Open File Envelope No. 12,371

EL 3884, EL 4539 AND EL 4883

THE COCKABIDNIE PROJECT

PACE 2020 INITIATIVE : PACE TARGETING, YEAR 1

PARTNERSHIP NO. 16 – 25 HZ TEMPEST AIRBORNE ELECTROMAGNETIC SURVEY OF THE CAMPOONA SYNCLINE REGION

PROJECT PT1-16 FINAL REPORT

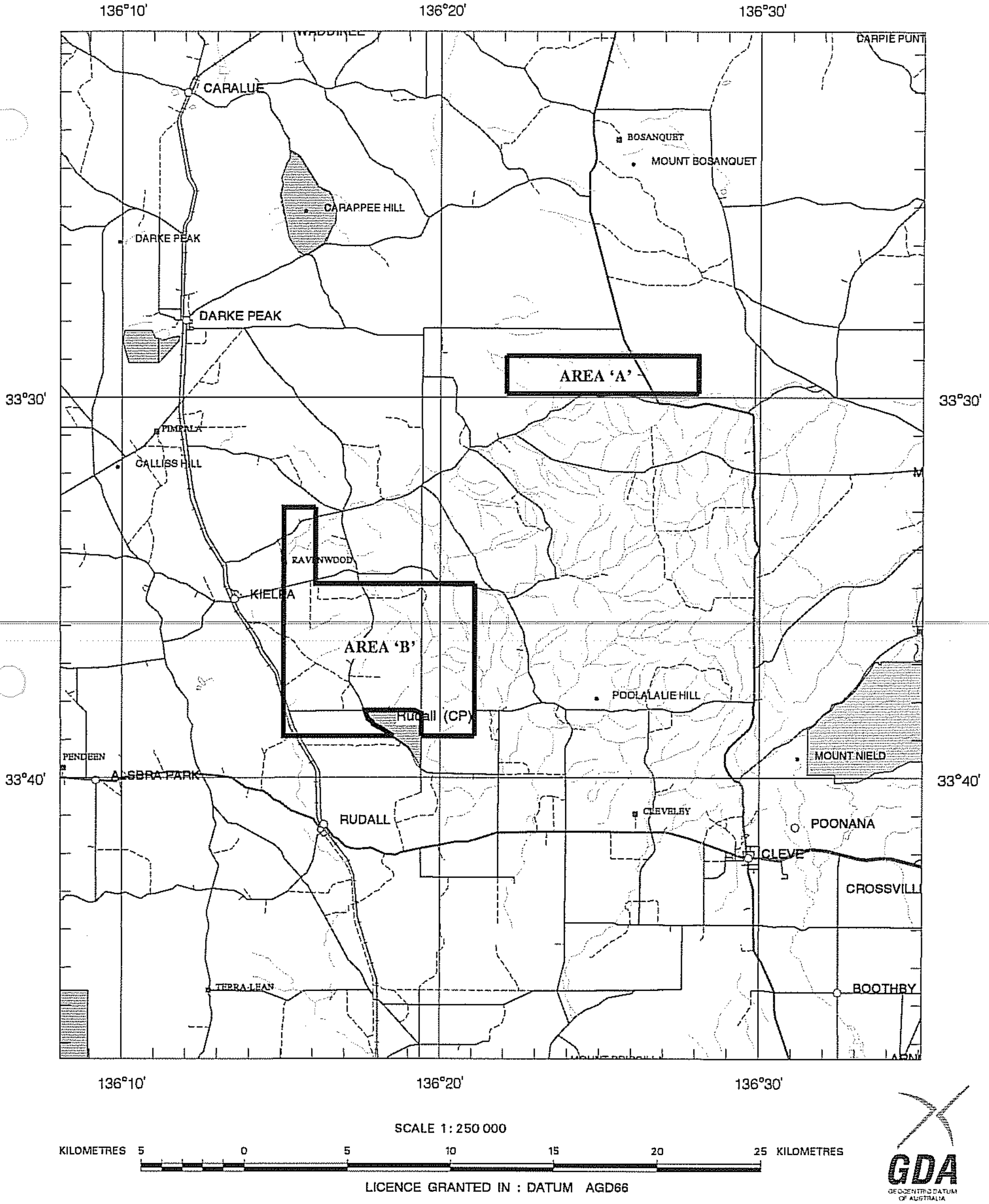
Submitted by
Lincoln Minerals Limited
2012

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 for Manufacturing, Innovation, Trade, Resources and Energy

SCHEDULE A



APPLICANT : **LINCOLN MINERALS LTD**

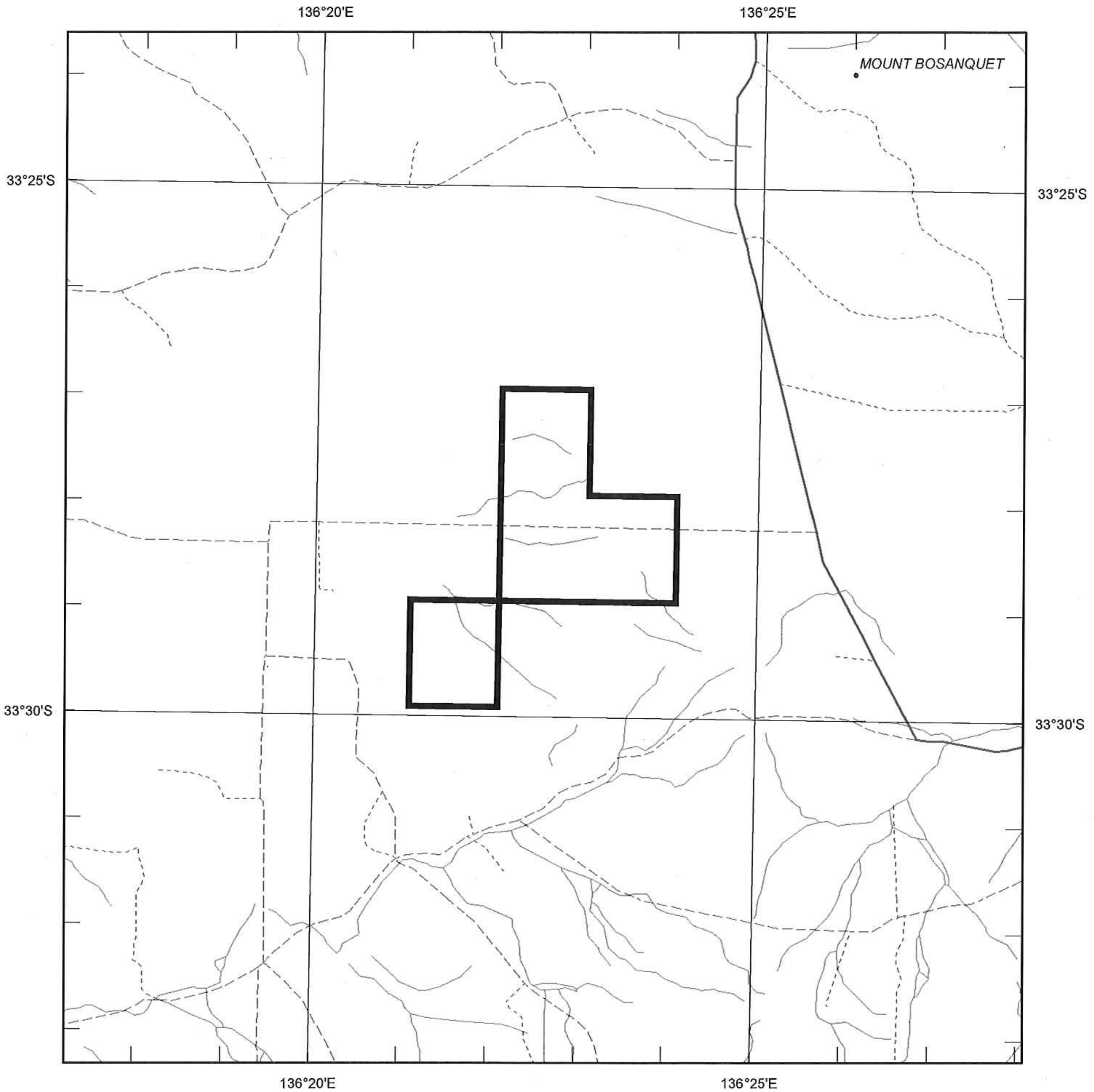
FILE REF : **114/07** TYPE : **MINERAL ONLY** AREA : **89** km² (approx.)

1:250000 MAPSHEETS : **KIMBA**

LOCALITY : **CAMPOONA AREA - Approximately 45 km south of Kimba**

DATE GRANTED : **06-Aug-2007** DATE EXPIRED : **05-Aug-2008** EL NO : **3884**

SCHEDULE A



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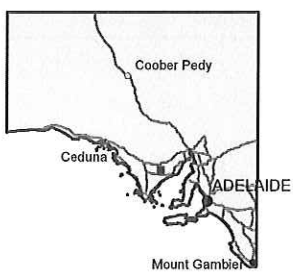
Kilometres

LICENCE BOUNDARIES IN : DATUM AGD66

LOCALITY



APPLICANT : **LINCOLN MINERALS LIMITED**

FILE REF : **2010/00020** TYPE : **MINERAL ONLY**

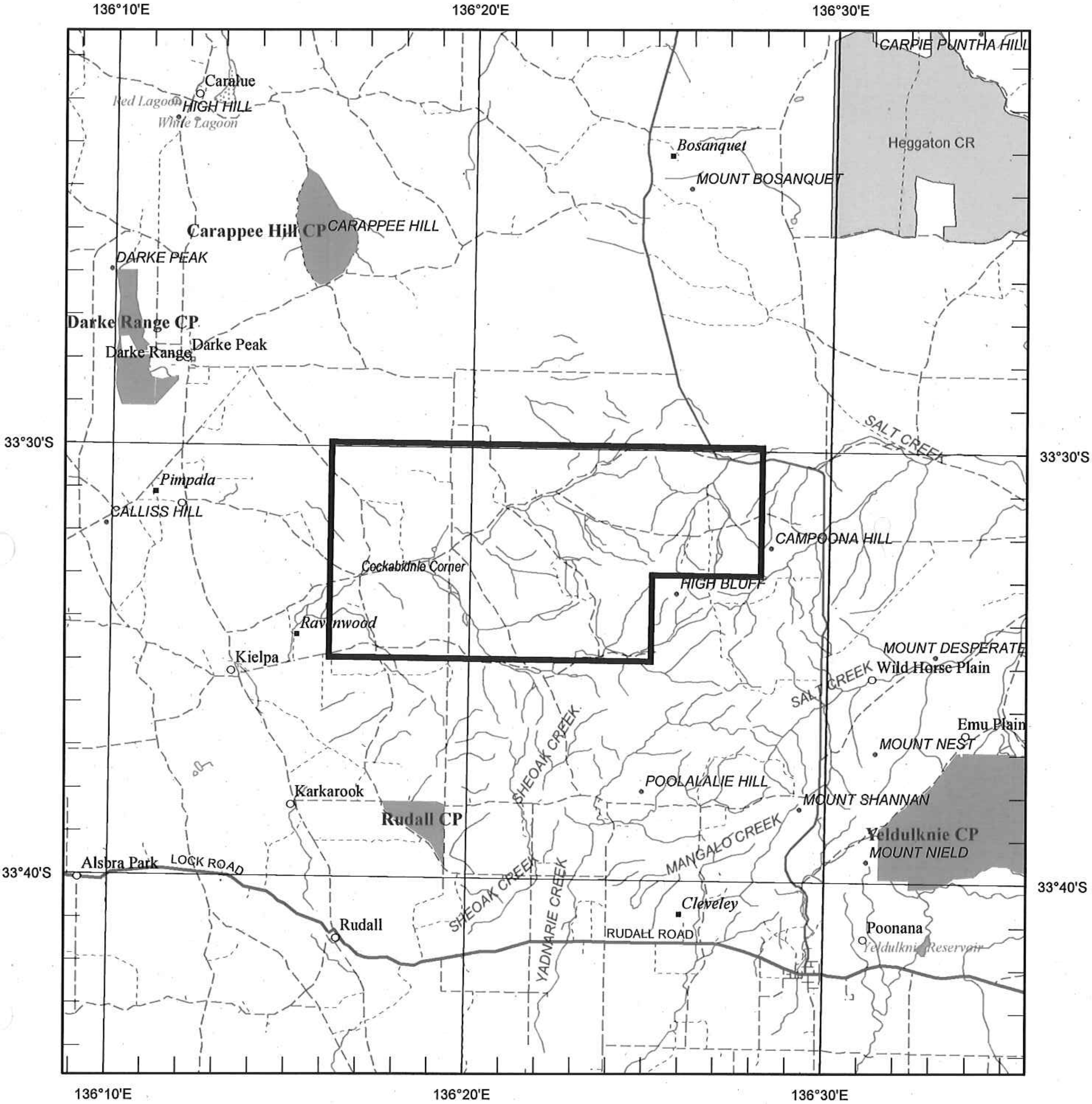
AREA : **11** sq km (approx)

1 : 250 000 MAPSHEETS : **KIMBA**

LOCALITY : **COCKABIDNIE NORTH AREA -**
Approximately 35 km SSW of Kimba

DATE GRANTED: **23-Aug-2010** DATE EXPIRED: **22-Aug-2014** EL NO: **4539**

SCHEDULE A



SCALE 1 : 250 000

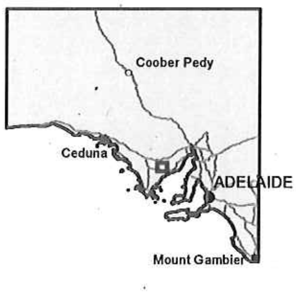
4 0 4 8 12 16 20

Kilometres

LICENCE BOUNDARIES IN : DATUM AGD66

GDA
GEOCENTRIC DATUM OF AUSTRALIA

LOCALITY



APPLICANT : **CENTREX METALS LIMITED**

FILE REF : **2011/00149** TYPE : **MINERAL ONLY**

AREA : **154** sq km (approx)

1 : 250 000 MAPSHEETS : **KIMBA**

LOCALITY : **COCKABIDNIE AREA -**
Approximately 120 km southwest of Port Augusta

DATE GRANTED: **14-Aug-2011** DATE EXPIRED: **13-Aug-2013** EL NO: **4883**

PACE Targeting

Cockabidnie Project, EL 4883 (formerly EL 3609), EL 4539 (formerly EL 3498), ELA 2012/00107 (formerly EL 3884)

Final Report PT1-16

Dwayne Povey, Chief Geologist
15th October 2012

Lincoln Minerals Limited

Contents

(Data - see Government of South Australia Mineral Resources Website)

Lincoln Minerals PACE Targeting Final Report

1. Introduction

This is the final report on PACE-Targeting undertaken by Lincoln Minerals Limited, on EL 4883 (formerly EL 3609), EL 4539 (formerly EL 3498), ELA 2012/00107 (Formerly EL 3884), in July 2012. Copies of the successful PACE proposal, and relevant invoices are appended.

2. Background

The Cockabidnie Nickel-Cobalt-Scandium Project is located on central Eyre Peninsula and in addition to nickel-cobalt-scandium is prospective for a large range of polymetallic minerals including gold, silver, graphite, manganese, unconformity uranium and base metals (copper, lead, zinc).

Drilling was completed during October 2007 and April 2008. Lincoln Minerals discovered lateritic-saprolitic nickel mineralisation in the Campoona Syncline. Mineralisation up to 1.15% Ni + 0.33% Co + 51ppm Sc occurs at a depth of about 15-20m beneath shallow cover and overlies gabbroic amphibolite with up to 0.2% Ni in fresh bedrock. The aeromagnetic and calcrete anomalies associated with mineralisation extend over a strike length of 3 km.

Within and immediately west of the Campoona Syncline, drilling in 2007 identified significant base metal, gold and silver mineralisation up to 2.4% Zn+Pb, 0.26g/t Au and 26g/t Ag.

Figure 1. Location of Cockabidnie Exploration Licenses.

In October 2011, Lincoln Minerals Ltd was awarded a grant of $52,500 in PACE 2020 to undertake geophysical surveys as part of project proposal PT1-16.

3. Geology of Cockabidnie region

The regional geology of the eastern Eyre Peninsula is described by Parker et al (1988). The area forms part of the southern margin of the Gawler Craton which comprises a variety of Archaean to Mesoproterozoic gneisses and granites. The majority of Lincoln Minerals' tenements are located within the Cleve Subdomain where the Palaeoproterozoic Hutchison Group metasedimentary sequence was highly metamorphosed to upper amphibolite facies and multiply deformed during the Kimban Orogeny about 1840-1700 Ma (Drexel *et al*., 1993). This deformation folded the rocks into a series of tight, often refolded synclines and anticlines sandwiched between major faults and shear zones. The Hutchison Group was intruded by a series of granites prior to and during the Kimban Orogeny and many of these granites are now strongly deformed themselves.

The Hutchison Group on central Eyre Peninsula was formed from a sequence of platformal mixed carbonate and clastic sediments. The basal Warrow Quartzite progrades from west to east and is overlain by a platformal carbonate sequence now represented by dolomitic marble, calcsilicate gneiss and BIF. This is prospective for base metals, iron ore and uranium. The carbonate/BIF sequence is overlain by a thick sequence of fine grained clastic sediments now represented by garnetiferous schist, gneiss and amphibolite. The latter may have a mafic volcanic component and is thought to host nickel-cobalt-scandium mineralisation.

The Cockabidnie area has been the focus of both base metal and uranium exploration sporadically since the late 1960's. It has potential for unconformity uranium mineralisation associated with the base of the Blue Range Beds and also both base metal and iron ore mineralisation associated with the BIF-marble-calcsilicate sequence extending south and southwest from the Stanley Mine.

3.1 Regional structure and tectonics

The Hutchison Group was affected by the Kimban Orogeny, a major period of deformation, metamorphism and granite intrusion which extended between 1785 Ma and 1700Ma. The Kimban Orogeny comprised three main tectonic events:

- An early high grade amphibolite to granulite facies event (M1)

- A high grade isoclinal folding event with some possible thrusting (D2)

- A lower grade open folding event (D3) with associated shearing along discrete mylonite zones.

Hutchison Group rocks have been extensively intruded by middle to late Palaeoproterozoic granites ranging in age from 1845Ma to 1710Ma .

Typically BIF's occur as sinuous belts of magnetite-bearing rocks generally strongly deformed and recrystallised. They are dominated by quartz, magnetite, iron rich silicate minerals (hornblende, anthophyllite, grunerite, gedrite, diopside and tremolite), dolomitic carbonate and local accessories include apatite, garnet and pyrite. These rocks give rise to corridors of distinctive high amplitude magnetic anomalies. Amphibolites are characterised by lower magnitude anomalies to magnetite and require higher resolution images.

BIFs are moderately to strongly banded with magnetite rich layers alternating with iron silicate rich, carbonate rich and quartz rich layers. Typically, banding is layer parallel (termed S1) and can be seen to be strongly deformed by F2 isoclinal folds. Intrafolial F2 folds can be seen in core to be refolded by more open F3 folds. There is clear evidence on a mesoscopic scale of thickening of individual magnetite layers in fold noses. This suggests strongly that the same process is happening on a macroscopic scale.

3.2 Structures

The Cockabidnie tenement is dominated by the Campoona Syncline which is a key structural feature that may also play an important role in nickel-cobalt mineralisation. Aeromagnetic data indicates a NNE-trending open syncline with an approximate 5km strike length. Amphibolitic gabbro with anomalous nickel-cobalt has been identified in the core of the Campoona Syncline.

3.3 Regolith and base of oxidation

The regolith at Cockabidnie is dominated by Cainozoic soils, wind-blown and alluvial sands together with calcrete and saprolitic clays. Ironstone lag is ubiquitous over the EL and can most probably be attributed to eroded laterite.

4. Exploration to date

Lincoln Minerals exploration program for the Cockabidnie area focussed initially on potential unconformity uranium mineralisation associated with the base of the Blue Range Beds combined with ongoing exploration for gold and base metals particularly in the Campoona Syncline and southwest of Sugarloaf Hill. The key to this exploration program was a detailed high-resolution aeromagnetic and radiometric survey to identify uranium-only radiometric anomalies in the first case but also to identify strategic structures such as shear zones, faults and graphitic schist units intersecting the unconformity.

