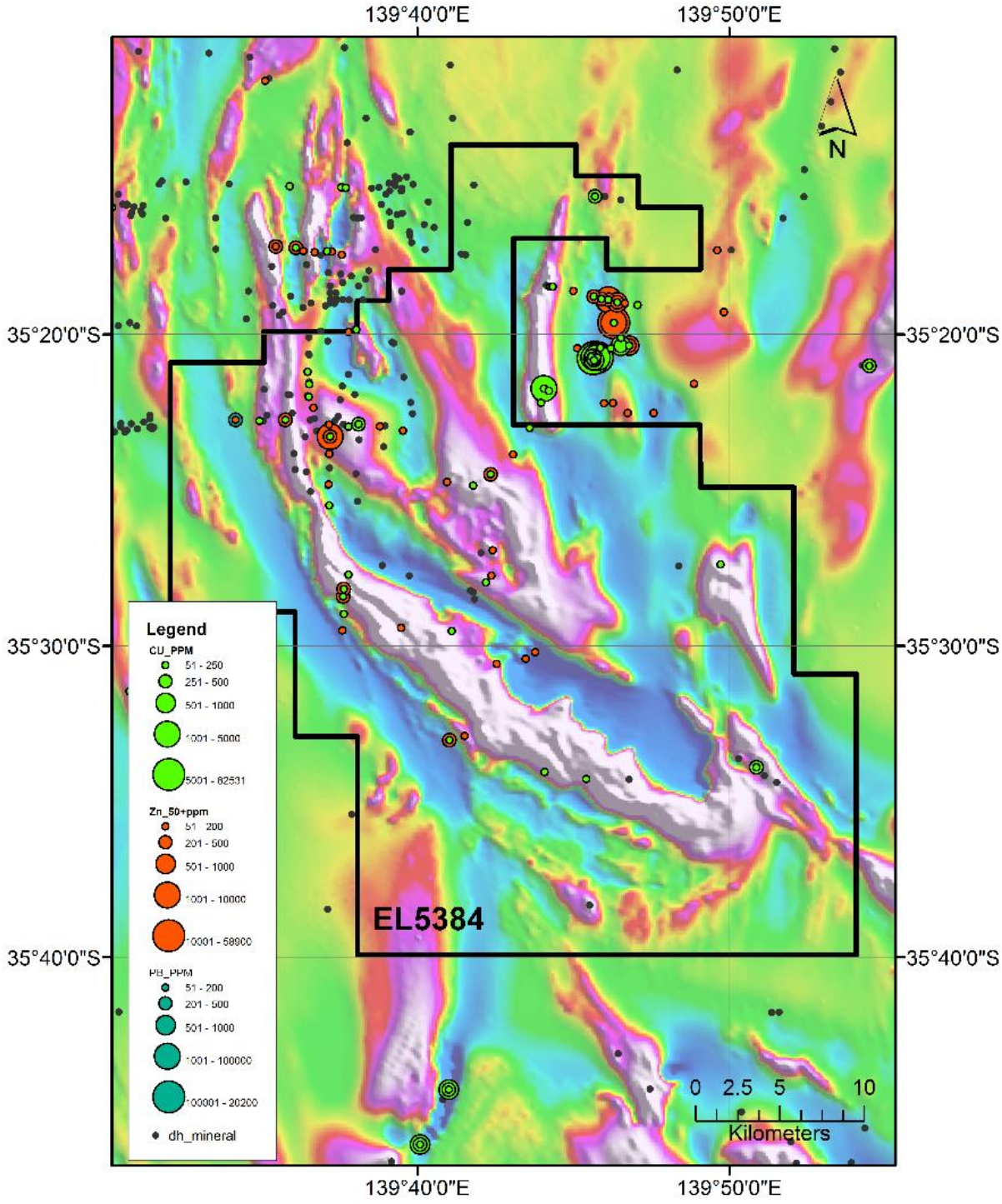



Figure 12: *Anomalous Cu-Zn-Pb recorded on EL 5384 (Coomandook) from basement drill chips overlying a RTP Residual Aeromagnetic Image.*