A low level airborne geophysical survey was undertaken in February 2007 for 1,934 line kilometres at a line spacing of 100m. Geophysical data and expenses were shared between Centrex Metals Limited and Lincoln Minerals. A comprehensive report on the geophysics of Cockabidnie was included in the first annual report for EL3609 Cockabidnie (Centrex Metals, 2007). A 200m spaced Airborne Full Tensor Gravity (FTG) survey flown by Bell Geospace was completed for Centrex in August/September 2009.

Lincoln Minerals' drilling results include zones of elevated uranium up to 81ppm U below calcrete soil uranium anomalies. The elevated uranium occurs in basement rocks that were originally not far below a Mesoproterozoic unconformity analogous to Alligator River style uranium mineralisation in the Northern Territory.

Surface geochemical calcrete gold anomalies (>10ppb Au and up to 272ppb Au) occur southwest of Sugarloaf Hill Mine and in the Campoona Syncline. There are >100ppm Cu, >100ppm Zn and >50ppm Ni anomalies coincident with the calcrete gold anomalies (Figure 2).

The first phase of drilling was completed during October 2007. 45 aircore and slimline RC drillholes were drilled for a total of 3,396m. Lincoln Minerals discovered lateritic nickel mineralisation in the Campoona Syncline. Mineralisation up to 0.7% Ni + 0.05% Co occurs at a depth of about 15-20m beneath shallow cover and overlies gabbroic amphibolite with up to 0.1% Ni in fresh bedrock (Figures 3, 4 and 5). The aeromagnetic and calcrete anomalies associated with mineralisation extend over a strike length of 5 km.

The second phase of drilling was completed during April 2008. The drilling of 3,817m by Silver City Drilling outlined further lateritic/saprolitic nickel-cobalt-scandium mineralisation grading up to 1.15% Ni (with 0.045% Co, 0.037% Cu and 0.18% Zn; CBAC182, 25-26m) and 0.33% Co (with 0.21% Ni and 0.07% Cu; CBAC185, 30-31m). There are significant intervals of mineralisation up to 30m wide (CBAC185, 20-50m @ 0.13% Co, 0.18% Ni and 0.05% Cu).

These results have identified a zone of scattered lateritic and saprolitic nickel-cobalt mineralization over a strike length of 5 km. The mineralisation occurs to depths of 50m beneath shallow soil and sand cover 5-15m thick and is relatively enriched in cobalt relative to typical lateritic nickel deposits. The latest results outline a number of pods or exploration targets. However, because of the widely spaced drill lines and line spacing of existing aeromagnetics for targeting, the pods are open both along strike and in some cases across strike.

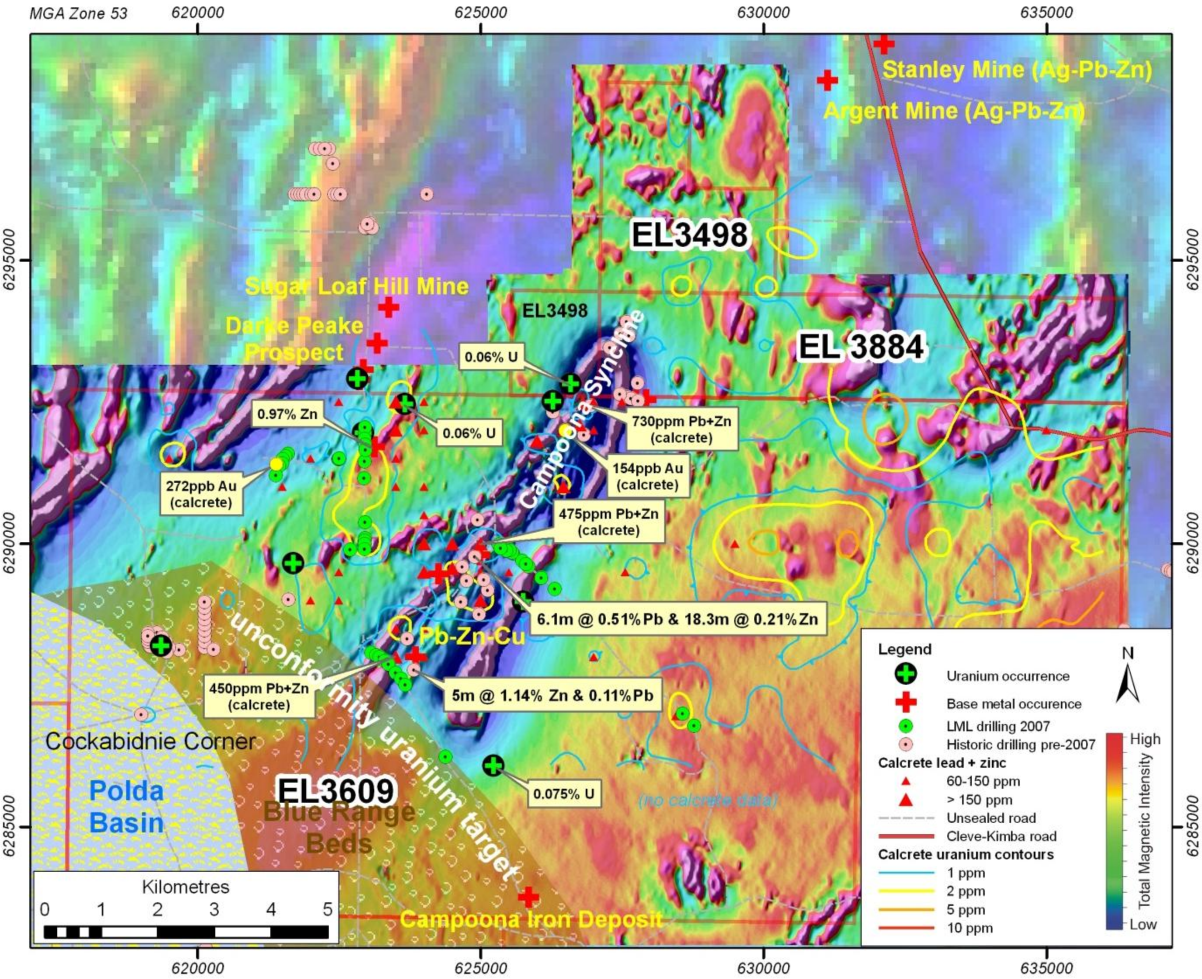


Figure 2: Summary map of anomalous calcrete, soil and rock chip samples, previous drilling and recent LML drilling, Cockabidnie Project

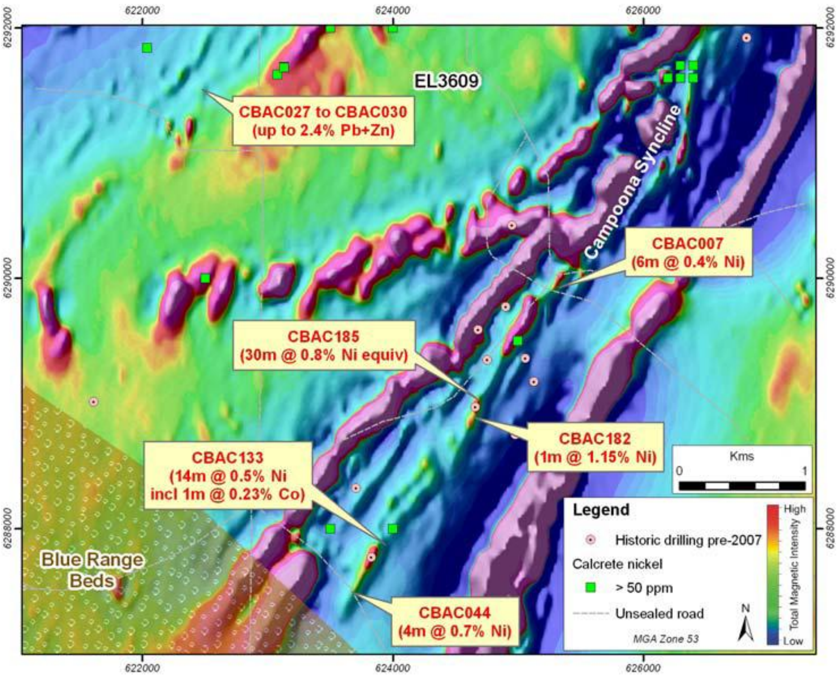


Figure 3: Lincoln Minerals drill holes intersecting nickel-cobalt mineralisation

Figure 4: Typical chip tray showing ~15m of shallow cover

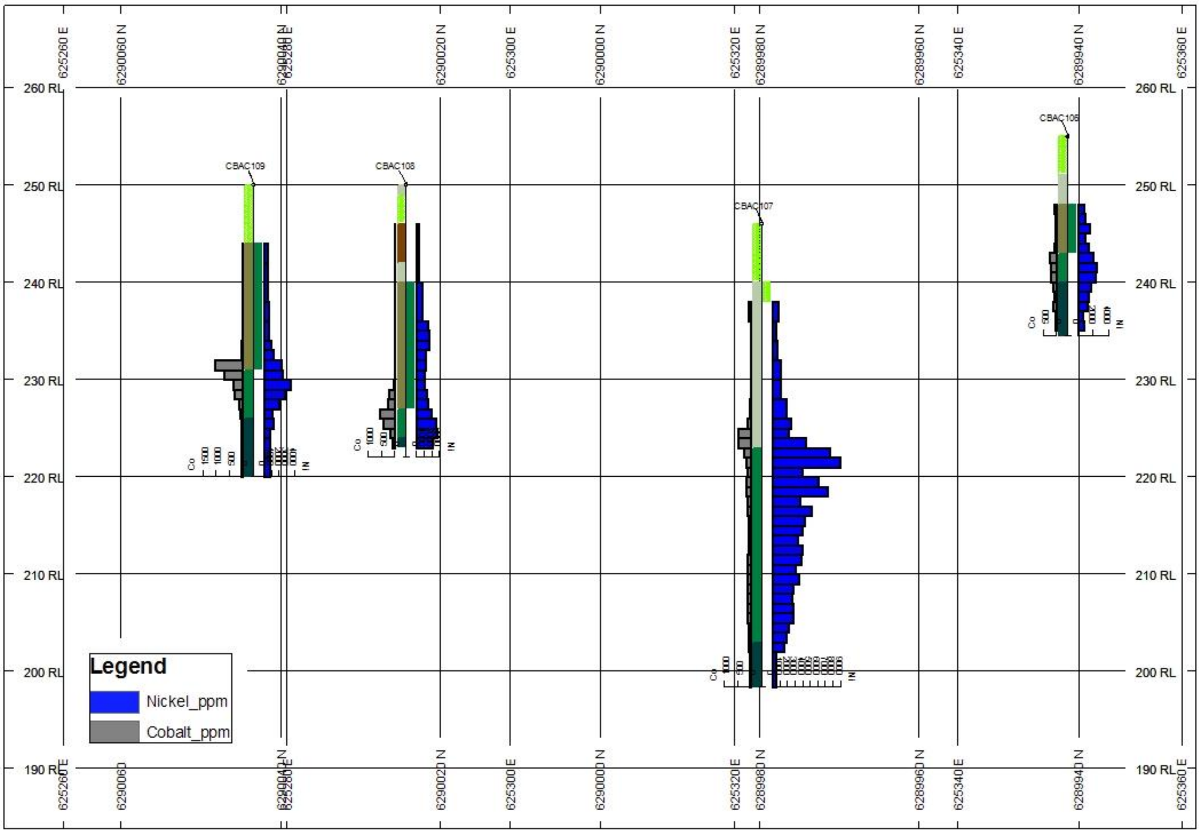


Figure 5: Simplified cross section displaying nickel-cobalt intercepts

5. Previous Exploration

Exploration by CRA Exploration and Shell Metals/Billiton (Env 3573) centred on the Campoona Syncline where there is high background base metal geochemistry (up to 0.9% Pb in outcrop samples) and Sirotem anomalies associated with BIFs. Many Sirotem anomalies were attributed to graphitic schist and uranium anomalies were mainly in surficial sands. One drillhole 5km ENE of Cockabidnie Corner intersected 6.1m @ 0.51% Pb and 18.3m @ 0.21% Zn. Drilling by Western Mining in the same general area intersected intervals up to 5m @ 1.14% Zn and 0.11% Pb (Env 6566).

A 10 x background gas-in-soil radon anomaly was located by the Pancontinental Mining-PNC-Afmeco Joint Venture 1.5km north-northeast of Cockabidnie Corner with coincident uranium in borehole water and hematite alteration in both the Mesoproterozoic cover and underlying graphitic schist basement (Env. 3551). Neither the source of the radon nor uranium anomalies were identified from RAB and core drilling but the anomaly highlights the potential in this region for unconformity-related uranium mineralisation.

6. Proposed VTEM Survey

Lincoln Minerals is proposing a Versatile Time-Domain Electromagnetic (VTEM) geophysical system to survey the Campoona Syncline area, comprising the following main instrumentation:

- The VTEM Time Domain EM system for locating conductive anomalies and mapping earth resistivities
- A high-sensitivity proton precession magnetometer for mapping geologic structure and lithology.
- A proton precession magnetometer base station for diurnal correction.
- A Radar altimeter with an accuracy of approximately 1 meter
- A GPS Navigation System providing an in-flight accuracy up to 3 meters
- Data processing and mapping, by experienced geophysicists, using the latest computer technology and state-of-the-art software.

The location of the proposed survey is shown in Figure 6.

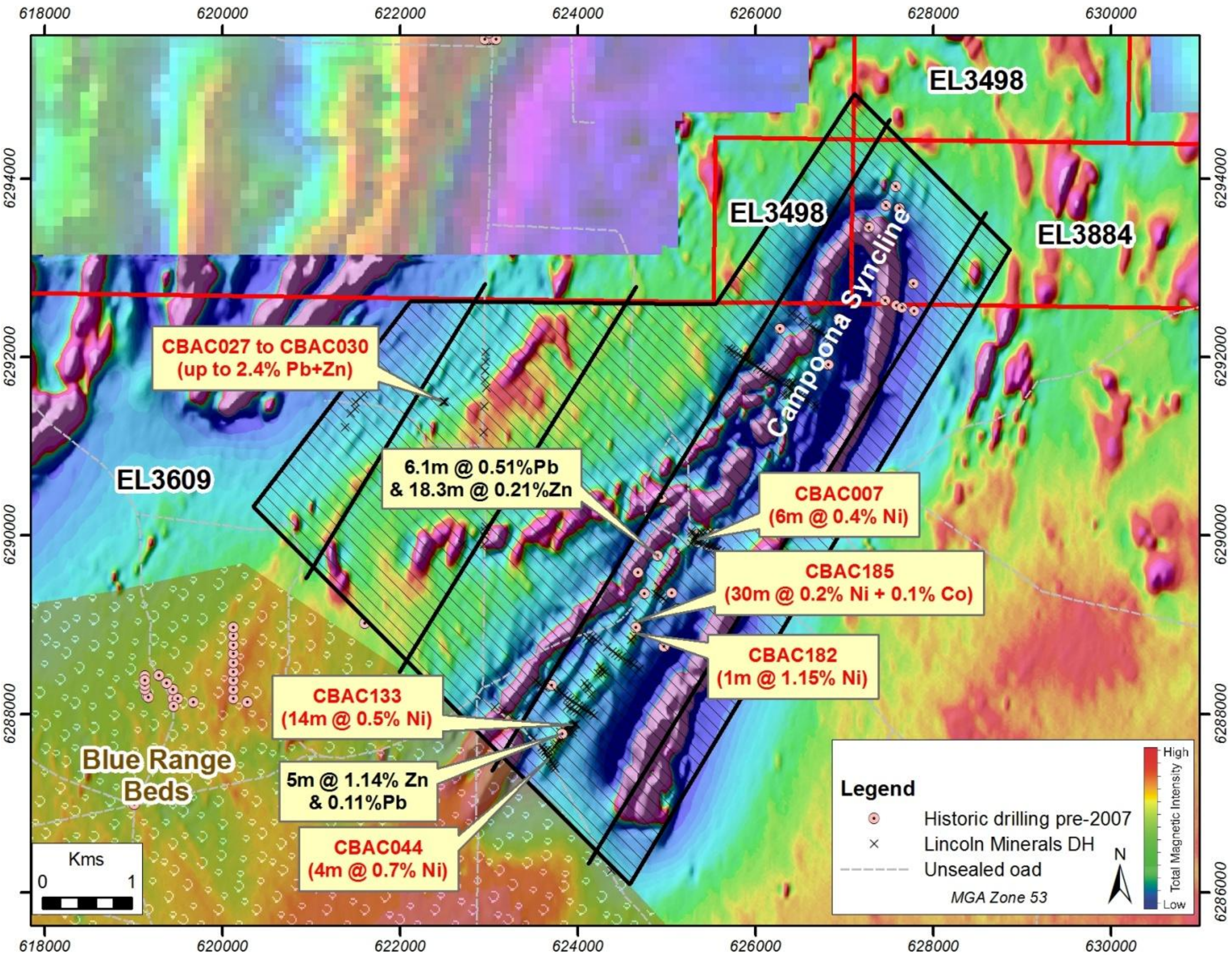


Figure 6: Location of proposed VTEM survey over the Campoona Syncline

Proposed survey details are:

	Line Spacing	Line Length	Line Direction	Tie Line Spacing	Tie Line Direction	Line kms
Campoona Syncline	100m	2.5 – 6.0 km	135 - 315			350
				1,500	045 - 225	25
						375

The proposed height of the helicopter and sensors above ground level are:

- Helicopter – 75 to 85 meters (tow cable dependant)
- EM sensor – 35 to 45 meters
- Magnetic sensor – 60 to 70 meters (tow cable dependant).

The estimated cost of the survey is:

VTEM Basic Survey Charge per line km			$350
For an estimated	375	line km	$131,250
Helicopter mob to Base of Operations			$15,000
Equipment and Crew mob to Base of Operations			$10,000
Estimated Survey Charge			**$156,250**
Additional Fuel Charges per line-km		$20.00	
Additional Fuel Charges			$7,500
Additional Accomodation Charges per line-km		$20.00	
Additional Camp (Accomodation & Meals) Charges			$7,500
Estimated Total Survey Charge			**$171,250**
Additional Charge for B-Field (optional) per line-km		$15.00	
Additional Charge for B-Field (optional)			$5,750
Estimated Survey Charge with B-Field			**$177,000**

The VTEM or Versatile Time Domain Electro Magnetic system is the most innovative and successful airborne electromagnetic system to be introduced in more than 30 years. The proprietary receiver design using the advantages of modern digital electronics and signal processing delivers exceptionally low-noise levels. Coupled with a high dipole moment transmitter, the result is unparalleled resolution and depth of investigation in precision electromagnetic measurements.

Key features include:

- Superior Exploration Depth – Over 400 metres
- Low Base Frequency (25 or 30 Hz) for Penetration through conductive cover
- High Spatial Resolution – 2 to 3 metres
- Improved Interpretability due to Receiver-Transmitter symmetry
- Spotting drill targets directly off of the airborne results
- Excellent resistivity discrimination and detection of weak anomalies
- Virtually impervious to spheric activity.

The system was designed to be field configurable to best suit a large variety of different geophysical requirements from deep penetration to optimizing the discrimination within a narrow range of resistivity values.

The system is easily transportable. It can be disassembled for packaging in relatively small units for shipping to surveys around the world.

In the event of damage to the EM bird in-flight or while being transported between survey sites, the unique design allows the easy replacement of any part of the system in the field. The transmitter loop can be assembled or disassembled in 3-4 hours.

The recent surveys flown with VTEM have produced superior results over the same test areas flown by competing airborne EM surveys. VTEM has flown the Reid-Mahaffy, Caber, Perseverance and Montcalm test ranges and the results have demonstrated that VTEM provides the Industry's highest signal/noise ratio and conductor spatial resolution.

It is believed that the lateritic/saprolitic nickel-cobalt-scandium mineralisation at Cockabidnie is structurally controlled and directly overlies massive gabbroic amphibolite which is believed to be conductive and can be detected by airborne electromagnetics. As such, a Versatile Time Domain Electromagnetic (VTEM) survey is proposed to cover the Campoona Syncline occurrences and surrounds in order to hopefully detect the known occurrences, highlight other anomalies that may represent previously undiscovered or blind deposits at shallow depths and provide walk up drill targets.

A dedicated PC-based field computer workstation will be used in the field for purposes of displaying geophysical data for quality control, calculating and displaying the navigation, producing preliminary EM anomaly information and diurnally corrected magnetic maps, and copying/verifying the digital data.

The survey crew will consist of at least the following personnel:

1. An experienced Geophysicist or Geophysical Technician/Project Manager to supervise the survey operations, perform quality control of the data and to assist in arranging the survey logistics and field operations.
2. A Geophysical Operator to maintain and operate the geophysical instruments.
3. An experienced Survey Pilot, who has demonstrated his ability to fly the geophysical instrumentation safely and within survey specifications.
4. An experienced Aircraft Mechanic will be on stand-by at the helicopter base and should be ready to be on the survey site with minimal delay.

7. Outcomes

The aims of the geophysical survey were to identify Ni-Co mineralisation and to define and target additional nickel-cobalt-scandium resources. The geophysical surveys would provide detailed geological and geophysical interpretations to assist drill hole planning and, in addition, to define what the Campoona Syncline may hold in respect to other base metal and precious metal mineralisation. Upon selecting electromagnetic (EM) methods for Cockabidnie survey, it was found through discussion and optimising current technologies with Geophysical contractors that the width and dip of the Ni-Co bodies was not suited to the VTEM style survey. After much deliberation and rationale the TEMPEST EM method supplied by Fugro was chosen for its ability to quickly acquire high resolution, transient electromagnetic (TEM) data that could be used for both conductivity mapping applications and conductive target detection. TEMPEST is a broad bandwidth square wave time-domain EM system operated from a fixed-wing aircraft. TEMPEST's fixed-wing configuration provides fast and cost effective acquisition of detailed conductivity data over large areas, enabling quick identification of high priority targets, and minimizing environmental impact and access problems. TEMPEST's broad bandwidth makes it capable of resolving subtle variations in conductivity from the near surface to many hundreds of metres deep, making it ideally suited to a wide range of exploration targets. Over the course of securing Geophysical contractors, a major company focus developed into graphite resources on the Eyre Peninsula with a recent spike in graphite prices. The survey was now able to target both Ni-Co amphibolite conductors as well as highly conductive graphite horizons. All interpretations are currently being undertaken.

The survey was expected to be undertaken during May 2012 but did not eventuate until mid July 2012. Upon flight and data capture, the turnaround for data processing was estimated at 6-8 weeks post data capture. This also has blown out by 4-6 weeks due to the contractors "backlog" and not delivered until October. So future planning of Geophysical surveys must take into account contractors' delays and possible penalties attracted to them for these delays.

Two maps have been included below to show the anomalies detected with the X and Z channel merged data respectively (Figures 7 and 8). The following interpretation maps (Figures 9 and 10) display some geological interpretation and follow up areas associated with the EM anomalies. In the north western part of EL4883 the large EM anomaly can be deduced as a large saline water body associated with surficial sand dunes. There is also another high amplitude anomaly associated with possibly the contact of the Blue Range Beds with the Hutchison Group which may also be attributed to saline water. Several anomalies of particular interest in the northwest quadrant of EL4883 is the Sugarloaf trend where historic and recent drilling by Archer identified graphitic schist and previous exploration also discovered Cu-Au anomalism in calcrete. Other EM anomalies of note are within the Campoona Syncline where Lincoln Minerals has intersected Ni-Co mineralisation and other drillhole intercepts of graphitic schist. Interesting to note that the Archer Campoona Shaft EM anomaly is not clearly defined on the east, but several other EM anomalies are defined to the immediate west and warrant further follow up and possible drilling. Further processing, specialist anomaly identification and modelling is planned for the EM imagery in the coming weeks.

8. Rehabilitation

Due to the aerial survey having no ground impact no rehabilitation was required over the Cockabidnie exploration licenses. A significant landholder engagement program was run prior to the flights being undertaken and this was met with positive responses for notifying landholders and any concerns they may have had were resolved prior to the survey. Lincoln Minerals offered on ground services to landholders who expressed concerns for livestock during the survey. There was no request from Lincoln Minerals to assist landholders during the survey and several landholders thanked us for keeping them informed during the survey.

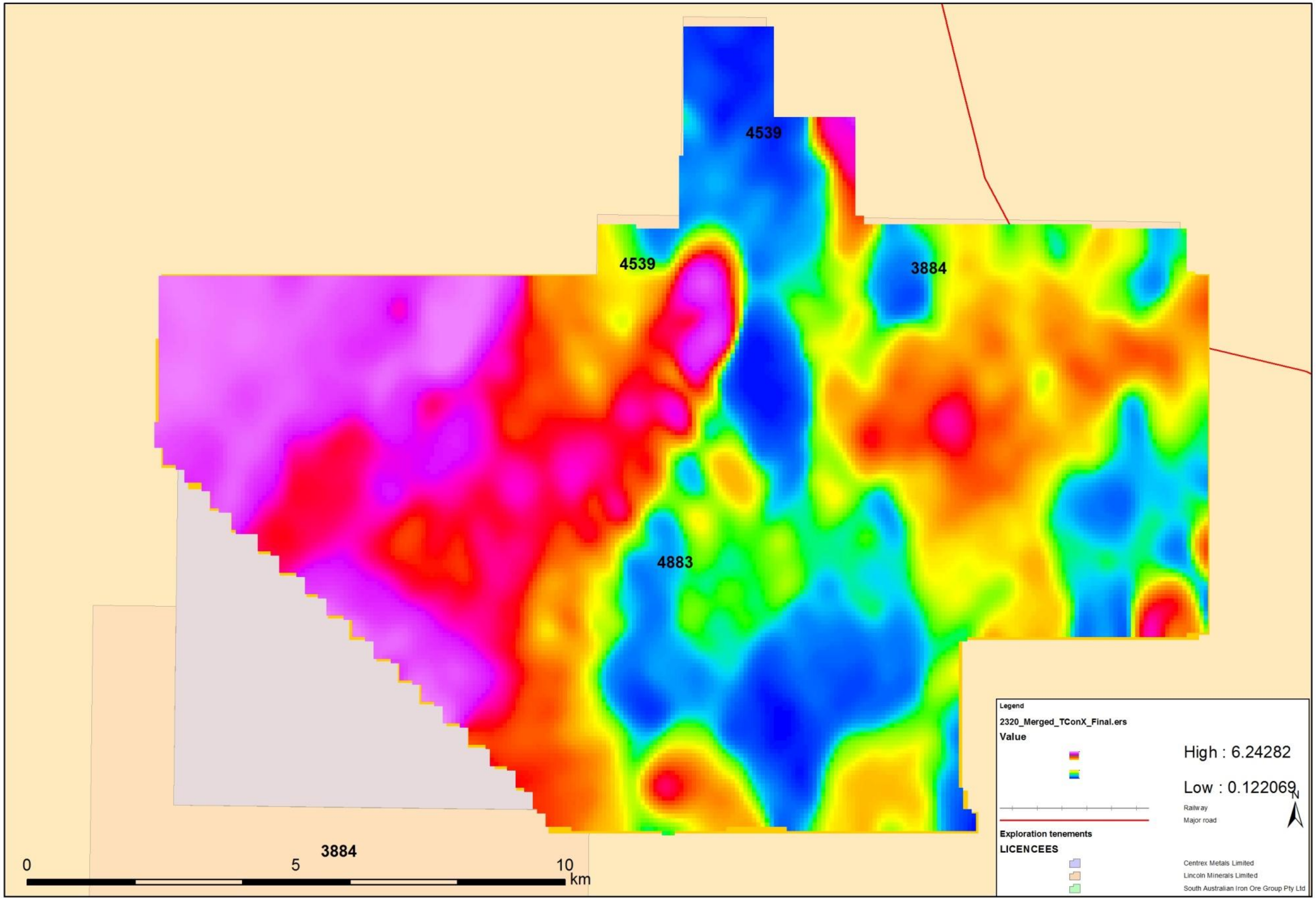


Figure 7: Airborne EM Merged X channel for Cockabidnie area

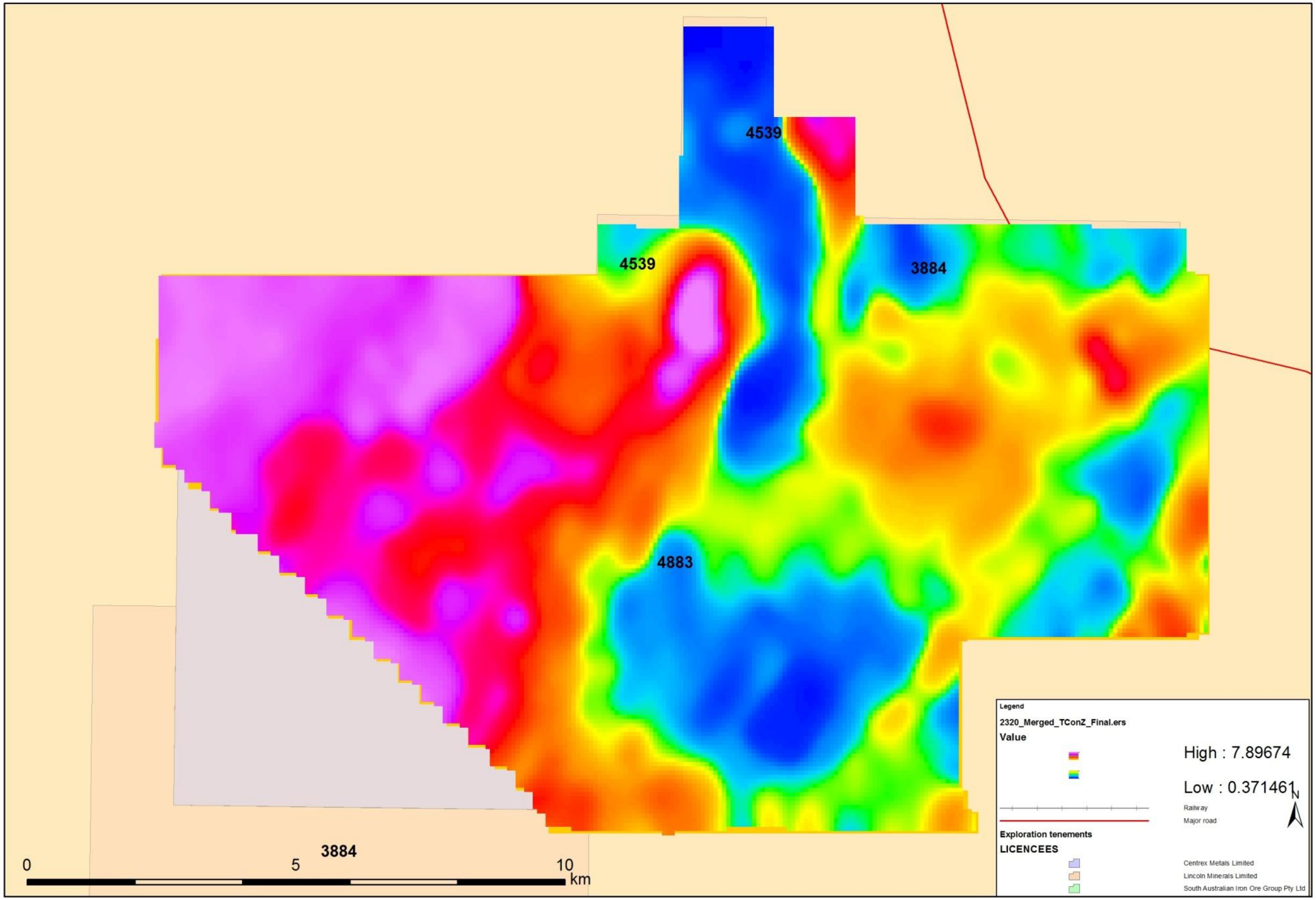


Figure 8: Airborne EM Merged Z channel for Cockabidnie area

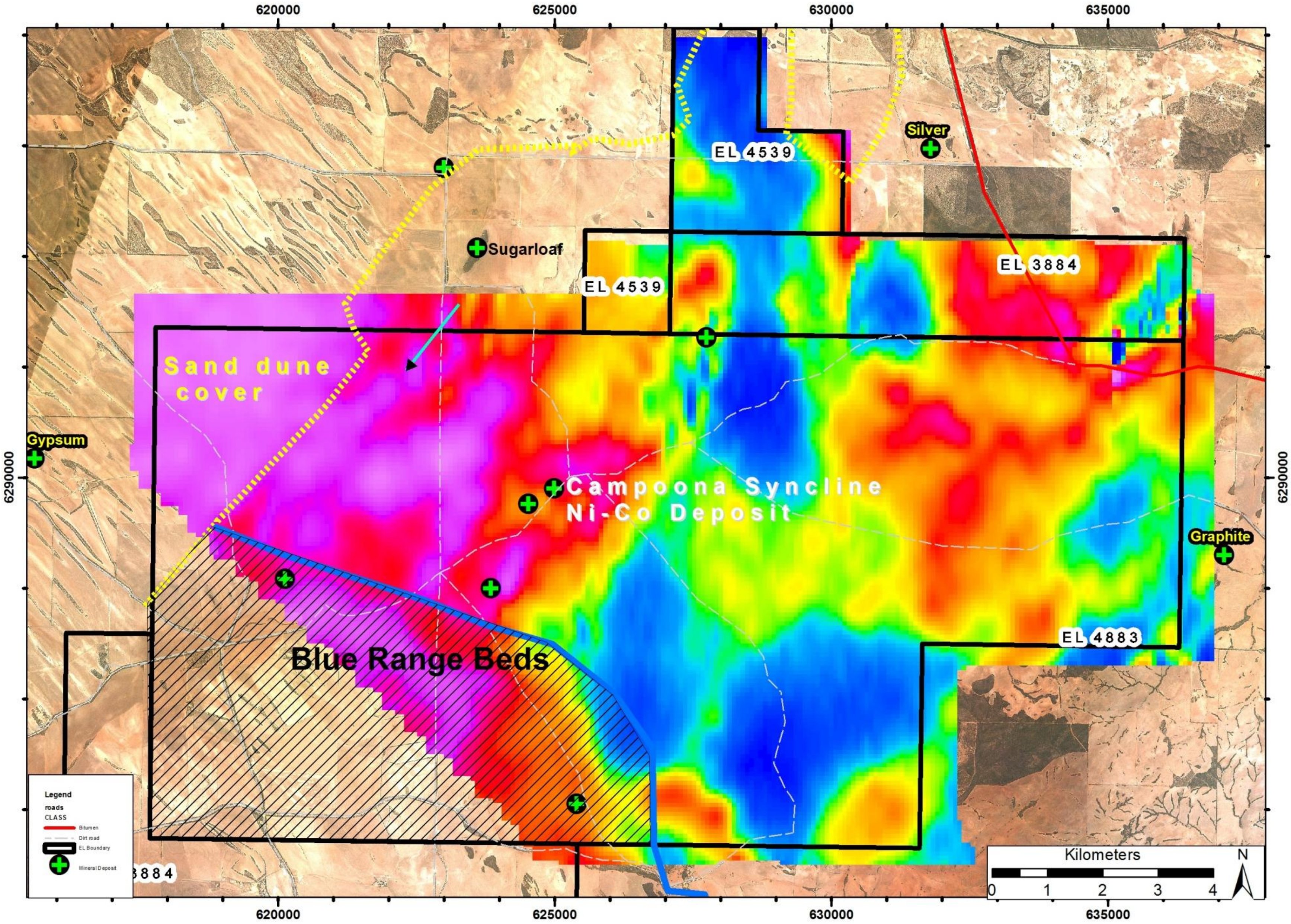


Figure 9: Preliminary interpretation of EM anomalies

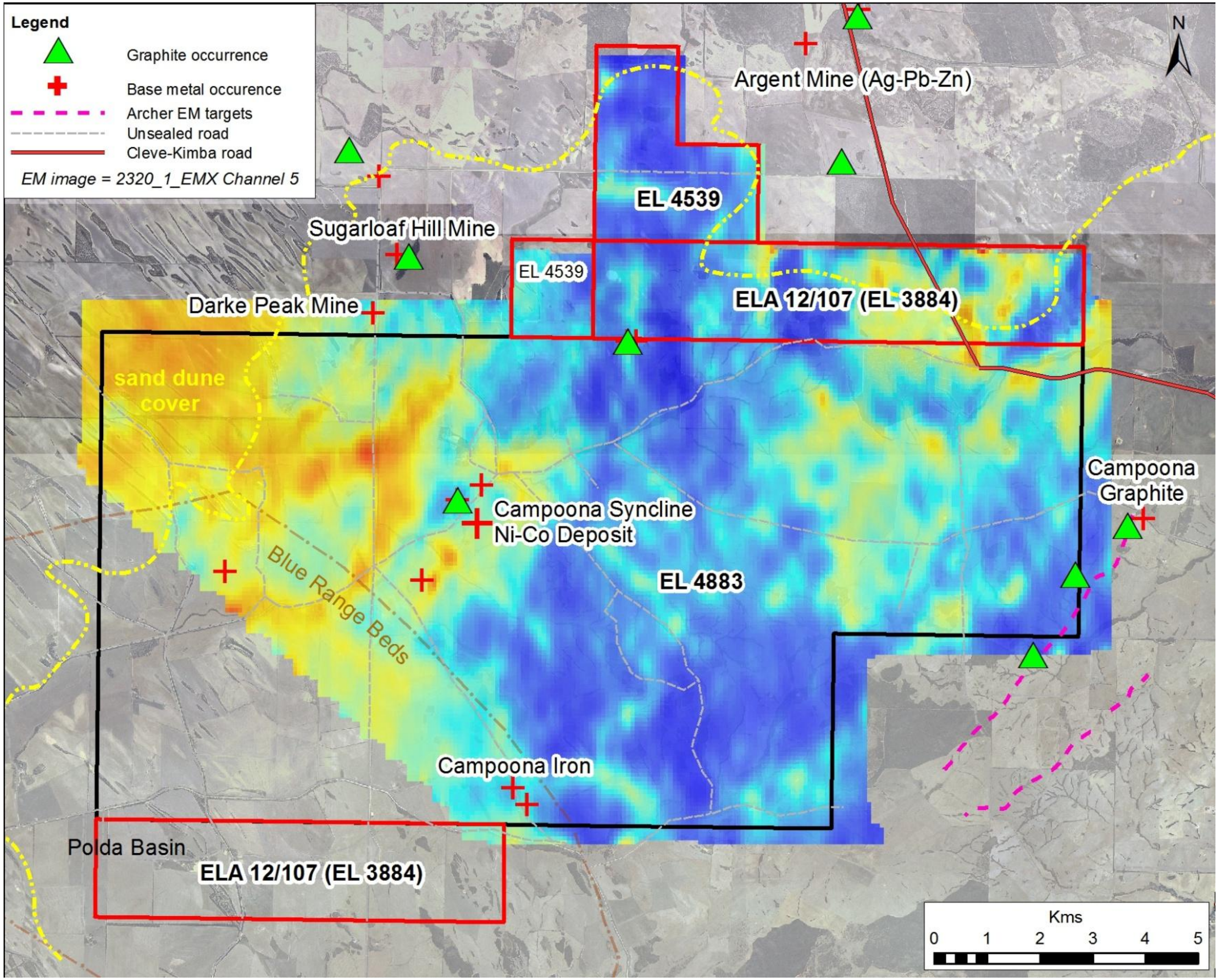


Figure 10: Preliminary interpretation of EM anomalies

9. Invoicing

Invoice Date	Total (incl gst)
8th May 2012	$125,612.52
25th June 2012	$199.65
31st July 2012	$62,806.26
31st July 2012	$4,950.00
15th Oct 2012	$20,935.42
	Total $ 214,503.85
Cockabidnie component	$109,351.85
50% PACE funding or max grant value payable	**$52,500**

FUGRO AIRBORNE SURVEYS PTY LTD

U3, 435 Scarborough Beach Road
Osborne Park, 6017
PO Box 1847
Osborne Park, 6916
Western Australia

Telephone: +61 8 9273 6400
Facsimile: +61 8 9273 6466

TAX INVOICE

Lincoln Minerals Ltd
Att: Dwayne Povey
28 Greenhill Road
Wayville SA 5034

Telephone #: +61 8 8274 0243
Facsimile #: +61 8 8274 0242

DATE: 8 May 2012
OUR REF: J02320/LIN04
YOUR REF:

INVOICE NO: SI012640

RE: **TENEMENTS EL3609, EL3884 and EL4539 , SA** — 6010-1
AIRBORNE GEOPHYSICAL SURVEY — 6010-2
Progressive Invoice

Mobilisation	$	38,000.00		
Acquisition and Processing Charges 1,437 kms @ $106.00	$	152,322.00		
Total Contract Sum	**$**	**190,322.00**		
Amount due this invoice 60% of total estimated contract charges on signing of the contract			$	114,193.20
Sub Total			$	114,193.20
GST			$	11,419.32
Total Amount Payable including GST			**$**	**125,612.52**

All Enquiries To: P. Johnson

Prepared: P. Johnson

BDM: Maf.