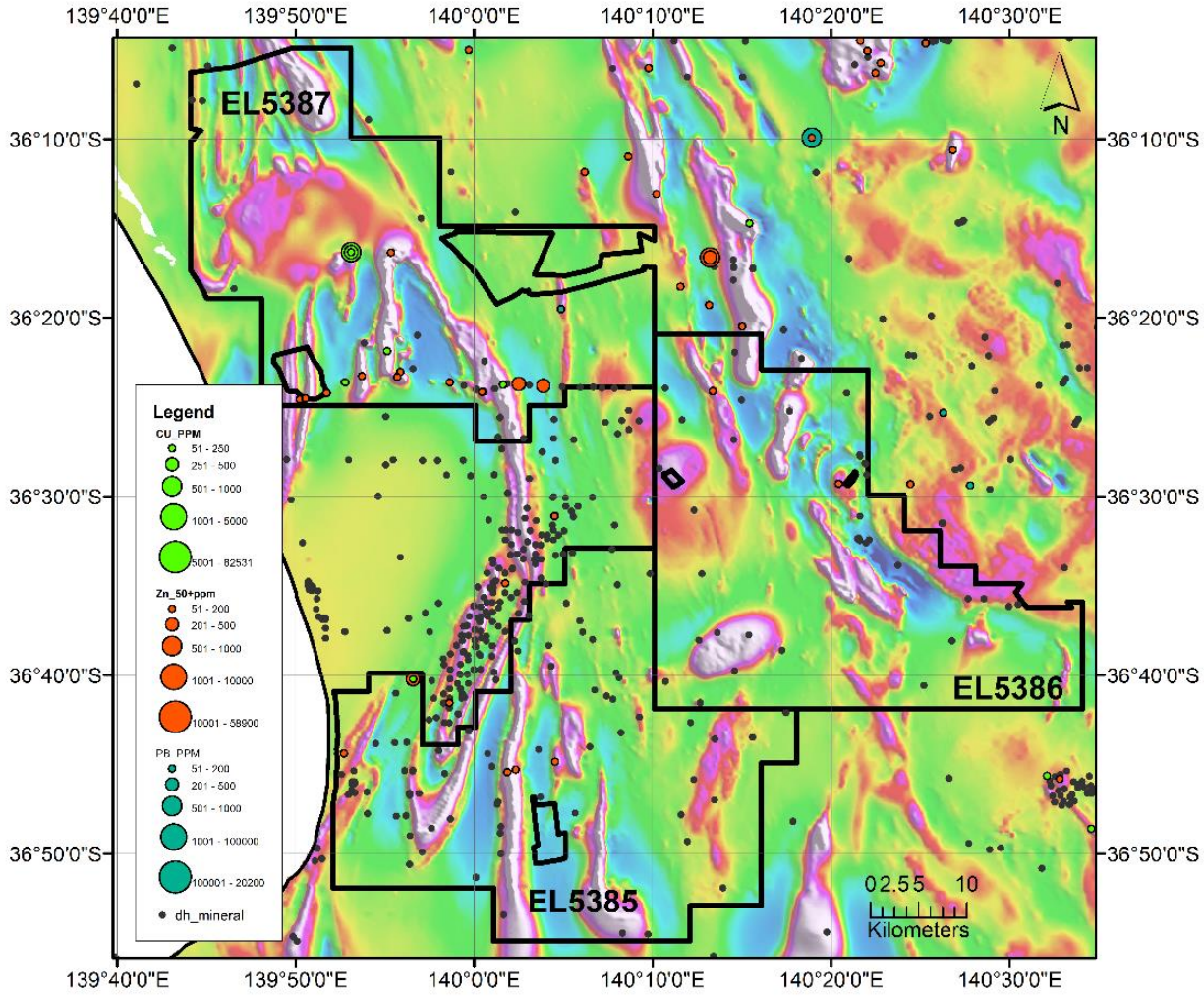



Figure 13: *Anomalous Cu-Zn-Pb recorded on EL's 5385 (Kingston), 5386 (Padthaway) & 5387 (Coorong) from basement drill chips overlying a RTP Residual Aeromagnetic Image.*

## 5.5 Selection of Target Areas

Target generation is geophysically based due to the transported cover. The geophysical review highlighted issues with targeting VMS systems with traditional airborne EM methods as a first pass screen due to the conductive cover. Ground EM methods will work in most regions on the southern leases where cover is generally shallower and less conductive however the northern Coomandook Lease (EL5384) only has a chance or working in areas where basement is less than about 80m due to the conductive overburden.

Drilling through the cover is problematic with thick aquifers present, preventing low cost RAB drilling methods to test basement targets. Holes will need to be drilled using rotary mud drilling methods and

cased to top of bedrock before switching to either diamond or RC drilling of the basement. The increased costs, risks and time associated with this form of drilling necessitates targets should ideally be less than 80m depth.

The VMS characterisation study identified that existing historical aeromagnetic data, when reprocessed to enhance subtle magnetic features is very useful in locating targets that may be indicative of VMS mineralisation. The study has identified 41 first pass targets which will be followed up with ground geophysical surveys after landholder access approvals.

Reconnaissance road side surveys were undertaken to access the cover sequences, calcrete distribution for potential geochemical sampling and to investigate rare volcanic outcrops. During the same period some land holder communications were undertaken.

## 6.0 ENVIRONMENT

No ground activities were undertaken over the surrendered areas apart from reconnaissance surveying and land holder engagements.

## 7.0 CONCLUSION

Compilation of existing geological, geochemical and geophysical data indicates the Padthaway area is fertile for VMS style mineralisation. VMS terrains typically contain clusters of deposits, however to date no modern systematic regional targeting exploration has occurred in the region. This is in part due to cover sequences that are conductive which make in particular EM geophysics problematic as a targeting tool.

Orientation work of magnetic signatures of known VMS occurrences in the region has highlighted this as an ideal first pass targeting tool and work in the first year has identified 41 targets of interest. Initial ground magnetic studies defined 8 targets in the Keilira Area worthy of further ground EM and potential drill testing. These targets were subject of the successful PACE grant application awarded June 2016 to test the best 4 targets identified.

During the reporting period access arrangements to perform ground magnetic surveys over identified airborne magnetic targets on EL's 5384 and 5387 were underway but not completed with landholders. With the protracted down turn in investment interest however in the mining sector, the Company sought reduce its tenement holdings at the end of the reporting period to a size that it could fund

adequately moving forward. As a result only the most advance targets have been retained which occur on EL's 5385 & 5386 with EL's 5384 and EL 5387 surrendered.

## References

Hill, P.W. 1995, Coomandook Bedrock Drilling Program, 1994. *Department of Mines and Energy, Geological Survey South Australia Report Book No. 95/20*

Huston, D.L. and Kamprad, J. 2000, A high sulphidation Cu-Au deposit in the Mt Lyell field, of possible Ordovician age. *AGSO Research Newsletter May 2000, No. 32.*

# APPENDIX 1

## SELECTED ABSTRACTS
## HISTORICAL COMPANY EXPLORATION

# SARIG EXTRACTS OF RELEVANT COMPANY ENVELOPES

| | |
|---|---|
| **Reference:** | **Env 01048** |
| **Title:** | **Southern Murray Basin area. Progress and final reports to licence expiry/renewal for the period 17/6/1968 to 31/3/1969.** |
| **Author:** | Forwood, P.S.; Veit, T.O.; Davy, R.; Powell, J.A. |
| **Publication Date:** | May 1969 |
| **Prepared by:** | Amdel Ltd |
| **Client:** | North Broken Hill Ltd; Forwood, P.S.; Woolf, D.L. |
| **Tenement:** | SML00198 |
| **Licensee:** | North Broken Hill Ltd |
| **Abstract:** | The south-western fringe of the Murray Basin was explored by the licensee for pointers to possible blind base metal sulphide orebodies lying within the Cambrian basement concealed under extensive, thick porous sediment cover, by performing geochemical soil sampling and analysis for detecting low level mercury emissions (the so-called 'mercury halo' phenomenon). Research into and development of a local application of this new exploration technique were carried out in association with AMDEL, to determine how to allow the reliable determination of mercury concentrations as low as one part per billion (1 ppb). Geochemical orientation exercises and reconnaissance sampling resulted in the collection of 7746 soil samples. Analytical results varied from 1 to 485 ppb Hg, with most being in the 5-80 ppb Hg range. 50 anomalous areas having > 100 ppb Hg were followed up by obtaining 663 further check samples, in order firstly to validate the initial high analysis, and then to extend laterally the soil sampling coverage across a true mercury anomaly, via a small grid pattern of samples. This follow-up sampling work was less than 25% complete at the time of expiry of the licence.<br>It was found that the analyses of the follow-up samples did not always correlate closely with the original anomalous values, and in some cases the anomaly seemed to disappear. Also, the type of soil material sampled, or perhaps the position of the material within the soil profile, had a marked effect on the results. However, a number of mercury-anomalous zones were able to be detected ( these being zones which have apparently 'constant' high values obtained in the follow-up sampling, taken from sampling locations within a short distance of the original high). So far, two definite mercury-anomalous zones have been delineated in the area situated north of the Dukes Highway between Keith and Bordertown (designated the Senior anomaly and the Cannawigarra anomaly), while other anomalous zones have tentatively been identified to the north of Naracoorte.<br>Other exploratory work recently done at the Senior anomaly has included field trials of gold and silver sampling probes, in an effort to identify a mercury measurement method which is not influenced by the type of soil present, plus drilling of 19 deep auger holes each to 82 feet depth to assess whether the surface geochemical anomaly intensifies or shifts laterally at depth (314 downhole samples taken for analysis - still in progress), and lastly, the conduct of a ground magnetic survey there, which revealed subdued magnetic relief. |

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| **Reference:** | **Env 01154** |
| **Title:** | **Colebatch. Progress and final reports to licence expiry/surrender for the period 12/5/1969 to 11/5/1970.** |
| **Author:** | Forwood, P.S.; Richards, K.A.; Lynch, J.E. |
| **Publication Date:** | Sep 1970 |
| **Tenement:** | SML00303 |
| **Licensee:** | North Broken Hill Ltd |
| **Abstract:** | In a continuation of geochemical exploration for possible large blind base metal sulphide orebodies formed within the concealed Cambrian basement, North Broken Hill carried out infill sampling of significant mercury soil anomalies (> 150 ppm Hg) at 0.1 mile intervals, and also performed fortnightly re-sampling of certain sites over a whole year to check for possible temporal variations in mercury vapour flux that could be due to the changing weather. The detailed sampling could not replicate the tenor of the mercury anomalies formerly detected in regional soil sampling on SML 198 at 0.5 mile intervals, and the strange variability of assay results was frustrating and inconclusive. The licensee commissioned Amdel to conduct applied research into the mercury halo exploration method, and a report was written.<br>Six reconnaissance traverses laid out across the two apparently most mercury-anomalous zones situated near Mount Boothby were closely soil sampled and had ground magnetometer readings taken along them. The latter survey revealed several small magnetic anomalies, one of which lay over an exposure of adamellite that contains minor magnetite.<br>Examinations of all of the few outcrops of granitic rock present in the licence area showed that the vein of molybdenite found previously is probably an isolated occurrence.<br><br>It was concluded that the Colebatch area is not suitable for utilising the mercury halo method of surface geochemical prospecting for buried sulphide mineralisation, since the local soil types are mainly calcrete and sand, both of which are porous and transmit mercury vapour rather than absorbing it. |

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| **Reference:** | **Env 01411** |
| **Title:** | **Kingston [South-East]. Progress reports to licence surrender for the period 18/6/1970 to 15/12/1970.** |
| **Author:** | Philp, R.H.D.; Whittle, A.W.G. |
| **Publication Date:** | 24Dec1970 |
| **Prepared by:** | Agilis Exploration Services (Aust.) Pty Ltd; A.W.G. Whittle and Associates |
| **Client:** | Abadon Holdings NL |
| **Tenement:** | SML00435 |
| **Licensee:** | Abadon Holdings NL |
| **Abstract:** | Outcropping small exposures of granitic rocks, found in nine isolated locations within and lying just to the east of the subject licence, were examined for their potential to host possible economic occurrences of molybdenum and tungsten mineralisation of the type known to occur in ?similar age granite bodies on Spilsby Island, 230 miles to the north-west in southern Spencer Gulf. Most of the area examined by ground traversing was seen to be covered by Pleistocene to Recent sediments.<br>The igneous intrusions are grouped into three general categories or belts, consisting of porphyritic adamellites, soda rhyolites, and granite-microgranite, going from west to east. Neither the adamellites or granites exhibit any features such as alterations, structure, etc. which would indicate that they may be favourable for base or precious metal occurrences. Extensive cultivated areas plus widespread consolidated cover sediments ('kunkar') render any geochemical sampling of underlying bedrock intrusives on a strictly reconnaissance basis economically unfeasible.<br>The soda rhyolites do have certain alteration characteristics which are known to accompany base metal mineralisation. If a direct target can be established in the two areas with these rocks, both of which lie outside of the current licence boundaries, geochemical sampling by means of a drill should be considered. |

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| **Reference:** | **Env 01581** |
| **Title:** | **Woolumbool Range and Glenstrae. Combined first progress / final report to licences' joint surrender, for the period 4/2/1971 to 28/6/1971.** |
| **Author:** | Holcapek, F. |
| **Publication Date:** | 7Apr1971 |
| **Prepared by:** | Agilis Exploration Services (Aust.) Pty Ltd |
| **Client:** | Abadon Holdings NL |
| **Tenement:** | SML00540; SML00541 |
| **Licensee:** | Abadon Holdings NL |
| **Abstract:** | Two areas located north-east of Kingston (SE) were taken up to explore for shallowly covered igneous rock bodies which might contain economic hydrothermal / metasomatic base metal mineralisation similar to that recently found on Spilsby Island in southern Spencer Gulf.<br>Bedrock auger geochemical sampling (113 samples), ground magnetometer surveying along six traverses, and detailed geological mapping at approximately 1:15,000 scale were used to try to identify and characterise prospective intrusions. Where rarely encountered in drilling, the various subcropping igneous rocks lie between 10-30 feet depth, but heavy metal assays of bottomhole power auger samples did not return any anomalous results. The ground magnetic data profiles obtained were very broad and low intensity (maximum 300 gammas), and thus were regarded as of no use in delineating intrusion boundaries.<br>A small outcrop of rhyolite at Minecrow shows minor hydrolytic alteration along tight fractures or joint planes, which contain sub-economic amounts of fluorite, chalcopyrite and molybdenite. The geochemical exploration failed to outline exploration targets, and in general the available subsurface information indicated that the chances of locating shallowly occurring basement rock within the licence areas are slim. Consequently, it was recommended that tenure of both areas be surrendered. |