PM: Johnson

INVOICE NO: **SI012640**
TOTAL AMT DUE: **$ 125,612.52**
ACCOUNT REF: **J02320/LIN04**

Thank You for Your Business
Please return this portion with your payment within 14 days

or please remit by telegraphic transfer to AUD Acc.:
Westpac Bank — BSB Number 036 022
109 St Georges Tce — Account Number 123647
PERTH 6000 — **Credit A/C Fugro Airborne Surveys Pty Ltd**
Remittance advice email address: accounts@fugroairborne.com.au

Distribution
Invoice File
Job File

FUGRO AIRBORNE SURVEYS PTY LTD

U3, 435 Scarborough Beach Road
Osborne Park, 6017
PO Box 1847
Osborne Park, 6916
Western Australia

Telephone: +61 8 9273 6400
Facsimile: +61 8 9273 6466

TAX INVOICE

Lincoln Minerals Ltd
Att: Dwayne Povey
28 Greenhill Road
Wayville SA 5034

Telephone #: +61 8 8274 0243
Facsimile #: +61 8 8274 0242

DATE: 31 July 2012
OUR REF: J02320/LIN04
YOUR REF:

INVOICE NO: SI012791

RE: **COCKABIDNIE & KOPPIO-KOOKABURRA, SA** 6010-1
AIRBORNE GEOPHYSICAL SURVEY 6010-2
Progressive Invoice

Mobilisation	$	38,000.00		
Acquisition and Processing Charges 1,437 kms @ $106.00	$	152,322.00		
Total Contract Sum	**$**	**190,322.00**		
Amount due this invoice 30% of total estimated contract charges on completion of flying			$	57,096.60
Sub Total			$	57,096.60
GST			$	5,709.66
Total Amount Payable including GST			**$**	**62,806.26**

All Enquiries To: P. Johnson

Prepared: P. Johnson

BDM:

PM:

INVOICE NO: SI012791
TOTAL AMT DUE: **$ 62,806.26**
ACCOUNT REF: **J02320/LIN04**

Thank You for Your Business
Please return this portion with your payment within 14 days

or please remit by telegraphic transfer to AUD Acc.:
Westpac Bank — BSB Number 036 022
109 St Georges Tce — Account Number 123647
PERTH 6000 — **Credit A/C Fugro Airborne Surveys Pty Ltd**
Remittance advice email address: accounts@fugroairborne.com.au

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FUGRO AIRBORNE SURVEYS PTY LTD

U3, 435 Scarborough Beach Road
Osborne Park, 6017
PO Box 1847
Osborne Park, 6916
Western Australia

Telephone: +61 8 9273 6400
Facsimile: +61 8 9273 6466

TAX INVOICE

Lincoln Minerals Ltd
Att: Dwayne Povey
28 Greenhill Road
Wayville SA 5034
6009

Telephone #: +61 8 8274 0243
Facsimile #: +61 8 8274 0242

DATE: 31 July 2012
OUR REF: J02320/LIN04
YOUR REF: 6011-2

INVOICE NO: **SI012793**

RE: **COCKABIDNIE & KOPPIO-KOOKABURRA, SA**
AIRBORNE GEOPHYSICAL SURVEY
Standby Invoice

Standby Charges

Date	Days	Description	
16-Jul-12	1.0	Short flight aborted due to turbulence. All data scrubbed.	
Total	1.0	days @ $4,500	$ 4,500.00

All Enquiries To: P.Johnson

Prepared: P.Johnson

BDM:

PM:

Sub Total	$ 4,500.00
GST	$ 450.00
Total Amount Payable including GST	**$ 4,950.00**

INVOICE NO: **SI012793**
TOTAL AMT DUE: **$ 4,950.00**
ACCOUNT REF: **J02320/LIN04**

Thank You for Your Business
Please return this portion with your payment within 14 days

or please remit by telegraphic transfer to AUD Acc.:
Westpac Bank — BSB Number 036 022
109 St Georges Tce — Account Number 123647
PERTH 6000 — **Credit A/C Fugro Airborne Surveys Pty Ltd**
Remittance advice email address: accounts@fugroairborne.com.au

Distribution Invoice File / Job File

Fugro Airborne Surveys Pty Ltd ABN: 33 009 238 395
A member of the Fugro group of companies with offices around the world

ISO 9001 FS521009 OHSAS 18001 OHS 540862

FUGRO AIRBORNE SURVEYS PTY LTD

U3, 435 Scarborough Beach Road
Osborne Park, 6017
PO Box 1847
Osborne Park, 6916
Western Australia

Telephone: +61 8 9273 6400
Facsimile: +61 8 9273 6466

TAX INVOICE

Lincoln Minerals Ltd
Att: Dwayne Povey
28 Greenhill Road
Wayville SA 5034

Telephone #: +61 8 8274 0243
Facsimile #: +61 8 8274 0242

DATE: 25 June 2012
OUR REF: J02320/LIN04
YOUR REF:

INVOICE NO: SI012699

RE:	**COCKABIDNIE & KOPPIO-KOOKABURRA, SA**	6010-1
	AIRBORNE GEOPHYSICAL SURVEY	6010-2
	Progressive Invoice	
	Extension of insurance coverage for "Accidental Injury to Animals" as requested	$ 181.50
All Enquiries To: P. Johnson		
Prepared: P. Johnson		
BDM:		
	Sub Total	$ 181.50
PM:	**GST**	$ 18.15
	Total Amount Payable including GST	**$ 199.65**

INVOICE NO: SI012699
TOTAL AMT DUE: $ 199.65
ACCOUNT REF: J02320/LIN04

Thank You for Your Business
Please return this portion with your payment within 14 days

or please remit by telegraphic transfer to AUD Acc.:

Westpac Bank — BSB Number 036 022
109 St Georges Tce — Account Number 123647
PERTH 6000 — **Credit A/C Fugro Airborne Surveys Pty Ltd**
Remittance advice email address: accounts@fugroairborne.com.au

Distribution
Invoice File
Job File

FUGRO AIRBORNE SURVEYS PTY LTD

U3, 435 Scarborough Beach Road
Osborne Park, 6017
PO Box 1847
Osborne Park, 6916
Western Australia

Telephone: +61 8 9273 6400
Facsimile: +61 8 9273 6466

TAX INVOICE

Lincoln Minerals Ltd
Att: Dwayne Povey
28 Greenhill Road
Wayville SA 5034

Telephone #: +61 8 8274 0243
Facsimile #: +61 8 8274 0242

DATE: 15 October 2012
OUR REF: J02320/LIN04
YOUR REF:

INVOICE NO: **SI012929**

RE:	**COCKABIDNIE & KOPPIO-KOOKABURRA, SA** **AIRBORNE GEOPHYSICAL SURVEY** **Final Invoice**			6010-1 6010-2
	Mobilisation	$	38,000.00	
	Acquisition and Processing Charges 1,437 kms @ $106.00	$	152,322.00	
All Enquiries To: P.Johnson	**Total Contract Sum**	**$**	**190,322.00**	
	Less Amounts Already Invoiced SI012640 SI012791	$ $	(114,193.20) (57,096.60)	
Prepared: P.Johnson				
	Amount due this invoice			$ 19,032.20
BDM:				
	Sub Total			$ 19,032.20
PM:	**GST**			$ 1,903.22
	Total Amount Payable including GST			**$ 20,935.42**

INVOICE NO: **SI012929**
TOTAL AMT DUE: **$ 20,935.42**
ACCOUNT REF: **J02320/LIN04**

Thank You for Your Business
Please return this portion with your payment within 14 days

or please remit by telegraphic transfer to AUD Acc.:

Westpac Bank — BSB Number 036 022
109 St Georges Tce — Account Number 123647
PERTH 6000 — Credit A/C Fugro Airborne Surveys Pty Ltd
Remittance advice email address: accounts@fugroairborne.com.au

Distribution: Invoice File, Job File

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APPENDIX 1

Fugro - Cockabidnie and Koppio-Kookaburra Tempest Geophysical Survey

Acquisition and processing report

Cockabidnie & Koppio-Kookaburra, South Australia TEMPEST Geophysical Survey

Acquisition and Processing Report

for

Lincoln Minerals Limited

Prepared by :	M. Abubeker L. Stenning
Authorised for release by :	…………………………..
	…………………………..

Survey flown: July 2012

by

Fugro Airborne Surveys
435 Scarborough Beach Road, Osborne Park WA 6017, Australia
Tel: (61-8) 9273 6400   Fax: (61-8) 9273 6466

FAS JOB # 2320

CONTENTS

1. SURVEY OPERATIONS AND LOGISTICS

1.1 Introduction

Between the 14th and the 23rd July 2012, Fugro Airborne Surveys Pty. Ltd. (FAS) undertook an airborne TEMPEST electromagnetic and magnetic survey for Lincoln Minerals Limited, over the Cockabidnie and Koppio-Kookaburra Project areas in South Australia. Total coverage of the survey area amounted to 1437 line kilometres flown in 5 flights. The survey was flown using a CASA 212 aircraft, registration VH-TEM owned and operated by FAS. This report summarises the procedures and equipment used by FAS in the acquisition, verification and processing of the airborne geophysical data.

1.2 Survey Base

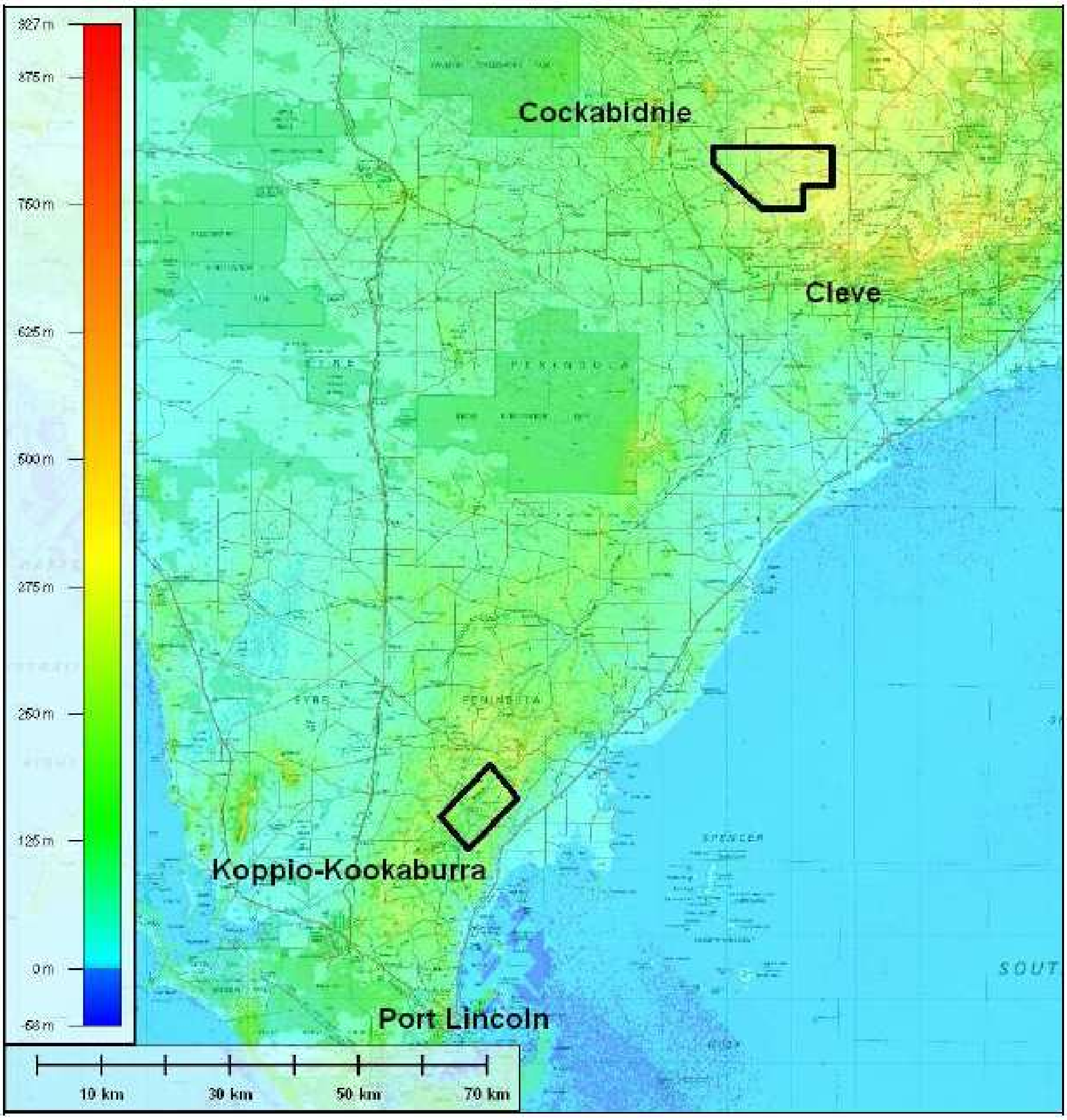
The survey was based out of Port Lincoln, South Australia. The survey aircraft was operated from Port Lincoln Airport with the aircraft fuel available on site. A temporary office was set up at the Hilton Motel, Port Lincoln, where all survey operations were run and the post-flight data verification was performed.

1.3 Survey Personnel

The following personnel were involved in this project:

Project Supervision - Acquisition	Peter Johnson
- Processing	Denis Cowey
On-site Crew Leader	Ben Riggs
Pilot/s	Peter Hiskins, Elizabeth Derricks, Mark Harradence
System Operator/s	Ben Riggs
Engineer	James Kenny, John Remington-Gurney
Field Data Processing	Mohamed Abubeker
Office Data Processing	Mohamed Abubeker

1.4 Area Map



Cockabidnie and Koppio-Kookaburra survey areas
GDA94 MGA 53

1.5 General Disclaimer

It is Fugro Airborne Survey's understanding that the data and report provided to the client is to be used for the purpose agreed between the parties. That purpose was a significant factor in determining the scope and level of the Services being offered to the Client. Should the purpose for which the data and report is used change, the data and report may no longer be valid or appropriate and any further use of, or reliance upon, the data and report in those circumstances by the Client without Fugro Airborne Survey's review and advice shall be at the Client's own or sole risk.

The Services were performed by Fugro Airborne Survey exclusively for the purposes of the Client. Should the data and report be made available in whole or part to any third party, and such party relies thereon, that party does so wholly at its own and sole risk and Fugro Airborne Survey disclaims any liability to such party.

Where the Services have involved Fugro Airborne Survey's use of any information provided by the Client or third parties, upon which Fugro Airborne Survey was reasonably entitled to rely, then the Services are limited by the accuracy of such information. Fugro Airborne Survey is not liable for any inaccuracies (including any incompleteness) in the said information, save as otherwise provided in the terms of the contract between the Client and Fugro Airborne Survey.

2. SURVEY SPECIFICATIONS AND PARAMETERS

2.1 Area Co-ordinates

The survey areas were located within GDA94 MGA Zone 53S, Central Meridian = 135
(Note - Co-ordinates in GDA94/MGA Zone 53S)

Area 1 - Cockabidnie

Easting	Northing
617815	6293004
636354	6293004
636354	6286966
631709	6286966
631709	6283270
625428	6283391
617774	6290360

Area 2 – Koppio-Kookaburra

Easting	Northing
575505	6188661
583148	6196585
587469	6191381
579820	6183495

2.2 Survey Area Parameters

Job Number	-	2320
Survey Company	-	Fugro Airborne Surveys Pty Ltd
Date Flown	-	19th – 23rd July 2012
Client	-	Lincoln Minerals Limited.
EM System	-	25 Hz TEMPEST
Navigation	-	Real-time differential GPS
Datum	-	GDA94
Projection	-	MGA Zone 53S
Area Names	-	Cockabidnie & Koppio-Kookaburra, S.A.
Nominal Terrain Clearance	-	120 m
Traverse Line Spacing	-	400 m (Area 1) 100 m (Area 2)
Traverse Line Direction	-	090 – 270 degrees (Area 1) 120 – 320 degrees (Area 2)
Traverse Line Numbers	-	10001 – 10026 (Area 1) 10001 – 10112 (Area 2)
Tie Line Spacing	-	4000 m (Area 1) 1000 m (Area 2)
Tie Line Direction	-	000 – 180 degrees (Area 1) 044 – 224 degrees (Area 2)
Tie Line Numbers	-	19001 - 19005 (Area 1) 19001 – 19008 (Area 2)
Line Kilometres Cockabidnie	-	445 km
Line Kilometres Koppio-Kookaburra	-	992 km
Total Survey Line Kilometres	-	1437 km

2.3 Job Safety Plan

A Job Safety Plan was prepared and implemented in accordance with the Fugro Airborne Surveys Occupational Safety & Health Management System.

3. AIRCRAFT EQUIPMENT AND SPECIFICATIONS

3.1 Aircraft

Manufacturer	-	CASA
Model	-	212
Registration	-	VH-TEM
Ownership	-	Fugro Airborne Surveys Pty Ltd

3.2 TEMPEST System Specifications

Specifications of the TEMPEST Airborne EM System (Lane et al., 2000) are:

- Base frequency - 25 Hz
- Transmitter area - 221 m^2
- Transmitter turns - 1
- Waveform - Square
- Duty cycle - 50%
- Transmitter pulse width - 10 ms
- Transmitter off-time - 10 ms
- Peak current - 280 A
- Peak moment - 61880 Am^2
- Average moment - 30940 Am^2
- Sample rate - 75 kHz on X and Z
- Sample interval - 13 microseconds
- Samples per half-cycle - 1500
- System bandwidth - 25 Hz to 37.5 kHz
- Flying height - 120 m (subject to safety considerations)
- EM sensor - Towed bird with 3 component dB/dt coils
- Tx-Rx horizontal separation - 120 m (nominal)
- Tx-Rx vertical separation - 35 m (nominal)
- Stacked data output interval - 200 ms (~12 m)
- Number of output windows - 15
- Window centre times - 13 μs to 16.2 ms
- Magnetometer - Stinger-mounted cesium vapour
- Magnetometer compensation - Fully digital
- Magnetometer output interval - 200 ms (~12 m)
- Magnetometer resolution - 0.001 nT
- Typical noise level - 1.0 nT
- GPS cycle rate - 1 second

3.2.1 EM Receiver and Logging Computer

The EM receiver computer was an EMFASDAS. The EM receiver computer executes a proprietary program for system control, timing, data acquisition and recording. Control, triggering and timing is provided to the TEMPEST transmitter and Digital Signal Processing (DSP) boards by the timing card, which ensures that all waveform generation and sampling is accomplished with high accuracy. The timing card is synchronised to the Global Positioning System (GPS) through the use of the Pulse Per Second (PPS) output from the system GPS card. Synchronisation is also provided to the magnetometer processor card for the purpose of accurate magnetic sampling with respect to the EM transmitter waveform.

The EM receiver computer displays information on the main screen during system calibrations and survey line acquisition to enable the airborne operator to assess the data quality and performance of the system.

3.2.2 TEMPEST Transmitter

The transmitted waveform is a square wave of alternating polarity, which is triggered directly from the EM receiver computer. The nominal transmitter base frequency was 25 Hz with a pulse width of 10ms (50 % duty cycle). Loop current waveform monitoring is provided by a current transformer located directly in the loop current path to allow for full logging of the waveform shape and amplitude, which is sampled by the EM receiver.

3.2.3 TEMPEST 3-Axis Towed Bird Assembly

The TEMPEST 3-axis towed bird assembly provides accurate low noise sampling of the X (horizontal in line), Y (horizontal transverse) and Z (vertical) components of the electromagnetic field. The receiver coils measure the time rate of change of the magnetic field (dB/dt). Signals from each axis are transferred to the aircraft through a tow cable specifically designed for its electrical and mechanical properties.

3.3 FASDAS Survey Computer

The Survey computer executes a proprietary program for acquisition and recording of location, magnetic and ancillary data. Data are presented both numerically and graphically in real time on the Video Graphics Array (VGA) Liquid Crystal Display (LCD) display, which provides an on-line display capability. The operator may alter the sensitivity of the displays on-line to assist in quality control. Selected EM data are transferred from the EM receiver computer to the SURVEY computer for quality control (QC) display.

3.3.1 Cesium Vapour Magnetometer Sensor

A cesium vapour magnetometer sensor is utilised on the aircraft and consists of the sensor head and cable, and the sensor electronics. The sensor head is housed at the end of a composite material tail stinger.

3.3.2 Magnetometer Processor Board

A FASDAS magnetometer processor board is used for de-coupling and processing the Larmor frequency output of the magnetometer sensor. The processor board interfaces with the survey computer, which initiates data sampling and transfer for precise sample intervals and also with the EM receiver computer to ensure that the magnetic samples remain synchronised with the EM system.

3.3.3 Fluxgate Magnetometer

A tail stinger mounted Bartington MAG-03MC three-axis fluxgate magnetometer is used to provide information on the attitude of the aircraft. This information is used for compensation of the measured magnetic total field.

3.3.4 GPS Receiver

A Novatel GPScard 951R is utilised for airborne positioning and navigation. Satellite range data are recorded for generating post processed differential solutions.

3.3.5 Differential GPS Demodulator

The OMNISTAR differential GPS service provides real time differential corrections.

3.4 Navigation System

A FASDAS Navigation Computer was used for real-time navigation. These computers load a pre-programmed flight plan from disk which contains boundary co-ordinates, line start and end co-ordinates, local co-ordinate system parameters, line spacing, and cross track definitions. The World Geodetic System 1984 (WGS84) latitude and longitude positional data received from the Novatel GPS card contained in the SURVEY computer is transformed to the local co-ordinate system for calculation of the cross track and distance to go values. This information, along with ground heading and ground speed, is displayed to the pilot numerically and graphically on a two line LCD display, and on an analogue Horizontal Strip Indicator (HSI). It is also presented on a LCD screen in conjunction with a pictorial representation of the survey area, survey lines, and ongoing flight path.

The Navigation computers are interlocked to the SURVEY computer for auto selection and verification of the line to be flown. The GPS information passed to the navigation computer is corrected using the received real time differential data from the OMNISTAR service, enabling the aircraft to fly as close to the intended track as possible.

3.5 Altimeter System

3.5.1 Radar Altimeter

Model:	Collins RL 50 radio altimeter system
Sample interval:	0.2 second
Accuracy:	+/- 1.5 % of indicated altitude.

The Collins radio altimeter is a high quality instrument whose output is factory calibrated. It is fitted with a test function which checks the calibration of a terrain clearance of 100 feet, and altitudes which are multiples of 100 feet. The aircraft radio altitude is recorded onto digital tape as well as displayed on the aircraft chart recorder. The recorded value is the average of the altimeters output during the previous second.

3.5.2 Laser Altimeter

Model:	Optech 501SB (WGT)
Sample interval:	0.2 second
Accuracy:	± 0.05m at survey altitude

3.5.3 Barometric Altimeter

Output of a Digiquartz 215A-101pressure transducer is used for calculating the barometric altitude of the aircraft. The atmospheric pressure is taken from a gimbal-mounted probe projecting 0.5 metres from the wing tip of the aircraft and fed to the transducer mounted in the aircraft wingtip.

3.6 Video Tracking System

The video file recorded by the digital video system is synchronised with the geophysical record by a digital fiducial display. It is also labelled with GPS latitude and longitude information and survey line number.

3.7 Data Recorded by the Airborne Acquisition Equipment

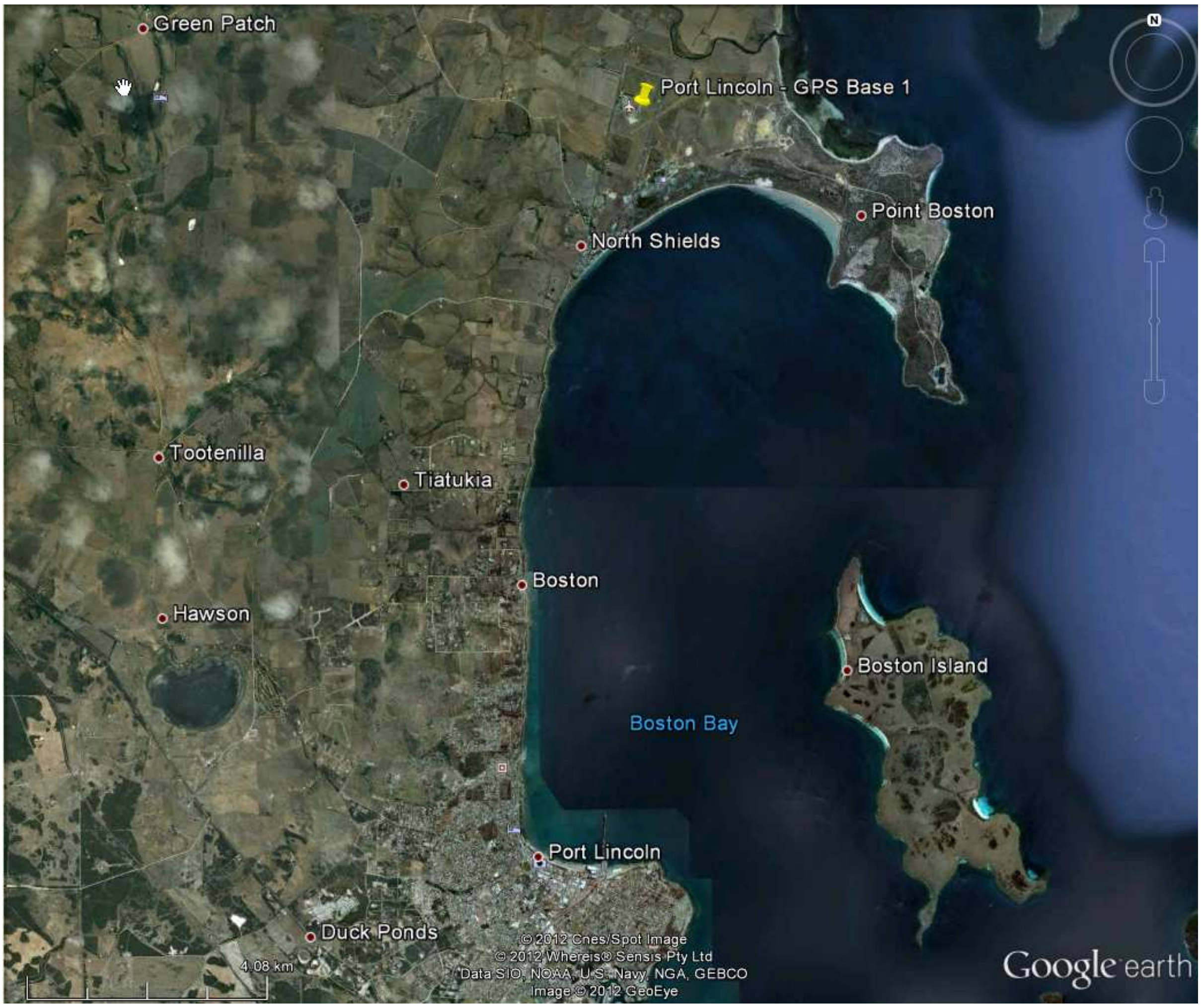
With the FASDAS acquisition system the raw EM data including fiducial, local time, X and Z axis sensor response, current monitor and bird auxiliary sensor output are recorded on the EM receiver computer as "*.raw" EM files. Logging to the files is continuous, however, a new *.raw EM file is created when the size of the previous one reaches 1Gb.

The FASDAS Survey computer records a continuous MSD file which contains all other ancillary data including magnetic, altimeter, GPS and analogue channels.

4. GROUND DATA ACQUISITION EQUIPMENT AND SPECIFICATIONS

4.1 Magnetic Base Station

A CF1 magnetometer was used to measure the daily variations of the Earth's magnetic field. The base stations were established in an area of low gradient, away from cultural influences. The base stations were run continuously throughout the survey flying period with a sampling interval of 1 and 5 seconds respectively, at a sensitivity of 0.01 nT. The base station data were closely examined after each day's production flying to determine if any data had been acquired during periods of out-of-specification diurnal variation. The base station was located at Port Lincoln Airport.



4.2 GPS Base Station

A GPS base logging station was set up at Port Lincoln Airport. The sensor was contained in the CF1 unit.

The GPS base system was comprised of a Novatel GPS PC card mounted in a portable computer. The computer is connected to a mains UPS backup, with a reserve capacity of approximately 100 minutes, to ensure continuous data logging in the event of mains power interruptions.

The GPS base station position was calculated by logging data continuously at the base position over a period of approximately 24 hours. These data were then statistically averaged to obtain the position of the base station using GrafNav software.

The calculated GPS base position was (in WGS84):

Lat: 34° 36' 15.52067" S
Long: 135° 52' 34.89240" E
Height: 1.008 m. (WGS84 Ellipsoidal Height)

5. EM AND OTHER CALIBRATIONS AND MONITORING

At the beginning and end of each individual survey flight, the EM system is checked for background noise levels and performance. All of these checks are conducted at a nominal terrain clearance of 600 m (2000 ft) to eliminate ground response.

These checks include:-

5.1 Transmitter-off

These lines are recorded in straight and level flight with the system in standard survey geometry, with the transmitter turned off and bird response turned on to observe ambient noise and to check for noise in the receiver system (bird/coils → tow cable → winch → computer). *Note: FFFF is the flight number and PP is the attempt number.*

Pre-Flight Transmitter-off: Line 900FFFFPP
Post-Flight Transmitter-off: Line 906FFFFPP

5.2 Noise Additive

These lines are recorded in straight and level flight with the system in standard survey geometry, with the transmitter on and the bird response turned off at the tow cable winch. This is to check the noise contribution from the acquisition system and is used in deconvolution of survey line data. *Note: FFFF is the flight number and PP is the attempt number.*

Pre-Flight Noise Additive: Line 901FFFFPP
Post-Flight Transmitter-off: Line 904FFFFPP

5.3 Zero

These lines are recorded in straight and level flight with the system in standard survey configuration with transmitter and receiver turned on. This is used to determine the system's response in the absence of ground signal and is used to determine a standard waveform for deconvolution of survey lines. *Note: FFFF is the flight number and PP is the attempt number.*

Additionally, through all these calibrations the airborne operator can assess the system and ambient noise levels.

Pre-Flight Zero: Line 902FFFFPP
Post-Flight Zero: Line 905FFFFPP

5.4 Swoops

This line is recorded immediately after the pre-flight zero. During this manoeuvre the pilot conducts a series of 'swoop' manoeuvres (pitch up/pitch down) over approximately 30-40 seconds to vary the position of the towed sensor relative to the aircraft. The EM data are monitored by the airborne operator to confirm correct operation of the system during the manoeuvre. This data is used to determine coefficients used in the processing to compensate for such variations in the survey data. *Note: FFFF is the flight number and PP is the attempt number.*

Pre-Flight Swoop: Line 903FFFFPP

5.5 Dynamic Magnetometer Compensation

To limit aircraft manoeuvre effects on the magnetic data that can be of the same spatial wavelength as the signals from geological sources, compensation calibration lines are flown in a low magnetic gradient area close to the survey. This involves flying a series of tests on the survey line heading and approximately 15 degrees either side to accommodate small heading variations whilst flying survey lines. The data for each heading consists of a series of aircraft manoeuvres, including pitches, rolls and yaws. This is done to artificially create the most extreme possible attitude the aircraft may encounter whilst on survey. Data from these lines are used to derive compensation coefficients for removing magnetic noise induced by the aircraft's attitude in the naturally occurring magnetic field.

Compensation data were acquired on the dates below.

14th July 2012

5.6 Parallax Checks

Due to the relative positions of the EM towed bird and the magnetometer instruments on the aircraft and to processing / recording time lags, raw readings from each vary in position. To correct for this and to align selected anomaly features on lines flown in opposite directions, magnetics, EM data and the altimeters are 'parallaxed' with respect to the position information. System parallax is checked occasionally or following any major changes in the aircraft system, which are likely to affect the parallax values.

Variable	Parallax Value
Magnetics	16.2 s
GPS	0 s
Radar Altimeter	0 s
Laser Altimeter	0 s
EM - X	- 4.4 s
EM – Z	- 4.0 s

5.7 Radar Altimeter Calibration

The radar altimeter is checked for accuracy and linearity every 12 months or when any change in a key system component requires this procedure to be carried out. This calibration allows the radar altimeter data to be compared and assessed with other height data (GPS and barometric) to confirm the accuracy of the radar altimeter over its operating range.

Absolute radar and barometric altimeter calibration was carried out over water at Mandurah, Western Australia, and was successful in calibrating the radar altimeter to information provided by the GPS and barometer instrument. Calibration factors were as expected. The calibration procedure also provides parallax information required for positional correction of the radar and GPS altimeters.

5.8 Heading Error Checks

Historically, heading error checks have been part of the aeromagnetic data acquisition procedure but they are no longer used. Fugro Airborne Surveys now calculates these effects using the aircraft magnetic compensation system and specially developed software. The precision to which these effects are now calculated and corrected for is far in excess of the manual methods used in the past.

6. DATA PROCESSING

6.1 Field Data Processing

6.1.1 Quality Control Specifications

6.1.1.1 Navigation Tolerance

The re-flight specifications applied for the duration of the survey were:

Electronic Navigation - absence of electronic navigation data (e.g. GPS base station fails).

Flight Path - where the flightpath deviates from the flightplan by more than 50 metres for more than 5 km. The line spacing measurements to be used in determining such reflights will be made from the field flight path recovery

Altitude - terrain clearance continuously exceeds the nominal terrain clearance by plus or minus 30 m over a distance of 5 km or more unless to do so would, in the sole opinion of the pilot, jeopardise the safety of the aircraft or the crew or the equipment or would be in contravention of the Civil Aviation Safety Authority regulation such as those pertaining to built up areas.

6.1.1.2 Magnetics Noise and Diurnal Tolerance

The re-flight specifications applied for the duration of the survey were:

Magnetic Diurnal - where the magnetometer base station data exceeds a 10 nT change in 10 minutes.

6.1.1.3 Electromagnetic Data

The quality control checks on the electromagnetic data were:

Noise - where RMS noise in the last channel of the EM data exceeds 0.1 fT over 3 km for B-field (assessed in a resistive region) or where FAS believes an important anomaly is rendered un-interpretable.

Sferics – where sferic activity renders a potential anomaly un-interpretable.

6.1.2 In-Field Data Processing

Following acquisition, multiple copies of the EM data are made onto DVDs or CDs. The EM, location, magnetic and ancillary data are then processed at the field base to the point that the quality of the data from each flight can be fully assessed. Copies of the raw and processed data are then transferred to Perth for final data processing. A more comprehensive statement of EM data processing is given in section 6.2.3.

6.2 Final Data Processing

6.2.1 Magnetics

Magnetic data were compensated for aircraft manoeuvre noise using coefficients derived from the appropriate compensation flight. Base station data is edited so that all significant spikes, level shifts and null data are eliminated.

A diurnal base value was then added.

Area	Base Value
Cockabidnie	50200nT
Koppio-Kookaburra	50200nT

A lag was applied to synchronise the magnetic data with the navigation data.

The International Geomagnetic Reference Field (IGRF) 2010 model (updated for secular variation) was removed from the levelled total field magnetics. An IGRF base value was then added to the data.

Area	Base Value	Updated Model
Cockabidnie	49956nT	14/7/2012
Koppio-Kookaburra	49956nT	14/7/2012

Where appropriate the magnetic data was tie line levelled. A FAS proprietary microlevelling process was then applied in order to more subtly level the data.

6.2.2 Derived Topography

Aircraft navigation whilst in survey mode is via real time differential GPS, obtained by combining broadcast differential corrections with on-board GPS measurements. Terrain clearance is measured with a laser altimeter.

The ground elevation, relative to the WGS84 spheroid used by GPS receiver units, is obtained by finding the difference between the terrain clearance (from the final processed and edited laser altimeter) and the aircraft GPS antenna altitude above the ellipsoid (GPS height derived from post-processing of the DGPS data using the field base station data), and taking into account that the laser altimeter is mounted 2.3 metres below the GPS antenna.

The digital elevation model derived from this survey can be expected to have an absolute accuracy of +/- several metres in areas of low to moderate topographic relief. Sources of error include uncertainty in the height of the GPS base station, variations in the laser altimeter characteristics over ground of varying surface characteristics (ie. false and non-returns are more prevalent over dense vegetation and water, respectively), and the finite footprint of the laser altimeter.

Following this, where appropriate, tie line and micro-levelling was applied in order to more subtly level the data. The algorithms are FAS proprietary operations used to remove the small across-line corrugations that may appear in the gridded data. The micro-levelling process attempts to de-corrugate the data without destroying the data's integrity. This is achieved by confining the changes to very small values and applying them as a correction to the along-line data.

An N-Value is then subtracted to correct the final data to the Australian Height Datum (AHD).

The accuracy of the elevation calculation is directly dependent on the accuracy of the two input parameters, laser altitude and GPS altitude. The GPS altitude value is dependent on the number of available satellites, plus the accuracy of the averaged GPS base position. Although post-processing of GPS data will yield X and Y accuracies in the order of 0.5 metres, the accuracy of the altitude value is usually much less, but generally still within 1-2 metres. Further inaccuracies may be introduced during the interpolation and gridding process as only 1 out of every 5 points across-line is real data. Furthermore, along line obstructions may cause the pilot to veer laterally and so data interpolated between lines may vary significantly from real topography, and do not show artificial vertical obstructions.

Because of the inherent inaccuracies of this method, no guarantee is made or implied that the information displayed is a true representation of the height above sea level. Although this product may be of some use as a general reference, THIS PRODUCT MUST NOT BE USED FOR NAVIGATION PURPOSES.

6.2.3 Electromagnetic Data Processing

Details of the pre-processing applied to TEMPEST data can be found in Lane et al. (2000).

6.2.3.1 Standard EM Processing

Calibration
High altitude calibration data are used to characterise the system response in the absence of any ground response.

Cleaning and Stacking
Routines to suppress sferic noise, powerline noise, VLF noise, and coil motion noise (collectively termed "cleaning" and to stack the data are applied to the survey line data. Output from the stacking filter is drawn at 0.2 second intervals. The stacked data are saved to file as an internal data management practice.

Deconvolution and Binning
The survey height stacked data are deconvolved using the high altitude reference waveform. The effect of currents in the transmitter loop and airframe ("primary") are then removed, leaving a "pure" ground response. The deconvolved ground response data are then transformed to B-field response for a perfect 100% duty cycle square wave. Finally, the evenly spaced samples are binned into a number of windows.

Table of TEMPEST window information for 25Hz base frequency

Window #	Start sample	End sample	No of samples	start time (s)	End time (s)	centre time (s)	centre time (ms)
1	1	2	2	0.000007	0.000020	0.000013	0.013
2	3	4	2	0.000033	0.000047	0.000040	0.040
3	5	6	2	0.000060	0.000073	0.000067	0.067
4	7	10	4	0.000087	0.000127	0.000107	0.107
5	11	16	6	0.000140	0.000207	0.000173	0.173
6	17	26	10	0.000220	0.000340	0.000280	0.280
7	27	42	16	0.000353	0.000553	0.000453	0.453
8	43	66	24	0.000567	0.000873	0.000720	0.720
9	67	102	36	0.000887	0.001353	0.001120	1.120
10	103	158	56	0.001367	0.002100	0.001733	1.733
11	159	246	88	0.002113	0.003273	0.002693	2.693
12	247	384	138	0.003287	0.005113	0.004200	4.200
13	385	600	216	0.005127	0.007993	0.006560	6.560
14	601	930	330	0.008007	0.012393	0.010200	10.200
15	931	1500	570	0.012407	0.019993	0.016200	16.200

The data are reviewed after windowing. Any decisions involving re-flights due to AEM factors are made at this point.