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| **Reference:** | **Env 03317** |
| **Title:** | **Yumali. Progress reports to licence expiry/renewal for the period 7/6/1978 to 18/10/1983.** |
| **Author:** | Gould, W.; Rau, G.L.; Dredge, C.P.; Jones, G.; Ellis, P.R.; Lonergan, T.; Hinrichs, G.R.; Coxhead, B.A.; Siemon, J.; Thrift, J. |
| **Publication Date:** | 14Nov1983 |
| **Prepared by:** | Solo Geophysics and Co.; Geoterrex Australia Pty Ltd |
| **Client:** | Thiess Bros Pty Ltd |
| **Tenement:** | EL00403; EL00707; EL00908 |
| **Operator:** | Thiess Bros Pty Ltd; CSR Ltd, Energy Div. |
| **Licensee:** | Thiess Bros Pty Ltd; CSR Ltd |

**Abstract:** Base metal exploration activities undertaken by Thiess Brothers in the Yumali - Coomandook area investigated several coincident regional gravity and aeromagnetic anomalies arising from concealed Palaeozoic basement rocks. These anomalies are part of a major band of magnetic and gravity anomalies which rings the western margin of the Murray Basin in South Australia. An interpretation of the anomalies contained within the subject licence area suggests that they are caused by dense bodies with strongly magnetic layers separated by less magnetic layers.
Following the conduct of 70 line km of ground magnetic and gravity surveys at 250 m station spacings, plus 38 line km of resistivity soundings at 25 m intervals along five traverses using an expanding Schlumberger array, to firm up basement drilling targets, 49 vertical rotary open holes totalling 4302 m of penetration were drilled. The results from 8 of these drillholes put down at the Ki Ki and Coomandook prospects in January 1980 showed that there the basement rocks consist of basic to intermediate intrusives and volcanics with trace amounts of pyrite and magnetite. Drillholes RH7 and RH8 encountered highly altered basic volcanic rocks which have only been metamorphosed to greenschist facies and so are thought to be younger than the Kanmantoo Group, and possibly equivalent to the Truro Volcanics.
Importantly, a significant amount of brown coal was intersected in the Tertiary Knight Group, when drillhole RH6 encountered a 3.5 m thick seam of lignite at 50.5 m depth, which was equated to the Moorlands Lignite Member of this group.
CSR took over as the sole licensee for EL 707 at the end of 1980, and commenced evaluating the extent of the coal discovery via two programmes of appraisal drillling performed in February and June 1981 (when it completed 34 open rotary, geophysically wireline logged holes totalling 2479.2 m). At this stage no drill cores were taken from the coal seams, but limited coring was eventually done during March 1982 to help to define the coal quality (28.17 m cored in two 100 mmm diameter diamond holes), while another two open rotary chip holes were put in to the east of the indicated deposit margin, for a total 346 m drilled, in order to improve the accuracy of the reserve estimation. The indicated brown coal reserves are 45 million tonnes in the Yarrawonga prospect, plus some other small inferred reserves to the east. The coal has high total moisture, averaging 55.2 %, and moderately low ash and high sulphur contents. It occurs at the top of the Renmark Beds, between 23 and 49 m below the surface, covers an area of about 16 square km, and has seams from 2 to 5.6 m thick.

Shallow auger drilling of 31 holes for 57 m has shown that kopi and seed gypsum occurrences in the Cooke Plains Embayment are more widely distributed than previously reported, and that the thickness of gypsum in areas away from the gypsum dune system is less than 2 m. Reserves of gypsum in dunes not covered by mining leases total 150 000 tonnes of seed gypsum and 12 000 tonnes of kopi. Low grade seed gypsum can be upgraded for plaster feed stock. The kopi is suitable for agricultural use only

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| **Reference:** | **Env 03957** |
| **Title:** | **CRA Murray Basin Project - Peake, Redcliffe, Sturtvale, Swan Reach, Waikerie, Narrung, Malinong, Bungunnia, Kakoonie, Karoonda, Mypolonga, Oak Bank and Gluepot areas. Progress and final reports for the period 7/10/1980 to 7/3/1985.** |
| **Author:** | Lewis, P.; Andrews, D.L.; Bubner, G.J.; McBain, D.R.J. |
| **Publication Date:** | 1985 |
| **Prepared by:** | Scintrex Pty Ltd; Geoex Pty Ltd; Geosearch Pty Ltd; Century Geophysical Corp.; BPB Instruments; Solo Geophysics and Co.; Geoterrex Ltd; Zonge Engineering and Research Organisation (ZERO) |
| **Tenement:** | EL00655; EL00657; EL00658; EL00659; EL00660; EL00661; EL00662; EL00664; EL00665; EL00666; EL00667; EL00668; EL00669; EL01033; EL01034; EL01037; EL01051; EL01052; EL01053 |
| **Licensee:** | CRA Exploration Pty Ltd |
| **Abstract:** | Work included detailed aerial surveys (over 24,000 line km), 104 drill holes (total 16,270 metres), and analysis of over 1400 geochemical samples.<br>Drilling for coal along the downthrown side of the Morgan Fault intersected thin (less than 2 metres) lignite beds within the Eocene Renmark Beds in 10 holes, including a 7 metre thick lignite seam from 195 metres depth in RD84WA1. It appears that significant lignite is unlikely to be found at less than 50 - 150 metres depth.<br>Drilling of 24 of 107 potential kimberlitic anomalies intersected a variety of magnetic basement rocks including 2 kimberlitic breccias (in 82FS3RM1 and RO84WA1), but their diamond potential is low. The conduct of an EM-37 survey plus two Sirotem surveys and a CSAMT survey over the shallower breccia failed to delineate that body. Anomalous copper, gold and manganese were returned from interlayered andesitic volcanics and chlorite - magnetite schist in 82FN3RM1. Drilling of 1 of 5 magnetic anomalies in the Florieton area intersected magnetic gabbro. Further work was discontinued due to excessive thickness of the Tertiary cover |

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|---|---|
| **Reference:** | **Env 03317** |
| **Title:** | **Yumali. Progress and final reports to licence surrender for the period 4/1/1984 to 19/9/1985.** |
| **Author:** | Coxhead, B.A.; Brunt, D.A.; Gidley, P.R.; Curtis, J.L.; Tonkin, D.G.; Dunn, J.; Woyzbun, P.; Fander, H.W. |
| **Publication Date:** | Sep 1986 |
| **Prepared by:** | Geoterrex Pty Ltd; Central Mineralogical Services Pty Ltd |
| **Tenement:** | EL01213 |
| **Licensee:** | CSR Ltd |
| **Abstract:** | A sequence of Cambrian rocks buried beneath thin Phanerozoic cover on the western edge of the Murray Basin was explored for possible skarn-related base metal mineralisation associated with concealed Ordovician granitic intrusions, for stratiform volcanogenic base metal sulphide deposits, and also for Palaeozoic epithermal / hydrothermal or placer gold derived from Lower Cambrian basic and intermediate volcanic rocks. Work undertaken included photogeological studies, the reprocessing of BMR regional aeromagnetic survey data, the acquisition in January 1984 of a detailed, 873 line km airborne magnetic and radiometric survey (300 m flight line spacing and 90 m sensor altitude), the conduct of follow-up ground magnetic surveys at selected magnetic anomalies, and the drilling of 9 vertical diamond holes (total penetration 1535 m, including a total of 57 m of bottom-hole coring). Eight of the drillholes reached the basement, which in seven of the holes comprised variably magnetic, much altered but probably Cambrian intrusive to extrusive igneous rocks of intermediate to basic composition. Only low base metal assay values were returned from the drill core sampling of the volcanic rocks, which do not exhibit the alteration styles characteristic of known VHMS deposits. Furthermore, the skarn mineralisation model proposed for the basement in CSR's adjoining Coonalpyn EL 978 tenement area was unable to be validated at Yumali. |

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|---|---|
| **Reference:** | **Env 08941** |
| **Title:** | **Willalooka. Annual and final reports to licence expiry for the period 18/10/93 to 17/10/97.** |
| **Author:** | Schmidt, B.L.; Randell, M.H.; Rossiter, A.G. |
| **Publication Date:** | Sep 1997 |
| **Tenement:** | EL01874 |
| **Operator:** | North Mining Ltd; Pasminco Australia Ltd |
| **Licensee:** | North Mining Ltd; Pasminco Australia Ltd |
| **Abstract:** | Gold and base metal exploration conducted in an area extending west and south-west of Keith was aimed at porphyry-type gold/copper mineralisation akin to that associated with the Staveley Belt in neighbouring western Victoria. Work undertaken comprised interpretation of SAEI aeromagnetic data, field inspection and sampling of basement outcrops, 39 line km of ground magnetic surveys, and RC/diamond drilling (13 holes, total 1298 m). Maximum gold values of only 0.2 ppm were returned from drill core and rock chip analyses, and base metal assays were less than encouraging. |

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| **Reference:** | **Env 08947** |
| **Title:** | **Mount Scott. Annual and final reports to licence surrender for the period 18/8/94 to 16/4/96.** |
| **Author:** | Lees, T.C.; Randell, M.H. |
| **Publication Date:** | 08Dec1995 |
| **Tenement:** | EL01998 |
| **Operator:** | Pasminco Exploration |
| **Licensee:** | Carnegie Minerals NL; Pecan Holdings Pty Ltd; Pasminco Exploration |
| **Abstract:** | Gold and base metal exploration in an area extending north and north-east of Kingston South-East comprised image interpretation of SAEI aeromagnetic data, plus ground magnetic surveying and RC and diamond drilling of 6 selected magnetic anomalies (6 holes, total 525 m). No anomalous base or precious metal values were obtained by assaying of samples from the cored metavolcanic and metasedimentary magnetic basement. |

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| **Reference:** | **Env 09016** |
| **Title:** | **Mount Rough. Annual and final reports for the period 16/12/94 to 10/6/98.** |
| **Author:** | Randell, M.H.; Parfrey, O.C.; Harrisson, S. |
| **Publication Date:** | 24Aug1998 |
| **Tenement:** | EL02039 |
| **Licensee:** | Pasminco Exploration Ltd |
| **Abstract:** | Ground magnetic and gravity traverses were conducted south - south-west of Tintinara over aeromagnetic features prospective for base and precious metals. 13 rotary / diamond drillholes (total 1048 / 271 metres) intersected diorite, dacite, basalt, dolerite and metasediments beneath 44-120 metres thickness of cover sediments and weathered bedrock. Abundant magnetite was recorded, but no significant metal values were returned from assays of core samples. A number of targets were found to be inaccessible due to thick scrub or swampy ground. |

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| **Reference:** | **Env 09014** |
| **Title:** | **Cooke Plains. Annual and final reports for the period 16/12/1994 to 10/6/1998.** |
| **Author:** | Randell, M.H.; Parfrey, O.C.; Harrisson, S. |
| **Publication Date:** | 24Aug1998 |
| **Tenement:** | EL02040 |
| **Licensee:** | Pasminco Exploration Ltd |
| **Abstract:** | Ground magnetic and gravity traverses were conducted south and east of Tailem Bend over aeromagnetic signatures prospective for base and precious metals. 68 rotary / diamond drillholes (total 3506 / 260 metres) were drilled in search of metavolcanics and metasediments of the Kanmantoo Group. Magnetite was abundant, but no significant metal values were returned from assays of core samples.<br>A number of targets were found to be inaccessible due to thick scrub or cropped or swampy ground. |

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| **Reference:** | **Env 09015** |
| **Title:** | **Sherlock. Annual and final reports for the period 16/12/94 to 10/6/98.** |
| **Author:** | Randell, M.H.; Parfrey, O.C.; Smith, P.C.; Mack, D.A.; Harrisson, S. |
| **Publication Date:** | 24Aug1998 |
| **Prepared by:** | Arrow Consulting Services; Geophysical Research Institute |
| **Tenement:** | EL02041 |
| **Licensee:** | Pasminco Exploration Ltd |
| **Abstract:** | Shallow aeromagnetic targets in the vicinity of the Padthaway Ridge were investigated in the Sherlock area, 35 km east of Tailem Bend. Ground magnetic follow-up and a program of 41 rotary / diamond drillholes (total 4150 / 879 metres) returned a base metals - mineralized intersection of 2.5 metres from 123 metres depth, grading at 1.6% Zn and 0.6% Pb, within sheared and weakly altered metasediments. Strongly altered black slate was recorded at a similar depth, 3.7 km to the southeast. Results of surface and downhole EM surveys were adversely affected by highly conductive overburden |