Raw and Final EM Data
The "raw" or "uncorrected" EM amplitudes reflect, not only the variations in ground conductivity, but the variations in geometry of the various parts of the EM measurements (i.e. transmitter loop pitch, transmitter loop roll, transmitter loop terrain clearance, transmitter loop to receiver coil horizontal longitudinal separation, transmitter loop to receiver coil horizontal transverse separation, and transmitter loop to receiver coil vertical separation) during the survey. For example, the largest influence on the early time EM amplitude is the terrain clearance of the transmitter loop. The larger the terrain clearance is the smaller the amplitude. Later window times (larger window number) show diminished variations due to terrain clearance.

"Final" or "geometry-corrected" located data are produced for optimum presentation of the EM amplitude data in image format (e.g. window amplitude images, principal component analysis images derived from the window amplitudes (Green,1998b)). Between "raw" and "final" states, the ground response data undergo an approximate correction to produce data from a nominated standard geometry. A dipole-image method (Green, 1998a) is used to adjust the data to the response that would be expected at a standard terrain clearance (120m), standard transmitter loop pitch and roll (zero degrees), and a standard transmitter loop to receiver coil geometry (120m behind and 35m below the aircraft). These variables have been set to their respective standard values in the "final" located data (whereas the "raw" located data file contains the variable field data). Zero parallax is applied to transmitter loop pitch, roll, terrain clearance, X component EM and Z component EM data prior to geometry correction. Over extremely conductive ground (e.g. > 100 S conductance), the estimates for transmitter loop to receiver coil separation determined from the primary field coupling factors may be in error at the metre scale due to uncertainty in the estimation of the primary field. This will influence the accuracy of very early time window amplitude information in the "geometry-corrected" located data. Receiver coil pitch has a significant effect on early time Z component response and late time X component response (Green and Lin, 1996). Receiver coil roll impacts early time Z component response.

Levelling
Limited range micro-levelling may be applied to the final window amplitudes for presentation purposes, principally for multi-flight surveys or when isolated re-flight lines are present.

6.2.3.2 Factors and Corrections

Geometric Factor
The geometric factor gives the ratio of the strength of the primary field coupling between the transmitter loop and the receiver coil at each observation relative to the coupling observed at high altitude during acquisition of reference waveform data. Variations in this factor indicate a change in the attitude and/or relative separation of the transmitter loop and the receiver coil.

Transmitter-Receiver Geometry
Transmitter to receiver geometry values for each observation is derived from the high altitude reference waveforms and knowledge of the system characteristics. These data are available in the located data (see section 6.2.6.1 for "standardised" values)

GPS Antenna, Laser Altimeter and Transmitter Loop Offset Corrections
The transmitter loop was mounted 0.1m above the GPS antenna on the aircraft. The GPS antenna is 3.3m above the belly of the aircraft. The laser altimeter sensor is mounted in the belly of the aircraft. Therefore a total of 3.05m (-0.25m + 3.3m) was added to the laser altimeter data to determine the transmitter loop height above the ground.

Transmitter Loop Pitch and Roll Correction
Measured vertical gyro aircraft pitch and roll attitude measurements are converted to transmitter loop pitch and roll by adding 0.45 degrees for pitch and 0.6 degrees for roll. Nose up is positive for pitch, and left wing up is positive for roll.

6.2.3.3 Primary Sources of EM Noise

A number of "monitor" values are calculated during processing to assist with interpretation. They generally represent quantities that have been removed as far as is practical from the data, but may still be present in trace amounts. These are more significant for interpretation of discrete conductors than for general mapping applications.

Sferic Monitor
Sferics are the electromagnetic signals associated with lightning activity. These signals travel large distances around the Earth. Background levels of sferics are recorded at all times from lightning activity in tropical areas of the world (eg tropical parts of Asia, South America and Africa). Additional higher amplitude signals are produced by "local" lightning activity (ie at distances of kilometres to hundreds of kilometres).

The sferic monitor is the sum of the absolute differences brought about by the sferic filter operations, summed over 0.2 second intervals, normalised by the receiver effective area. It is given in units of uV/sq.m/0.2s. Many sferics have a characteristic form that is well illustrated by figure 2 in Garner and Thiel (2000). The high frequency, initial part of a sferic event can be detected and filtered more easily than the later, low frequency portion. The sferic monitor indicates where at least the high frequency portion of a sferic has been successfully removed, but it is quite possible that lower frequency elements of the sferic event may have eluded detection, passing through to the window amplitude data. Thus, discrete anomalies coincident with sferic activity as indicated by the sferic monitor should be down-weighted relative to features clear of any sign of sferic activity.

Low Frequency Monitor

The Low Frequency Monitor (LFM) makes use of amplitudes at frequencies below the base frequency which are present in the streamed data to estimate the amplitude of coil motion (Earth magnetic field) noise at the base frequency in log10(pV/sqrt(Hz)/sq.m). The coil motion noise below the base frequency is rejected through the use of tapered stacking, but the coil motion noise at the base frequency itself is not easily removed. A sharp spike in the LFM can be an indicator of a coil motion event (eg the bird passing through extremely turbulent air). Note that the LFM will also respond to sferic events with an appreciable low frequency (sub-base frequency) component. This situation can be inferred when both the LFM and sferic monitors show a discrete kick.

Powerline Monitor

The powerline monitor gives the amplitude of the received signal at the powerline frequency (50 or 60 Hz) in log10(pV/sqrt(Hz)/sq.m). Careful selection of the base frequency (such that the powerline frequency is an even harmonic of the base frequency) and tapered stacking combine to strongly attenuate powerline signals. When passing directly over a powerline, the rapid lateral variations in the strength and direction of the magnetic fields associated with the powerline can result in imperfect cancellation of the powerline response during stacking. Some powerline-related interference can manifest itself in a form that is similar to the response of a discrete conductor. The exact form of the monitor profile over a powerline depends on the line direction, powerline direction, powerline current, and receiver component, but the monitor will show a general increase in amplitude approaching the powerline.

Grids (or images) of the powerline monitor reveal the location of the transmission lines. Note that the X component (horizontal receiver coil axis parallel with the flight line direction) does not register any response from powerlines parallel to the flight line direction since the magnetic fields associated with powerlines only vary in a direction perpendicular to the powerline. Note also that the Z component (vertical receiver coil axis) shows a narrow low directly over the powerline where the magnetic fields are purely horizontal.

Very Low Frequency Monitors

Wide area VLF communication signals in the 15 to 25 kHz frequency band are monitored by the TEMPEST system. In the Australian region, signals at 18.2 kHz, 19.8 kHz, 21.4 kHz and 22.2 kHz are monitored as the amplitude of the received signal at these frequencies in log10(pV/sqrt(Hz)/sq.m). The strongest signal comes from North West Cape (19.8 kHz). The signal at 18.2 kHz is often observed to pulse in a regular sequence. These strong narrow band signals have some impact on the high frequency response of the system, but they are strongly attenuated by selection of the base frequency and tapered stacking. The VLF transmissions are strongest in amplitude, in the horizontal direction at right angles to the direction to the VLF transmitter. This directional dependence enables the VLF monitors to be used to indicate the receiver coil attitude.

6.2.3.4 Other Sources of EM Noise

Man-made periodic discharges

If an image of the Z component sferic monitor shows the presence of spatially coherent events, then pulsed cultural interference would be strongly suspected. Since sferic signals are much stronger in the horizontal plane than in the vertical plane, few sferics of significant amplitude are recorded in Z component data. In contrast, evidence of cultural interference is generally swamped by true sferics in X component sferic monitor images.

Electric fences are the most common source of pulsed cultural interference. Periodic discharges (eg every second or so) into a large wire loop (fence) produce very large spikes in raw data. These are attenuated to a large degree by the sferic filter, but a residual artefact can still be present in the processed data.

Coil motion / Earth field noise
A change in coupling between the receiver coil and the ambient magnetic field will induce a voltage in the receiver coil. This noise is referred to as coil motion or Earth field noise. Receiver coils in the towed bird are suspended in a fashion that attempts to keep this noise below the noise floor at frequencies equal to and above the base frequency of the system. Severe turbulence, however, can result in 'coil knock events' that introduce noise into the processed data.

Grounded metal objects
Grounded extensive metal objects such as pipelines and rail lines can qualify as conductors and may produce a response that is visible in processed data. Grounded metal objects produce a response similar to shallow, highly conductive, steeply dipping conductors. These objects can sometimes be identified from good quality topographic maps, from aerial photographs, by viewing the tracking video, from their unusual spatial distribution (ie often a series of linear segments) and in some circumstances from their effect on the powerline monitor. A powerline running close to a long metal object will induce a 50 Hz response in the object.

6.2.4 Conductivity Depth Images (CDI)

CDI conductivity sections for TEMPEST data were calculated using EMFlow and then modified to reflect the finite depth of investigation using an in-house routine, *Sigtime*.

The *Sigtime* routine removes many of the spurious conductive features that appear at depth as a result of fitting long time constant exponential decays to very small amplitude features in the late times. For each observation, the time when the response falls below a signal threshold amplitude is determined. This time is transformed into a diffusion depth with reference to the conductivity values determined for that observation. Anomalous conductivity values below this depth are replaced by background values or set to undefined, reflecting the uncertainty in their origin. The settings and options applied are indicated in the appropriate header files for *Sigtime* output. This procedure is different to that which would be obtained by filtering conductivity values using either a constant time or constant depth across the entire line.

The "final" Z component EM data were input into version 5.10 of EMFlow to calculate Conductivity Depth Images (CDI). Conductivity values were calculated at each point then run through *Sigtime.*

EMFlow was developed within the CRC-AMET through AMIRA research projects (Macnae et al, 1998, Macnae and Zonghou, 1998, Stolz and Macnae, 1998). The software has been commercialised by Encom Technology Pty Ltd. Examples of TEMPEST conductivity data can be seen in Lane et al. (2000), Lane et al. (1999), and Lane and Pracillio (2000).

Conductivity values were calculated to a depth of 500 m below surface at each point, using a depth increment of 5 m and a conductivity range of 0.1-500mS/m for area 1 and 0.2-200mS/m.

6.2.5 System Specifications for Modelling TEMPEST Data

Differences between the specifications for the acquisition system, and those of the virtual system for which processed results are given, must be kept in mind when forward modelling, transforming or inverting TEMPEST data.

Acquisition is carried out with a 50% duty cycle square transmitter current waveform and dB/dt sensors.

During processing, TEMPEST EM data are transformed to the response that would be obtained with a B-field sensor for a 100% duty cycle square waveform at the base frequency, involving a 1A change in current (from -0.5A to +0.5A to -0.5A) in a 1sq.m transmitter. Data are given in units of femtotesla (fT = 10^{-15} Tesla). It is this configuration, rather than the actual acquisition configuration, which must be specified when modelling TEMPEST data.

Window timing information is given above (see section 6.2.3).

6.2.5.1 Standard Height and Geometry

The "final" EM data have been standardised through an approximate transformation to a standard transmitter loop terrain clearance, transmitter loop pitch and roll of zero degrees, and a fixed transmitter loop to receiver coil geometry (roughly equal to the average "raw" geometry values). Transmitter loop pitch, transmitter loop roll and transmitter loop terrain clearance values for each observation have been modified to reflect the standard values. Hence, the "final" (fixed) geometry values should be used if modelling with the final X- and Z-component amplitude data - the following table summarises the values used to correct the transmitter height/pitch/roll/geometry to.

Table of values used to standardise transmitter loop height, pitch, roll and geometry

Variable	Standardised value
Transmitter loop pitch	0 degrees
Transmitter loop roll	0 degrees
Transmitter loop terrain clearance	120 metres
Transmitter loop – to – receiver coil geometry	120 m behind and 35 m below the aircraft

6.2.5.2 Parallax

The located data files utilise the following parallax values:-

- magnetics = 16.2 fiducials (81 observations from the zero parallax position),
- radar altimeter = 0 fiducials (0 observations from the zero parallax position),
- EM X-component = -4.4 fiducials (22 observation from the zero parallax position),
- EM Z-component = -4.0 fiducials (20 observations from the zero parallax position),

For the Tempest Airborne EM system, due to the asymmetry in the transmitter loop-receiver coil geometry with respect to flight direction, there is no single EM parallax value which will align the peak response for all conductivity distributions for lines flown in opposite directions.

The choice of EM parallax value depends on the intended usage, but with the predominance of broad, shallowly dipping conductors, and the client's desire to grid the data, parallax has been applied so that data are optimised for gridding. The 'optimum' depends on the conductor depth, the acquisition geometry and the delay time, and hence, the selected value will be a compromise.

(NB negative parallax values are defined in this case as shifting the indicated quantity forward along line to larger fiducial values. Location information remains in the zero parallax state)

6.2.6 Delivered Products

Appendix III contains a complete list of all data supplied digitally.

Digital ascii located data and a Geosoft GDB format was produced, containing the raw and final, X and Z EM data, conductivity data as well as magnetics and digital terrain.

Stacked CDI sections and CDI-multiplots (Z component) in Adobe PDF format.

Grids (in ER Mapper format) of all X and Z EM windows, total magnetic field and digital elevation were produced.

A flight path map was delivered in "png" image format.

Acquisition and processing report in hardcopy and digital format.

7. REFERENCES

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APPENDIX I – Weekly Acquisition Reports

System: Tempest
Aircraft: VH-TEM
Total Job kms: 1437.500 Kms
Plan Kms Remain: 0.000 Kms
% Complete: 100.000 %

19521.0 Hrs - Progressive M/R Hrs at the start of job, prior to mobilisation
19561.2 Hrs - The hours the Periodic Inspection is actally due at start of the job

Job Number: 2320
Contract Number: QT6950
Job Name: Cockabidnie SA
Area Names: Cockabidnie, Koppio – Kookaburra
Client: Lincoln Recources Limited

Date	Flt	Pilot initials	On board Oper initials	Production inc. Reflights Exc. Scrubs	FAS Scrub	Time Start	Time End	Engine Hours on M/R	Hours to Periodic Inspectio	Job Hrs to Date	Prod. to Date	FAS Scrubs to Date	Stdby Days	Activity Contribution	Activity	COMMENTS Weather, Data delivery Aircraft movement, etc
09-July-2012																
Julian Day 191																
Monday																
									40.2							
Date 10-Jul																
Julian Day 192																
Tuesday																
									40.2							
Date 11-Jul																
Julian Day 193																
Wednesday																
									40.2							
Date 12-Jul		PH, ED				7:02:00	9:52:00	2.8						0.30	MO	PH, ED fly TEM Ti Tree to ceduna
Julian Day 194		PH, ED				10:46:00	13:50:00	3.1						0.30	MO	PH, ED fly TEM Ceduna to Port Lincoln
Thursday														0.40	MO	BR, MA, JRG drive Ti Tree to Coober Pedy
									34.3	5.9						
Date 13-Jul														1.00	MO	BR, MA, JRG drive Coober Pedy to Port Lincoln
Julian Day 195															Comment	MH Arrives
Friday																
									34.3	5.9						
Date 14-Jul	1	MH, ED	BR			9:55:00	11:22:00	1.5						0.30	SETUP	Reccie Flight, PH on board also
Julian Day 196														0.70	SETUP	Base setup
Saturday																
									32.8	7.4						
Date 15-Jul														1.00	SETUP	Base setup, PTW.
Julian Day 197															Comment	Rain, high winds
Sunday															Comment	PH Departs
								`	32.8	7.4						
			Totals This Week: ►				Week Hours: ►	**7.4**	▲: A/C Hrs to Next Service					**4.00**		

System: Tempest
Aircraft: VH-TEM

19521.0 Hrs - Progressive M/R Hrs at the start of job, prior to mobilisation

Total Job kms: 1437.500 Kms

19561.2 Hrs - The hours the Periodic Inspection is actally due at start of the job

Plan Kms Remain: 0.000 Kms
% Complete: 100.000 %

Job Number: 2320
Contract Number: QT6950
Job Name: Cockabidnie SA
Area Names: Cockabidnie, Koppio – Kookaburra
Client: Lincoln Recources Limited

Date	Flt	Pilot initials	On board Oper initials	Production inc. Reflights Exc. Scrubs	FAS Scrub	Time Start	Time End	Engine Hours on M/R	Hours to Periodic Inspectio	Job Hrs to Date	Prod. to Date	FAS Scrubs to Date	Stdby Days	Activity Contribution	Activity	COMMENTS Weather, Data delivery Aircraft movement, etc
16-July-2012	2	MH, ED	BR		123.900	9:18:00	11:26:00	2.1					1.00	1.00	W	Short flight (to test bird) - aborted due to strong winds.
Julian Day 198															Comment	Bird Test Flight
															Comment	Bird Issues
Monday																
									30.7	9.5		123.900				
Date 17-Jul														1.00	E	Bird Rebuilding
Julian Day 199																
Tuesday																
									30.7	9.5		123.900				
Date 18-Jul														1.00	E	Bird Rebuilding
Julian Day 200																
Wednesday																
									30.7	9.5		123.900				
Date 19-Jul	3	MH, ED	BR	16.000		8:07:00	9:07:00	1.0						0.10	P	Bird test
Julian Day 201														0.90	E	checking data
Thursday																
									29.7	10.5	16.000	123.900				
Date 20-Jul	4	MH, ED	BR	444.700		11:22:00	15:45:00	4.4						1.00	P	Area 1 completed
Julian Day 202																
Friday																
									25.3	14.9	460.700	123.900				
Date 21-Jul	5	MH, ED	BR	296.000	144.000	10:14:00	15:00:00	4.8						1.00	P & S	Scrubs due to x-track problems
Julian Day 203																
Saturday																
									20.5	19.7	756.700	267.900				
Date 22-Jul	6	MH, ED	BR	408.800	8.000	10:03:00	14:45:00	4.7						1.00	P & S	scrubs due to coil Knock
Julian Day 204																
Sunday																
							`		15.8	24.4	1165.500	275.900				
			Totals This Week: ►	**1165.500**	**275.900**	Week Hours:►		**17.0**	▲: A/C Hrs to Next Service				**1.00**	**7.00**		

System: Tempest
Aircraft: VH-TEM

19521.0 Hrs - Progressive M/R Hrs at the start of job, prior to mobilisation

Total Job kms: 1437.500 Kms

19561.2 Hrs - The hours the Periodic Inspection is actally due at start of the job

Plan Kms Remain: 0.000 Kms
% Complete: 100.000 %

Job Number: 2320
Contract Number: QT6950
Job Name: Cockabidnie SA
Area Names: Cockabidnie, Koppio – Kookaburra
Client: Lincoln Recources Limited

Date	Flt	Pilot initials	On board Oper initials	Production inc. Reflights Exc. Scrubs	FAS Scrub	Time Start	Time End	Engine Hours on M/R	Hours to Periodic Inspectio	Job Hrs to Date	Prod. to Date	FAS Scrubs to Date	Stdby Days	Activity Contribution	Activity	COMMENTS Weather, Data delivery Aircraft movement, etc
23-July-2012	7	MH, ED	BR	272.000	32.000	10:03:00	14:40:00	4.6						1.00	P & S	Area 2 completed
Julian Day 205																
Monday																
									11.2	29.0	1437.500	307.900				
Date 24-Jul														1.00	SETUP	packup / prepare to demobilise
Julian Day 206															Comment	aircraft maintenance begins
Tuesday																
									11.2	29.0	1437.500	307.900				
Date 25-Jul														1.00	MA	B-check continues on TEM
Julian Day 207															Comment	MA & BR depart site
															Comment	Wayne Saunders arrives on-site. Liz Derricks departs site
Wednesday																
									11.2	29.0	1437.500	307.900				
Date 26-Jul														1.00	MA	B-check continues on TEM
Julian Day 208																
Thursday																
									11.2	29.0	1437.500	307.900				
Date 27-Jul														1.00	MA	B-check continues on TEM
Julian Day 209																
Friday																
									11.2	29.0	1437.500	307.900				
Date 28-Jul																
Julian Day 210																
Saturday																
									11.2	29.0	1437.500	307.900				
Date 29-Jul																
Julian Day 211																
Sunday																
								`	11.2	29.0	1437.500	307.900				
			Totals This Week: ►	**272.000**	**32.000**		Week Hours:►	**4.6**	▲: A/C Hrs to Next Service					**5.00**		