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| **Reference:** | **Env 09721** |
| **Title:** | **Mount Monster, Mount Charles, Braemar, Redcliffe, Blanchetown, Palmer, Tailem Bend, Tauragat Hill and Oratan Rock areas (Padthaway Project). First annual report for the period 16/6/1999 to 15/6/2000.** |
| **Author:** | Price, A.T. |
| **Publication Date:** | Sep 2000 |
| **Tenement:** | EL02606; EL02607; EL02608; EL02609; EL02610; EL02611; EL02612; EL02613; EL02614 |
| **Licensee:** | Normandy Gold Exploration Pty Ltd |
| **Abstract:** | Exploration for hidden copper-gold mineralising systems possibly genetically related to fractionated, high crustal level emplaced Cambro-Ordovician intrusives, has addressed an arcuate, 300 km long north-south and 50 km wide east-west segment of eastern South Australia extending between Bordertown, The Coorong, Murray Bridge, Morgan and Yunta. 22 aircore holes (total 2697 m) and 14 diamond-tailed rotary mud holes (total 2140.2 m) targeted discrete magnetic highs and possible alteration zones in the vicinity of Delamerian granites. The drilling intersected Truro Volcanics equivalents plus gabbros, granites and metasediments, but no large alteration or mineralisation systems were indicated. |

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| **Reference:** | **Env 09667** |
| **Title:** | **Coonalpyn and Padthaway areas (part of the Coomandook Joint Venture Padthaway Project). Annual, partial relinquishment and final reports to licence expiry for the period 26/7/99 to 25/7/2004.** |
| **Author:** | Price, A.T.; Purvis, A.C.; McConachy, G.W.; Anderson, C.G. |
| **Publication Date:** | 8Aug2004 |
| **Prepared by:** | Pontifex and Associates Pty Ltd; Vintage Exploration and Mining Pty Ltd |
| **Client:** | Normandy Gold Exploration Pty Ltd |
| **Tenement:** | EL02625 |
| **Operator:** | Normandy Gold Exploration Pty Ltd; Kymura Pty Ltd |
| **Licensee:** | Kymura Pty Ltd; Normandy Gold Exploration Pty Ltd |
| **Abstract:** | Iron oxide and porphyry / skarn - associated copper-gold systems related to fractionated high level Cambrian to Ordovician intrusives were the targets of exploration in the Coonalpyn - Padthaway region, extending from north to south approximately 50 km west of Bordertown. A review of previous exploration data, plus re-assaying of existing CSR drill core samples which had returned anomalous Au to 130 ppb, defined drilling targets which were refined by ground magnetic surveys. A planned programme of 21 air core drillholes was reduced to nine holes (860 m) due to finding siliceous hard bands in the regolith and a greater than prognosed thickness of cover sediments. Only four of these holes reached basement, and no significant assay results were returned, thus failing to substantiate the reputed gold geochemical anomalism. Further reviewing of prospectivity resulted in the selection of four magnetic anomalies, which were drill tested by rotary mud pre-collared holes with diamond tails (5 holes, total 815.5 m). Probable Paleozoic basement rocks, encountered in all holes, included syenite to syeno-granite, strongly magnetic diorite/gabbro, non-magnetic hornfelsed metasediments, and strongly magnetic and altered mafic volcanics. No evidence of mineralisation was seen in these rocks, and again no significant assay results were obtained. The lithologies revealed by drilling were concluded to have adequately explained the target magnetic features.<br>Joint venturer Normandy Gold withdrew from the Coomandook operating agreement on 27/5/2001. Exploration by the original licensee is continuing in its adjacent EL 2655, to the west of Coonalpyn. |

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| **Reference:** | **Env 09845** |
| **Title:** | **Ki Ki (part of the Coonalpyn Joint Venture Project). Annual and final reports to licence expiry/surrender for the period 14/10/1999 to 17/1/2009.** |
| **Author:** | McConachy, G.W.; McKay, G.; Purvis, A.C. |
| **Publication Date:** | 23Feb2009 |
| **Prepared by:** | G.W. McConachy and Co. Pty Ltd; Haines Surveys Pty Ltd; Pontifex and Associates Pty Ltd |
| **Client:** | Red Metal Ltd |
| **Tenement:** | EL02655; EL03295 |
| **Operator:** | Kymura Pty Ltd; Normandy Gold Exploration Pty Ltd; Vintage Exploration and Mining Pty Ltd; Red Metal Ltd |
| **Licensee:** | Kymura Pty Ltd; Normandy Gold Exploration Pty Ltd; Vintage Exploration and Mining Pty Ltd; Red Metal Ltd |
| **Abstract:** | To investigate the possible Cu-Ni-PGE mineral sulphide mineralisation potential of a known buried mafic / ultramafic layered igneous intrusive complex situated within the Cambrian Kanmantoo Trough near Ki Ki in the upper South-East, the licensee and its joint venture partners variously undertook reprocessing and modelling / interpretation of existing aeromagnetic data, rotary mud/diamond core drilling (3 holes for a total penetration of 746.4 m, including 255.1 m cored : holes KK01 and KK02 were partly PACE Initiative - funded during 2005 as Project DPY1-32), geochemical assaying and petrological studies of drill cores, and also acquired and processed / interpreted a gravity survey of 560 stations. The last diamond drillhole, KKD-07-05, was completed in February 2007, reaching a total depth of 348.4 m. It encountered dense mafic/ultramafic volcanic rocks (amphibolites, schists) and banded metasediments carrying elevated nickel and chromium contents, but no significant sulphides were seen. This outcome was very disappointing after the earlier success of PACE drilling carried out on the Ki Ki prospect by Vintage Exploration & Mining Pty Ltd in July 2005, when hole KK02 penetrated an ultramafic rock that contains visible nickel sulphides and magnetite, which yielded assays of up to 0.135% Ni, 0.125% Cr and 34.3% Mg |

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| **Reference:** | **Env 10122** |
| **Title:** | **Marcollat. Progress, annual and final reports to licence expiry/surrender for the period 23/9/2002 to 9/10/2008.** |
| **Author:** | Rossiter, A.G.; White, A.J.R.; England, R.N. |
| **Publication Date:** | 24Nov2008 |
| **Client:** | Rosscraft Minerals Pty Ltd |
| **Tenement:** | EL03013; EL03953 |
| **Operator:** | Rosscraft Minerals Pty Ltd |
| **Licensee:** | Rosscraft Minerals Pty Ltd; Uranium Exploration Australia Ltd |
| **Abstract:** | Exploration of an area located 50 km south-southwest of Keith aimed to test the potential of known Cambrian siliceous volcanic rocks for hosting massive base metal sulphide deposits plus possible disseminated and skarn-related precious metals, following an exploration model put forward on the basis of the rocks' supposed petrological and geochemical similarities with the Mount Read Volcanics of western Tasmania.<br>Early work consisted of an interpretation of regional magnetic data, scout geological mapping and geochemical grab sampling of sparse basement outcrops, and the acquisition and interpretation of ground magnetic, gravity and TEM surveys intended to firm up drillable targets. No useful TEM results were obtained. The north-south volcanic belt crossing the licence area was interpreted to be demagnetised over a strike length of about 25 km. Within it the licensee discerned three small linear magnetic highs 1-2 km long with maximum amplitudes of 400 nT. These appeared to be conformable with the volcanic strata, and it was inferred that they might arise from pyrrhotite-bearing skarn or from massive sulphide deposits.<br>Difficulties ensued with securing a drilling contractor and with finding a joint venture partner to help bear the cost of drill testing the chosen magnetic anomalies. Consequently, no work took place during the period July 2004 until June 2007. On 30/5/2007 an option agreement was signed by the licensee with Uranium Exploration Australia, who undertook to fund drilling activities over two years in order to earn a 50% interest in the tenement. However, the agreement was allowed by that company to lapse on 13/2/2008 without its requirements being fully exercised.<br>The main field activity carried out under EL 3013 was the completion of a single vertical rotary mud - HQ/NQ diamond drillhole 336.1 m deep at the Clover Ridge magnetic/gravity anomaly during the week of 5-11/6/2007. After passing through 53.8 m thickness of Cenozoic cover rocks, the hole stayed within a tholeiitic dolerite intrusion for the remainder of its length. The mafic rocks recovered in the drill core show chlorite, epidote and carbonate alteration and veining plus the effects of contact metamorphism, but their sulphide content is minor and the core sample assay results were not encouraging. Petrographic work suggested that the magnetite which produces the Clover Ridge magnetic anomaly predates contact metamorphism, and is therefore not related to skarn mineralisation. Hence, if the magnetite in the dolerite is not related to contact metamorphism, it is likely that the dyke post-dates regional hydrothermal alteration which destroyed magnetite, an observation based on the airborne magnetic data. Any volcanogenic massive sulphide (VMS) deposits in the area would then be contemporaneous with the regional alteration, and thus pre-date the dyke. It was concluded, therefore, that drillhole 07CR001 had done little to elucidate the potential of EL 3013 for VMS mineralisation.<br>Given the presence of magnetic dykes in the area, it now seemed to the licensee that ongoing use of magnetic data as the primary exploration tool would not be reliable. Electrical geophysics might also struggle, as any zinc-rich ores would be poor conductors. But better results might be achieved using gravity, given that VMS deposits have very high specific gravities. It was suggested that any future gravity survey should concentrate on the 20 km long demagnetised zone in the southern half of the licence area, since this demagnetisation may have been caused by sulphur-rich fluids which had converted magnetite to pyrite (and in this process may also have deposited valuable metals) |

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| **Reference:** | **Env 11048** |
| **Title:** | **Unlocking South Australia's Mineral and Energy Potential - A Plan for Accelerating Exploration. Theme 2 (drilling partnerships with PIRSA and industry) : Year 1 partnership no. 32, Ki Ki intrusion mafic/ultramafic - hosted mineral prospects. Project final report.** |
| **Author:** | Anderson, C.G.; Purvis, A.C. |
| **Publication Date:** | Oct 2005 |
| **Prepared by:** | Pontifex and Associates Pty Ltd |
| **Client:** | Euro Exploration Ltd |
| **Tenement:** | EL03295 |
| **Operator:** | Euro Exploration Ltd |
| **Licensee:** | Vintage Exploration and Mining Ltd |
| **Abstract:** | To further investigate the Cu-Ni-PGE mineral sulphide potential of a known buried mafic / ultramafic layered igneous intrusive complex situated near Ki Ki in the upper South-East, the licensee of EL 3295 sought PACE Initiative funding to complete two drillholes to test a pair of hitherto undrilled discrete magnetic anomalies interpreted as being sourced from within it. Vertical rotary mud and diamond core holes KK01 and KK02 (drilled total 398 m, including 83 m of NQ coring in basement) were completed in June-July 2005 at locations approximately 7 km apart, having passed through a sequence of Tertiary Murray Basin sediments before reaching their targets.<br>Hole KK01 reached basement at 144 m depth, and was then cased with HQ rods and core drilled to TD 190.5 m. In this hole the basement lithology comprised mainly amygdaloidal basalt containing minor pyrite +/- trace chalcopyrite. A narrow band of lapilli tuff was described from petrological examination as occurring at about 160 m depth.<br>Hole KK02 was mud drilled down to top of basement at 169.5 m, and was then also cased with HQ and NQ cored to TD 207.25 m. Here basement consisted of layered ultramafic and amphibolitic (after ?dolerite) lithologies with minor magnetite, pentlandite and ?chromite. Difficult drilling conditions in the Tertiary cover, due to cavities and porous gravelly horizons in the calcareous sandstone units that are commonly present, meant that progress was slow with the mud circulation often effectively lost, and consequently no drill cuttings were returned in both holes over the interval from 35-145 m depth.<br>An initial 14 basement drill core samples have been examined for petrological and mineralogical characterisation and petrogenetic interpretation. The original ultramafic intrusion appears to have been later intruded by mafic dykes, or else has undergone a significant degree of both metamorphic retrogression and late stage low temperature alteration. Bleached zones evident in an altered metabasalt in KK01 contain abundant pyrite which could be associated with anomalous gold. Results of comprehensive split core sample assaying on hole KK02 are still pending at the time of this report. |