APPENDIX II – Located Data Formats

(Data - see Government of South Australia Mineral Resources Website)

Headers for final data files

FINAL EM

AREA 1

```
COMM FAS PROJECT NUMBER                                               2320
COMM AREA NUMBER:                                                        1
COMM SURVEY COMPANY:                                 Fugro Airborne Surveys
COMM CLIENT:                                       Lincoln Minerals Limited
COMM SURVEY TYPE:                                      25Hz TEMPEST Survey
COMM AREA NAME:                                                Cockabidnie
COMM STATE:                                                             SA
COMM COUNTRY:                                                    Australia
COMM SURVEY FLOWN:                                               July 2012
COMM LOCATED DATA CREATED:                                  September 2012
COMM
COMM DATUM:                                                          GDA94
COMM PROJECTION:                                                       MGA
COMM ZONE:                                                              53
COMM
COMM SURVEY SPECIFICATIONS
COMM
COMM TRAVERSE LINE SPACING:                                          400 m
COMM TRAVERSE LINE DIRECTION:                                 90 - 270 deg
COMM TIE LINE SPACING:                                              4000 m
COMM TIE LINE DIRECTION:                                     180 - 360 deg
COMM NOMINAL TERRAIN CLEARANCE:                                      120 m
COMM FINAL LINE KILOMETRES:                                         445 km
COMM
COMM LINE NUMBERING
COMM
COMM                                                           L10001:L10026
COMM                                                           T19001:T19005
COMM
COMM SURVEY EQUIPMENT
COMM
COMM AIRCRAFT:                                             CASA 212, VH-TEM
COMM
COMM ELECTROMAGNETIC SYSTEM:                                   25Hz TEMPEST
COMM INSTALLATION:                  Transmitter loop mounted on the aircraft
COMM                                          Receiver coils in a towed bird
COMM COIL ORIENTATION:                                                 X,Z
COMM RECORDING INTERVAL:                                             0.2 s
COMM SYSTEM GEOMETRY:
COMM HPRG CORRECTED RECEIVER DISTANCE BEHIND THE TRANSMITTER:       -120 m
COMM HPRG CORRECTED RECEIVER DISTANCE BELOW THE TRANSMITTER:         -35 m
COMM
COMM RADAR ALTIMETER:                                         Collins RL-50
COMM RECORDING INTERVAL:                                             0.2 s
COMM
COMM LASER ALTIMETER:                                         Optech 501SB
COMM RECORDING INTERVAL:                                             0.2 s
COMM
COMM NAVIGATION:                                Real-time differential GPS
COMM RECORDING INTERVAL:                                             1.0 s
COMM
COMM ACQUISITION SYSTEM:                                            FASDAS
```

```
COMM
COMM DATA PROCESSING
COMM
COMM TERRAIN CLEARANCE DATA
COMM LASER ALTIMETER: PARALLAX CORRECTION APPLIED                     0 s
COMM RADAR ALTIMETER: PARALLAX CORRECTION APPLIED                     0 s
COMM
COMM GPS ALTITUDE DATA
COMM PARALLAX CORRECTION APPLIED                                      0 s
COMM
COMM DIGITAL TERRAIN DATA
COMM DTM CALCULATED [DTM = GPS ALTITUDE - (LASER ALT + SENSOR SEPARATION)]
COMM DATA CORRECTED TO AUSTRALIAN HEIGHT DATUM
COMM DATA HAVE BEEN MICROLEVELLED
COMM
COMM ELECTROMAGNETIC DATA
COMM SYSTEM PARALLAX REMOVED, AS FOLLOWS:
COMM    X-COMPONENT EM DATA                                        -4.4 s
COMM    Z-COMPONENT EM DATA                                          -4 s
COMM DATA CORRECTED FOR TRANSMITTER HEIGHT, PITCH AND ROLL
COMM DATA CORRECTED FOR TRANSMITTER-RECEIVER GEOMETRY VARIATIONS
COMM DATA HAVE BEEN MICROLEVELLED
COMM CONDUCTIVITY DEPTH INVERSION CALCULATED                 EMFlow V5.10
COMM CONDUCTIVITY DEPTH RANGE                                 000 - 500 m
COMM CONDUCTIVITY DEPTH INTERVAL                                      5 m
COMM CONDUCTIVITIES CALCULATED USING HPRG CORRECTED EMZ DATA
COMM
COMM --------------------------------------------------------------------
COMM DISCLAIMER
COMM --------------------------------------------------------------------
COMM It is Fugro Airborne Survey’s understanding that the data provided to
COMM the client is to be used for the purpose agreed between the parties.
COMM That purpose was a significant factor in determining the scope and
COMM level of the Services being offered to the Client. Should the purpose
COMM for which the data is used change, the data may no longer be valid or
COMM appropriate and any further use of, or reliance upon, the data in
COMM those circumstances by the Client without Fugro Airborne Survey's
COMM review and advice shall be at the Client's own or sole risk.
COMM
COMM The Services were performed by Fugro Airborne Survey exclusively for
COMM the purposes of the Client. Should the data be made available in whole
COMM or part to any third party, and such party relies thereon, that party
COMM does so wholly at its own and sole risk and Fugro Airborne Survey
COMM disclaims any liability to such party.
COMM
COMM Where the Services have involved Fugro Airborne Survey's use of any
COMM information provided by the Client or third parties, upon which
COMM Fugro Airborne Survey was reasonably entitled to rely, then the
COMM Services are limited by the accuracy of such information. Fugro
COMM Airborne Survey is not liable for any inaccuracies (including any
COMM incompleteness) in the said information, save as otherwise provided
COMM in the terms of the contract between the Client and Fugro Airborne
COMM Survey.
COMM
COMM With regard to DIGITAL TERRAIN DATA, the accuracy of the elevation
COMM calculation is directly dependent on the accuracy of the two input
COMM parameters laser altitude and GPS altitude. The laser and radar altitude
COMM value may be erroneous in areas of heavy tree cover, where the
COMM altimeters reflect the distance to the tree canopy rather than the
COMM ground. The GPS altitude value is primarily dependent on the number of
COMM available satellites.
COMM Although post-processing of GPS data will yield X and Y accuracies in
COMM the order of 1-2 metres, the accuracy of the altitude value is usually
COMM much less, sometimes in the ±5 metre range.  Further inaccuracies
```

```
COMM may be introduced during the interpolation and gridding process.
COMM Because of the inherent inaccuracies of this method, no guarantee is
COMM made or implied that the information displayed is a true
COMM representation of the height above sea level.  Although this product
COMM may be of some use as a general reference,
COMM THIS PRODUCT MUST NOT BE USED FOR NAVIGATION PURPOSES.
COMM ---------------------------------------------------------------------------
COMM
COMM ELECTROMAGNETIC SYSTEM
COMM
COMM TEMPEST IS A TIME-DOMAIN SQUARE-WAVE SYSTEM,
COMM TRANSMITTING AT A BASE FREQUENCY OF 25Hz,
COMM WITH 2 ORTHOGONAL-AXIS RECEIVER COILS IN A TOWED BIRD.
COMM FINAL EM OUTPUT IS RECORDED 5 TIMES PER SECOND.
COMM THE TIMES (IN MILLISECONDS) FOR THE 15 WINDOWS ARE:
COMM
COMM WINDOW      START       END      CENTRE
COMM    1        0.007      0.020      0.013
COMM    2        0.033      0.047      0.040
COMM    3        0.060      0.073      0.067
COMM    4        0.087      0.127      0.107
COMM    5        0.140      0.207      0.173
COMM    6        0.220      0.340      0.280
COMM    7        0.353      0.553      0.453
COMM    8        0.567      0.873      0.720
COMM    9        0.887      1.353      1.120
COMM   10        1.367      2.100      1.733
COMM   11        2.113      3.273      2.693
COMM   12        3.287      5.113      4.200
COMM   13        5.127      7.993      6.560
COMM   14        8.007     12.393     10.200
COMM   15       12.407     19.993     16.200
COMM
COMM PULSE WIDTH: 10 ms
COMM
COMM TEMPEST EM data are transformed to the response that would be
COMM obtained with a B-field sensor for a 100% duty cycle square
COMM waveform at the base frequency, involving a 1A change in
COMM current (from -0.5A to +0.5A to -0.5A) in a 1sq.m transmitter.
COMM It is this configuration, rather than the actual acquisition
COMM configuration, which must be specified when modelling TEMPEST data.
COMM
COMM
COMM LOCATED DATA FORMAT
COMM
COMM  Output field format : ASCII ASEG-GDF
COMM
COMM FIELD                         UNITS            NULL                FORMAT
COMM Line                                           -99999999           I10
COMM Flight                                         -99                 I4
COMM Fiducial                                       -999999.9           F8.1
COMM Project_FAS                                    -9999               I6
COMM Date                                           -9999999            I9
COMM Time                           s               -9999.9             F8.1
COMM Bearing                        deg             -99                 I4
COMM Latitude                       deg             -99.9999999         F12.7
COMM Longitude                      deg             -999.9999999        F13.7
COMM Easting                        m               -99999.99           F10.2
COMM Northing                       m               -999999.99          F11.2
COMM Tx_Elevation                   m               -999.99             F8.2
COMM Lidar                          m               -999.99             F8.2
COMM DTM                            m               -999.99             F8.2
COMM Tx_Pitch                       deg             -999.99             F8.2
COMM Tx_Roll                        deg             -999.99             F8.2
```

COMM Tx_Clearance	m	-999.99	F8.2
COMM HSep_Raw	m	-999.99	F8.2
COMM VSep_Raw	m	-999.99	F8.2
COMM Tx_Clearance_std	m	-999.99	F8.2
COMM HSep_std	m	-999.99	F8.2
COMM VSep_std	m	-999.99	F8.2
COMM EMX_nonhprg[1:15]	fT	-999.999999	F12.6
COMM EMX_hprg[1:15]	fT	-999.999999	F12.6
COMM X_Sferics		-9999.999	F10.3
COMM X_LowFreq		-9999.999	F10.3
COMM X_Powerline		-9999.999	F10.3
COMM X_VLF1		-9999.999	F10.3
COMM X_VLF2		-9999.999	F10.3
COMM X_VLF3		-9999.999	F10.3
COMM X_VLF4		-9999.999	F10.3
COMM X_Geofact		-9999.999	F10.3
COMM EMZ_nonhprg[1:15]	fT	-999.999999	F12.6
COMM EMZ_hprg[1:15]	fT	-999.999999	F12.6
COMM Z_Sferics		-9999.999	F10.3
COMM Z_LowFreq		-9999.999	F10.3
COMM Z_Powerline		-9999.999	F10.3
COMM Z_VLF1		-9999.999	F10.3
COMM Z_VLF2		-9999.999	F10.3
COMM Z_VLF3		-9999.999	F10.3
COMM Z_VLF4		-9999.999	F10.3
COMM Z_Geofact		-9999.999	F10.3
COMM COND_Z[1:100]	mS/m	-9999.999	F10.3
COMM COND_Z_DEPTH	m	-99999	I5

AREA 2

COMM FAS PROJECT NUMBER	2320
COMM AREA NUMBER:	2
COMM SURVEY COMPANY:	Fugro Airborne Surveys
COMM CLIENT:	Lincoln Minerals Limited
COMM SURVEY TYPE:	25Hz TEMPEST Survey
COMM AREA NAME:	Koppio-Kookaburra
COMM STATE:	SA
COMM COUNTRY:	Australia
COMM SURVEY FLOWN:	July 2012
COMM LOCATED DATA CREATED:	September 2012
COMM	
COMM DATUM:	GDA94
COMM PROJECTION:	MGA
COMM ZONE:	53
COMM	
COMM SURVEY SPECIFICATIONS	
COMM	
COMM TRAVERSE LINE SPACING:	100 m
COMM TRAVERSE LINE DIRECTION:	140 - 320 deg
COMM TIE LINE SPACING:	1000 m
COMM TIE LINE DIRECTION:	44 - 224 deg
COMM NOMINAL TERRAIN CLEARANCE:	120 m
COMM FINAL LINE KILOMETRES:	992 km
COMM	
COMM LINE NUMBERING	
COMM	L20001:L20112
COMM	T29001:T29008
COMM	
COMM SURVEY EQUIPMENT	
COMM	
COMM AIRCRAFT:	CASA 212, VH-TEM
COMM	
COMM MAGNETOMETER:	Scintrex Cs-2 Cesium Vapour

```
COMM INSTALLATION:                                           Stinger mounted
COMM RESOLUTION:                                                   0.001 nT
COMM RECORDING INTERVAL:                                              0.2 s
COMM
COMM ELECTROMAGNETIC SYSTEM:                                    25Hz TEMPEST
COMM INSTALLATION:                  Transmitter loop mounted on the aircraft
COMM                                          Receiver coils in a towed bird
COMM COIL ORIENTATION:                                                  X,Z
COMM RECORDING INTERVAL:                                              0.2 s
COMM SYSTEM GEOMETRY:
COMM HPRG CORRECTED RECEIVER DISTANCE BEHIND THE TRANSMITTER:        -120 m
COMM HPRG CORRECTED RECEIVER DISTANCE BELOW THE TRANSMITTER:          -35 m
COMM
COMM RADAR ALTIMETER:                                         Collins RL-50
COMM RECORDING INTERVAL:                                              0.2 s
COMM
COMM LASER ALTIMETER:                                          Optech 501SB
COMM RECORDING INTERVAL:                                              0.2 s
COMM
COMM NAVIGATION:                                Real-time differential GPS
COMM RECORDING INTERVAL:                                              1.0 s
COMM
COMM ACQUISITION SYSTEM:                                             FASDAS
COMM
COMM DATA PROCESSING
COMM
COMM MAGNETIC DATA
COMM DIURNAL CORRECTION APPLIED                       base value 59300 nT
COMM PARALLAX CORRECTION APPLIED                                   16.2 s
COMM IGRF CORRECTION APPLIED                          base value 59309 nT
COMM IGRF MODEL 2010 extrapolated to                           2012/07/16
COMM DATA HAVE BEEN TIE LINE LEVELLED
COMM DATA HAVE BEEN MICROLEVELLED
COMM
COMM TERRAIN CLEARANCE DATA
COMM LASER ALTIMETER: PARALLAX CORRECTION APPLIED                      0 s
COMM RADAR ALTIMETER: PARALLAX CORRECTION APPLIED                      0 s
COMM
COMM GPS ALTITUDE DATA
COMM PARALLAX CORRECTION APPLIED                                       0 s
COMM
COMM DIGITAL TERRAIN DATA
COMM DTM CALCULATED [DTM = GPS ALTITUDE - (LASER ALT + SENSOR SEPARATION)]
COMM DATA CORRECTED TO AUSTRALIAN HEIGHT DATUM
COMM DATA HAVE BEEN TIE LINE LEVELLED
COMM DATA HAVE BEEN MICROLEVELLED
COMM
COMM ELECTROMAGNETIC DATA
COMM SYSTEM PARALLAX REMOVED, AS FOLLOWS:
COMM    X-COMPONENT EM DATA                                         -4.4 s
COMM    Z-COMPONENT EM DATA                                           -3 s
COMM DATA CORRECTED FOR TRANSMITTER HEIGHT, PITCH AND ROLL
COMM DATA CORRECTED FOR TRANSMITTER-RECEIVER GEOMETRY VARIATIONS
COMM DATA HAVE BEEN MICROLEVELLED
COMM CONDUCTIVITY DEPTH INVERSION CALCULATED                   EMFlow V5.10
COMM CONDUCTIVITY DEPTH RANGE                                     0 - 500 m
COMM CONDUCTIVITY DEPTH INTERVAL                                        5 m
COMM CONDUCTIVITIES CALCULATED USING HPRG CORRECTED EMZ DATA
COMM
COMM ----------------------------------------------------------------------
COMM DISCLAIMER
COMM ----------------------------------------------------------------------
COMM It is Fugro Airborne Survey's understanding that the data provided to
COMM the client is to be used for the purpose agreed between the parties.
```

```
COMM That purpose was a significant factor in determining the scope and
COMM level of the Services being offered to the Client. Should the purpose
COMM for which the data is used change, the data may no longer be valid or
COMM appropriate and any further use of, or reliance upon, the data in
COMM those circumstances by the Client without Fugro Airborne Survey's
COMM review and advice shall be at the Client's own or sole risk.
COMM
COMM The Services were performed by Fugro Airborne Survey exclusively for
COMM the purposes of the Client. Should the data be made available in whole
COMM or part to any third party, and such party relies thereon, that party
COMM does so wholly at its own and sole risk and Fugro Airborne Survey
COMM disclaims any liability to such party.
COMM
COMM Where the Services have involved Fugro Airborne Survey's use of any
COMM information provided by the Client or third parties, upon which
COMM Fugro Airborne Survey was reasonably entitled to rely, then the
COMM Services are limited by the accuracy of such information. Fugro
COMM Airborne Survey is not liable for any inaccuracies (including any
COMM incompleteness) in the said information, save as otherwise provided
COMM in the terms of the contract between the Client and Fugro Airborne
COMM Survey.
COMM
COMM With regard to DIGITAL TERRAIN DATA, the accuracy of the elevation
COMM calculation is directly dependent on the accuracy of the two input
COMM parameters laser altitude and GPS altitude. The laser and radar altitude
COMM value may be erroneous in areas of heavy tree cover, where the
altimeters
COMM reflect the distance to the tree canopy rather than the ground. The GPS
COMM altitude value is primarily dependent on the number of available
satellites.
COMM Although post-processing of GPS data will yield X and Y accuracies in
the
COMM order of 1-2 metres, the accuracy of the altitude value is usually
COMM much less, sometimes in the ±5 metre range.  Further inaccuracies
COMM may be introduced during the interpolation and gridding process.
COMM Because of the inherent inaccuracies of this method, no guarantee is
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COMM representation of the height above sea level.  Although this product
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COMM WITH 2 ORTHOGONAL-AXIS RECEIVER COILS IN A TOWED BIRD.
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COMM THE TIMES (IN MILLISECONDS) FOR THE 15 WINDOWS ARE:
COMM
COMM WINDOW      START      END      CENTRE
COMM    1        0.007      0.020      0.013
COMM    2        0.033      0.047      0.040
COMM    3        0.060      0.073      0.067
COMM    4        0.087      0.127      0.107
COMM    5        0.140      0.207      0.173
COMM    6        0.220      0.340      0.280
COMM    7        0.353      0.553      0.453
COMM    8        0.567      0.873      0.720
COMM    9        0.887      1.353      1.120
COMM   10        1.367      2.100      1.733
COMM   11        2.113      3.273      2.693
COMM   12        3.287      5.113      4.200
COMM   13        5.127      7.993      6.560
```

```
COMM   14         8.007     12.393     10.200
COMM   15        12.407     19.993     16.200
COMM
COMM PULSE WIDTH: 10 ms
COMM
COMM TEMPEST EM data are transformed to the response that would be
COMM obtained with a B-field sensor for a 100% duty cycle square
COMM waveform at the base frequency, involving a 1A change in
COMM current (from -0.5A to +0.5A to -0.5A) in a 1sq.m transmitter.
COMM It is this configuration, rather than the actual acquisition
COMM configuration, which must be specified when modelling TEMPEST data.
COMM
COMM
COMM LOCATED DATA FORMAT
COMM
COMM  Output field format : ASCII ASEG-GDF
COMM
COMM FIELD                          UNITS            NULL                FORMAT
COMM Line                                            -99999999           I10
COMM Flight                                          -99                 I4
COMM Fiducial                                        -999999.9           F8.1
COMM Project_FAS                                     -9999               I6
COMM Date                                            -9999999            I9
COMM Time                            s               -9999.9             F8.1
COMM Bearing                         deg             -99                 I4
COMM Latitude                        deg             -99.9999999         F12.7
COMM Longitude                       deg             -999.9999999        F13.7
COMM Easting                         m               -99999.99           F10.2
COMM Northing                        m               -999999.99          F11.2
COMM Tx_Elevation                    m               -999.99             F8.2
COMM Lidar                           m               -999.99             F8.2
COMM DTM                             m               -999.99             F8.2
COMM Mag                             nT              -99999.999          F11.3
COMM Tx_Pitch                        deg             -999.99             F8.2
COMM Tx_Roll                         deg             -999.99             F8.2
COMM Tx_Clearance                    m               -999.99             F8.2
COMM HSep_Raw                        m               -999.99             F8.2
COMM VSep_Raw                        m               -999.99             F8.2
COMM Tx_Clearance_std                m               -999.99             F8.2
COMM HSep_std                        m               -999.99             F8.2
COMM VSep_std                        m               -999.99             F8.2
COMM EMX_nonhprg[1:15]               fT              -999.999999         F12.6
COMM EMX_hprg[1:15]                  fT              -999.999999         F12.6
COMM X_Sferics                                       -9999.999           F10.3
COMM X_LowFreq                                       -9999.999           F10.3
COMM X_Powerline                                     -9999.999           F10.3
COMM X_VLF1                                          -9999.999           F10.3
COMM X_VLF2                                          -9999.999           F10.3
COMM X_VLF3                                          -9999.999           F10.3
COMM X_VLF4                                          -9999.999           F10.3
COMM X_Geofact                                       -9999.999           F10.3
COMM EMZ_nonhprg[1:15]               fT              -999.999999         F12.6
COMM EMZ_hprg[1:15]                  fT              -999.999999         F12.6
COMM Z_Sferics                                       -9999.999           F10.3
COMM Z_LowFreq                                       -9999.999           F10.3
COMM Z_Powerline                                     -9999.999           F10.3
COMM Z_VLF1                                          -9999.999           F10.3
COMM Z_VLF2                                          -9999.999           F10.3
COMM Z_VLF3                                          -9999.999           F10.3
COMM Z_VLF4                                          -9999.999           F10.3
COMM Z_Geofact                                       -9999.999           F10.3
COMM COND_Z[1:100]                   mS/m            -9999.999           F10.3
COMM COND_Z_DEPTH[1:100]             m               -99999              I5
```