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| **Reference:** | **Env 11492** |
| **Title:** | **Coonalpyn (part of the Coonalpyn Joint Venture Project). Annual reports to licence expiry/surrender for the period 16/10/2006 to 15/10/2008.** |
| **Author:** | McKay, G.; Pontifex, I.R. |
| **Publication Date:** | 13Nov2008 |
| **Prepared by:** | Pontifex and Associates Pty Ltd |
| **Client:** | Red Metal Ltd |
| **Tenement:** | EL03635 |
| **Operator:** | Red Metal Ltd |
| **Licensee:** | Red Metal Ltd; Vintage Exploration and Mining Pty Ltd |
| **Abstract:** | To investigate the possible Cu-Ni-PGE mineral sulphide mineralisation potential of a known buried mafic / ultramafic layered igneous intrusive complex situated near Ki Ki in the upper South-East, as well as exploring for base metal mineralisation elsewhere within the tenement, the licensee and its joint venture partners variously undertook reprocessing and modelling / interpretation of existing aeromagnetic data, rotary mud/diamond core drilling (5 holes for a total penetration of 1284.3 m, including 693.1 m cored), aircore drilling (2 unsuccessful holes for 134 m - neither was able to reach basement beneath sandy sediments), geochemical assaying and petrological studies of drill cores, and also acquired and processed / interpreted a gravity survey of 480 stations at 100 m spacing on lines 400 m apart. The gravity results defined a large regional anomaly that extends into the adjacent EL 3295, which contains the nickel-mineralised drillhole KK02 completed previously on the Ki Ki prospect. Accordingly, the subject drilling on EL 3635 targeted both this gravity anomaly thought to be associated with the nickel mineralisation, and also positively and negatively polarised magnetic targets for base metal mineralisation.<br>The geophysical anomalies were explained by lithological and mineralogical variations in the buried bedrock, and no economically significant nickel or base metal mineralisation was encountered. It would appear that, on a semi-regional scale, the Ki Ki gravity anomaly can be explained by the presence of sheared ultramafic rock types.<br>Drillholes KMD-07-01 and KMD-07-03, drilled on a negatively polarised magnetic anomaly, intersected a diorite to quartz-diorite intrusive rock type containing variable disseminated pyrrhotite and minor associated chalcopyrite with elevated nickel contents. Assaying of mineralised drill core samples returned best results of 728 ppm Cu and 522 ppm Ni from the depth interval 258-259 m in KMD-07-01, and 829 ppm Cu and 698 ppm Ni from the depth interval 105-106 m in KMD-07-03. |

**Reference:** **Env 11854**

**Title:** **Hawksnest, Policeman Point, Geegeela, Keith, Keppoch, Bordertown, Sugarloaf Hill, Kumorna, Mount Boothby, Mount Charles, Peacock Range and Tintinara (the Padthaway Ridge Sedimentary Uranium Project). Joint annual technical reports to licences' combined surrender, for the period 30/1/2008 to 3/9/2013.**

**Author:** Alley, N.F.; Parker, F.M.; Jones, W.

**Publication Date:** 16Jul2013

**Tenement:** EL04038; EL04039; EL04040; EL04041; EL04042; EL04043; EL04044; EL04045; EL04046; EL04054; EL04055; EL04418; EL04747; EL04838; EL05241; EL05242; EL05243; EL05244; EL05296

**Operator:** South East Energy Ltd; ERO Mining Ltd; Iluka Resources Ltd

**Licensee:** South East Energy Ltd; ERO Mining Ltd; Iluka Resources Ltd

**Abstract:** A package of fourteen mineral exploration tenements were taken up that straddled the north-eastern and south-western sides of the Padthaway Ridge, to allow the licensee to explore both the Tertiary Murray Basin and Gambier Basin sediments where they impinge against this Palaeozoic basement feature.
The primary aim of exploring there was to find possible economic roll front style or tabular sandstone-hosted uranium mineralisation which could have formed in palaeochannels, sedimentary basins and bedrock unconformity settings, as hitherto this particular region had been largely untested for its uranium potential. It was also recognised that it could have good prospectivity for discovering economic Tertiary coal deposits, since a buried lignite seam over 6 m thick was known to occur in the vicinity of Mount Perry, and lows in the regional gravity data suggested that localised sub-basins might be present which could contain significant carbonaceous strata and lignite.
The licensee's pre-tenure review of past mineral exploration data for the region had found that some of the bedrock-intruding Cambro-Ordovician granites on the Padthaway Ridge were reported to contain more than 5 times the average content of uranium expected in a typical granite, thus making the surrounding region highly prospective for sedimentary uranium occurrences. The licensee's own later testing showed that some granite bodies in the Kongal-Bordertown area contain 10 times this expected average content (i.e. >40 ppm U). Furthermore, like in other parts of the State, the Padthaway Ridge region has been subjected to hotter and wetter climates during the Tertiary, and a number of marine transgressions occurred then, during which carbonaceous and pyritic permeable sands with intervening bounding finer-grained sediments were deposited. These sediment facies were considered by the licensee to be ideal traps for uranium, and an early examination made of available drillhole data indicated that they are well represented on all of the tenements.

During Years 1 and 2 of the project activity South East Energy undertook a detailed prospectivity review of its tenements, compiling and modelling all of the available drillhole information on subsurface sedimentary geology, which included the exercise of re-logging stored sample records of selected drillholes and determining their uranium content qualitatively with a scintillometer.

Due to the perceived diminished prospectivity of the Tertiary Gambier Basin marginal sediments for hosting sedimentary uranium occurrences, EL 4039 situated therein was surrendered on 29/1/2009 (see Env 12025); this divestment was later followed by the surrender of adjoining ELs 4038 and 4055 on 24/2/2010 (see Env 12022). In addition, significant portions of another seven project licences were relinquished at their renewal on 29/1/2010 (see Env 11984).
On 12/10/2010 ERO Mining acquired 100% corporate ownership of South East Energy, and assumed technical management of the Padthaway Project licences.

No field work was done during Year 3 of the project, while the licensee conducted negotiations with parties who might be interested in a joint venture. On 18/7/2011 Iluka Resources entered into a joint venture with South East Energy over eight of the project licences, intending to evaluate their heavy mineral sands (HM) potential.
A shallow exploratory roadside drilling campaign along two regional traverses, comprising 161 vertical NQ aircore holes for 4242.4 m, was completed by Iluka during Year 4 on ELs 4041 and 4043. Encouraging stratigraphy was penetrated by most of the drillholes, with marine sands being encountered in the Bridgewater Formation. Minor HM (HM content <3.0%) were intersected in 3 drillholes. It was concluded by Iluka that further drilling was warranted nearby, as there was the possibility of discovering well-developed coastal barrier style strand sequences which could host significant HM deposits.

During Years 5 and 6 of the project acreage tenure, no additional field work was completed. ERO Mining sought unsuccessfully to introduce a new jont venture partner to help meet licence commitments, before eventually deciding to surrender the ground.