APPENDIX III – List of all Supplied Data and Products

(Data - see Government of South Australia Mineral Resources Website)

Initial Raw Products (Gridded data in Georeferenced TIFF format)

- Raw CDI's for 25% of survey lines
- Raw EM Channels (X and Z) for 3 selected windows

Preliminary Gridded Products (delivered in ERMapper format GDA94 MGA53S)

- Digital Terrain Model
- 15 channels of X-component
- 15 channels of Z-component
- EM Time Constant for X-component
- EM Time Constant for Z-component

Final Located Data

2320_Final.des **-** header file describing the contents of the located data
2320_Final.asc - flat ascii file containing located magnetic, EM and digital terrain data
2320_Final.gdb - Geosoft database file containing located magnetic, EM and digital terrain data

Final Gridded Products (delivered in ERMapper format GDA94 MGA53S)

- Total Magnetic Intensity for area 2
- First Vertical Derivative TMI for area 2
- Digital Terrain Model
- 15 channels of X-component
- 15 channels of Z-component
- EM Time Constant for X-component
- EM Time Constant for Z-component

Final Digital Products

- Flight Path map
- Z-Component Conductivity Depth Image (CDI) Multiplots & Stacked sections

Final Acquisition and Processing Report

Delivered as hardcopy and digitally

Government of South Australia

Primary Industries and Resources SA

PACE Targeting 2011

Project Proposal Form

NOTE: All sections must be complete for consideration

PROPONENT DETAILS	
Project Title	Cockabidnie Nickel-Cobalt-Scandium Project
Project Proponent	Lincoln Minerals Limited (LML)
Address and Registered Office of Project Proponent	28 Greenhill Rd WAYVILLE SA 5034
Project Proponent ACN	050 117 023
Project Proponent ABN	50 050 117 023
Project Proponent Registered for GST? Yes/No	Yes
Exploration Licence No.	EL 3609 (ELA 2011/00149), EL 3884 & EL 4539
Exploration Licence Holder	Lincoln Minerals Limited and Centrex Metals Limited
Exploration Licence Operator	Lincoln Minerals Limited and Centrex Metals Limited
SURVEY DETAILS	
Survey Type	Helicopter VTEM
Line / Grid Spacing	100m line spacing
No of Lines / Stations	80 lines 2.5 to 6.0 km long continuous sampling
Airborne Surveys Only: **Flight Height; Line Orientation**	Helicopter – 75 to 85 meters (tow cable dependant) EM sensor – 35 to 45 meters Magnetic sensor – 60 to 70 meters (tow cable dependant) Line orientation SE-NW 135-315°
Estimated Survey Costs *Mobilisation, Survey and Processing costs; specify if exclusive or inclusive of GST.*	Mobilisation $25,000 Survey $152,000 Processing $15,000
Funding Requested from PIRSA	$75,000
PROJECT INFORMATION	

Summary Project Description

The Cockabidnie Nickel-Cobalt-Scandium Project is located on central Eyre Peninsula and in addition to nickel-cobalt-scandium is prospective for a large range of polymetallic minerals including gold, silver, graphite, manganese, unconformity uranium and base metals (copper, lead, zinc). This area on central Eyre Peninsula is one of the most prospective areas for base metal mineralisation in South Australia.

Drilling was completed during October 2007 and April 2008. Lincoln Minerals discovered lateritic-saprolitic nickel mineralisation in the Campoona Syncline. Mineralisation up to 1.15% Ni + 0.33% Co + 51ppm Sc occurs at a depth of about 15-20m beneath shallow cover and overlies gabbroic amphibolite with up to 0.2% Ni in fresh bedrock. The aeromagnetic and calcrete anomalies associated with mineralisation extend over a strike length of 3 km.

Within and immediately west of the Campoona Syncline, drilling in 2007 identified significant base metal, gold and silver mineralisation up to 2.4% Zn+Pb, 0.26g/t Au and 26g/t Ag.

Estimated Project Start Date and Duration
Start date: February 2012; Duration: 2 weeks

What Outputs will be delivered?

1. Final standard digital maps on CD-ROM or DVD-ROM.

- Color magnetic map
- EM profiles map at a logarithmic scale

2. The processed digital data will be delivered on CD-ROM or DVD-ROM. The line data will be delivered in the Geosoft Montaj GDB format. The maps will be delivered in the Geosoft Montaj MAP format. Full descriptions of the digital data formats will be included in the final report and as text files on each CD-ROM

3. The survey report will provide information pertaining to the acquisition, processing and presentation of the data.

Will a Period of Confidentiality be required for Survey Results and Final Report Contents?

Yes, 6 months

Full Project Description
See below

Access
- Notices of Entry, Waivers of Exemption and Compensation Agreements are in all place.
- Notification to landholders of the proposed geophysical survey and an advertisement in the local Eyre Peninsula Tribune will be undertaken prior to survey.

Risk Analysis
- With increased activity in the minerals sector, there is a small risk that geophysical contractors will not be available at the time required in early 2012. Secure tenure of supply will be made in 2011.
- Weather in late summer over the Cockabidnie district is considered the best time of year. Standby delays are acceptable for interim weather conditions.

Proponent Contact Details for Correspondence
Dwayne Povey
Senior Geologist
Lincoln Minerals Limited
28 Greenhill Rd
WAYVILLE SA 5034
Mobile: 0439768377

Signature of Proponent

Dr A. John Parker
Managing Director, Lincoln Minerals Limited

DATE: 8 July 2011

PIRSA Use Only

DATE RECEIVED	
RECEIVED BY	
DATED CONFIRMATION OF RECEIPT BY PROJECT COORDINATOR	
PROPOSAL NO.	

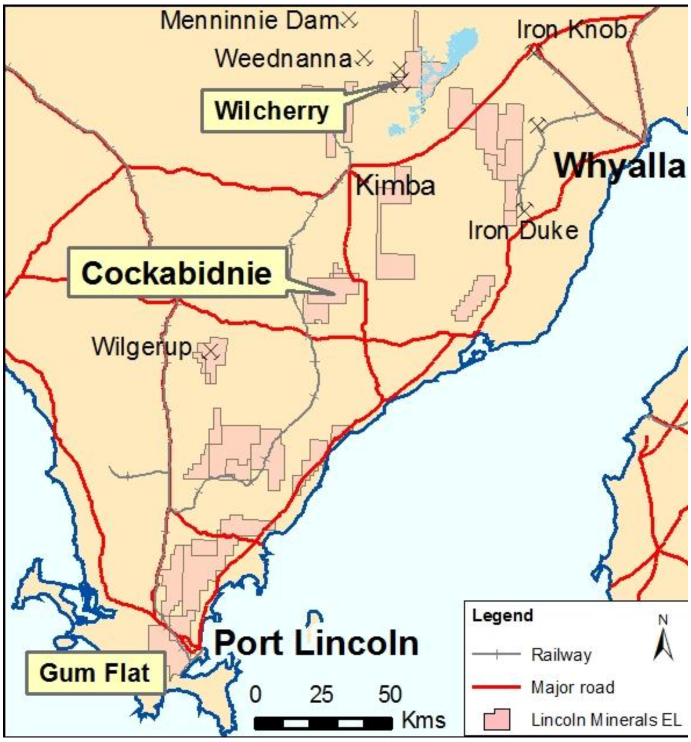

Figure 1: Location of Cockabidnie EL 3609 (ELA 2011/00149), EL 3884 and EL 4539

Aims

1. Undertake a detailed low-level Versatile Time-Domain Electromagnetic (VTEM) geophysical survey over the Campoona Syncline area for locating conductive anomalies and mapping earth resistivities.

2. Define and target additional nickel-cobalt-scandium and base metal mineralisation and potential resources by utilising these most up-to-date geophysics and cutting edge techniques and technologies to explore through regolith in the search for minerals in a highly prospective terrain. The resolution and sensitivity of geophysical processing and imagery has dramatically increased in recent years, along with the ability to integrate these data sets with other geological and geochemical data sets.

3. Based on the data generated from this proposed VTEM survey, undertake detailed geological and geophysical interpretations to assist target generation and drill hole planning within the Campoona Syncline and immediately adjacent area.

4. State-of-the-art interrogation processes will enable LML to ask "what-if" questions about these data sets, carry out more quantitative exploration, and better define what the nature of these new data sets should be.

Lincoln Minerals is targeting a potential maiden resource at Cockabidnie.

Tenements

The proposed VTEM survey is located on the following tenements:

Tenement	Expiry	Area (km2)	Locality	Licensee	Operator
EL 3609 **	13-Aug-11	154	Cockabidnie	CXM	LML jointly with CXM
EL 3884	5-Aug-12	40	Campoona	LML	LML
EL 4539 (former EL 3498)	23-Aug-12	11	Cockabidnie North	LML	LML jointly with CXM

An application (ELA 2011/00149) for a subsequent replacement EL for EL 3609 has been lodged with PIRSA.

Geological setting

The regional geology of the eastern Eyre Peninsula is described by Drexel *et al*. (1993). The area forms part of the southern margin of the Gawler Craton which comprises a variety of Archaean to Mesoproterozoic gneisses and granites. The majority of Lincoln Minerals' tenements are located within the Cleve Subdomain where the Palaeoproterozoic Hutchison Group metasedimentary sequence was highly metamorphosed to upper amphibolite facies and multiply deformed during the Kimban Orogeny about 1840-1700 Ma (Drexel *et al*., 1993). This deformation folded the rocks into a series of tight, often refolded synclines and anticlines sandwiched between major faults and shear zones. The Hutchison Group was intruded by a series of granites prior to and during the Kimban Orogeny and many of these granites are now strongly deformed themselves.

The Hutchison Group on central Eyre Peninsula was formed from a sequence of platformal mixed carbonate and clastic sediments. The basal Warrow Quartzite progrades from west to east and is overlain by a platformal carbonate sequence now represented by dolomitic marble, calcsilicate gneiss and BIF. This is prospective for base metals, iron ore and uranium. The carbonate/BIF sequence is overlain by a thick sequence of fine grained clastic sediments now represented by garnetiferous schist, gneiss and amphibolite. The latter may have a mafic volcanic component and is thought to host nickel-cobalt-scandium mineralisation.

The Cockabidnie area has been the focus of both base metal and uranium exploration sporadically since the late 1960's. It has potential for unconformity uranium mineralisation associated with the base of the Blue Range Beds and also both base metal and iron ore mineralisation associated with the BIF-marble-calcsilicate sequence extending south and southwest from the Stanley Mine.

Regional structure and tectonics

The Hutchison Group was affected by the Kimban Orogeny, a major period of deformation, metamorphism and granite intrusion which extended between 1785 Ma and 1700Ma. The Kimban Orogeny comprised three main tectonic events:

- An early high grade amphibolite to granulite facies event (M1)
- A high grade isoclinal folding event with some possible thrusting (D2)
- A lower grade open folding event (D3) with associated shearing along discrete mylonite zones.

Hutchison Group rocks have been extensively intruded by middle to late Palaeoproterozoic granites ranging in age from 1845Ma to 1710Ma.

Typically BIF’s occur as sinuous belts of magnetite-bearing rocks generally strongly deformed and recrystallised. They are dominated by quartz, magnetite, iron rich silicate minerals (hornblende, anthophyllite, grunerite, gedrite, diopside and tremolite), dolomitic carbonate and local accessories include apatite, garnet and pyrite. These rocks give rise to corridors of distinctive high amplitude magnetic anomalies. Amphibolites are characterised by lower magnitude anomalies to magnetite and require higher resolution images.

BIFs are moderately to strongly banded with magnetite rich layers alternating with iron silicate rich, carbonate rich and quartz rich layers. Typically, banding is layer parallel (termed S1) and can be seen to be strongly deformed by F2 isoclinal folds. Intrafolial F2 folds can be seen in core to be refolded by more open F3 folds. There is clear evidence on a mesoscopic scale of thickening of individual magnetite layers in fold noses. This suggests strongly that the same process is happening on a macroscopic scale.

Structures

The Cockabidnie tenement is dominated by the Campoona Syncline which is a key structural feature that may also play an important role in nickel-cobalt mineralisation. Aeromagnetic data indicates a NNE-trending open syncline with an approximate 5km strike length. Amphibolitic gabbro with anomalous nickel-cobalt has been identified in the core of the Campoona Syncline.

Regolith and base of oxidation

The regolith at Cockabidnie is dominated by Cainozoic soils, wind-blown and alluvial sands together with calcrete and saprolitic clays. Ironstone lag is ubiquitous over the EL and can most probably be attributed to eroded laterite.

Exploration to date

Lincoln Minerals exploration program for the Cockabidnie area focussed initially on potential unconformity uranium mineralisation associated with the base of the Blue Range Beds combined with ongoing exploration for gold and base metals particularly in the Campoona Syncline and southwest of Sugarloaf Hill. The key to this exploration program was a detailed high-resolution aeromagnetic and radiometric survey to identify uranium-only radiometric anomalies in the first case but also to identify strategic structures such as shear zones, faults and graphitic schist units intersecting the unconformity.

A low level airborne geophysical survey was undertaken in February 2007 for 1,934 line kilometres at a line spacing of 100m. Geophysical data and expenses were shared between Centrex Metals Limited and Lincoln Minerals. A comprehensive report on the geophysics of Cockabidnie was included in the first annual report for EL3609 Cockabidnie (Centrex Metals, 2007: confidential). A 200m spaced Airborne Full Tensor Gravity (FTG) survey flown by Bell Geospace was completed for Centrex in August/September 2009.

Lincoln Minerals' drilling results include zones of elevated uranium up to 81ppm U below calcrete soil uranium anomalies. The elevated uranium occurs in basement rocks that were originally not far below a Mesoproterozoic unconformity analogous to Alligator River style uranium mineralisation in the Northern Territory.

Surface geochemical calcrete gold anomalies (>10ppb Au and up to 272ppb Au) occur southwest of Sugarloaf Hill Mine and in the Campoona Syncline. There are >100ppm Cu, >100ppm Zn and >50ppm Ni anomalies coincident with the calcrete gold anomalies (Figure 2).

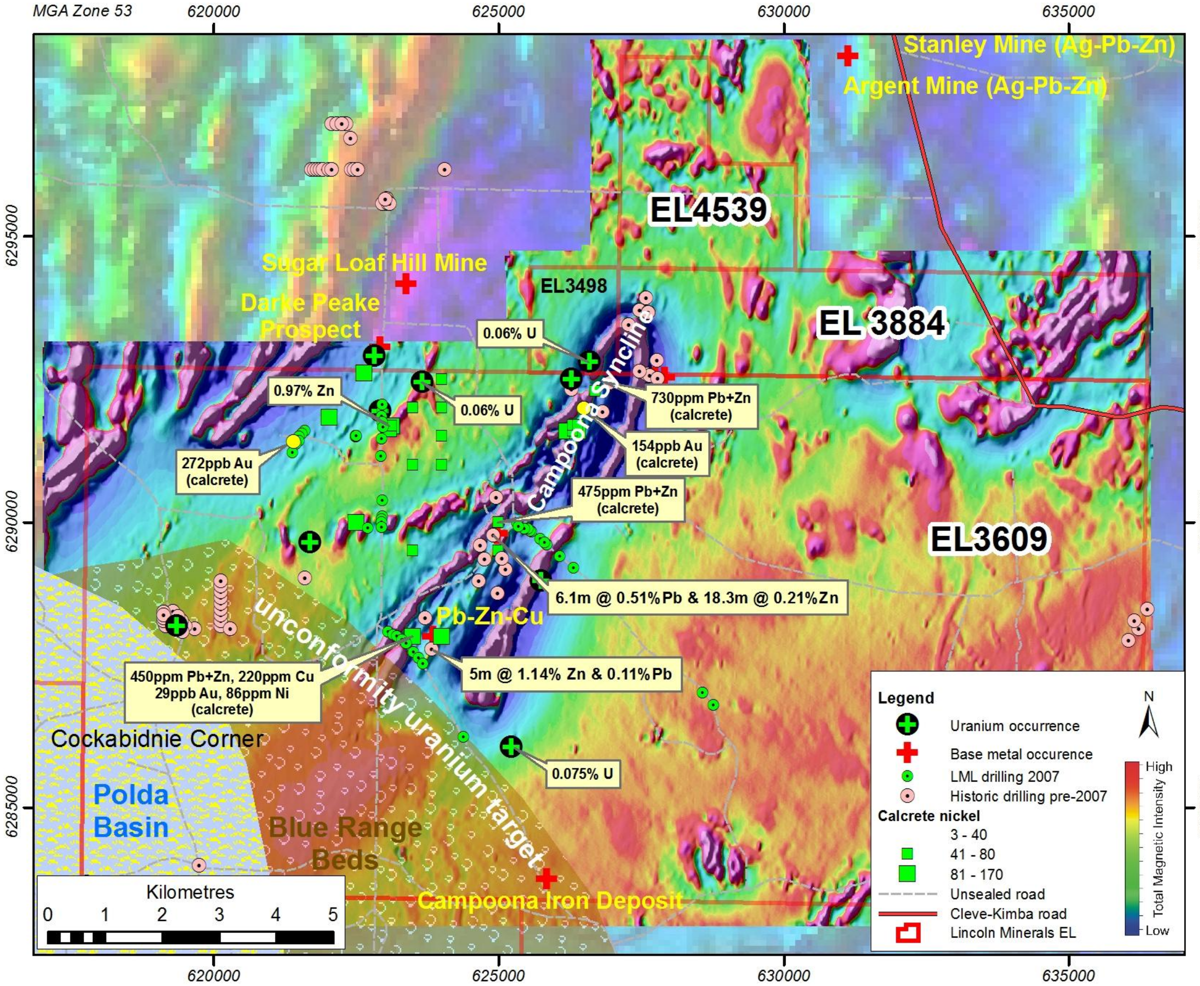

Figure 2: Summary map of anomalous calcrete nickel samples, previous drilling and 2007 LML drilling, Cockabidnie Project

The first phase of drilling was completed during October 2007. 45 aircore and slimline RC drillholes were drilled for a total of 3,396m. Lincoln Minerals discovered lateritic nickel mineralisation in the Campoona Syncline. Mineralisation up to 0.7% Ni + 0.05% Co occurs at a depth of about 15-20m beneath shallow cover and overlies gabbroic amphibolite with up to 0.2% Ni in fresh bedrock (Figures 3, 4 and 5). The aeromagnetic and calcrete anomalies associated with mineralisation extend over a strike length of 3-5 km.

In addition to nickel-cobalt, the 2007 drilling also identified a new area of lead-zinc-silver mineralisation immediately west of the Campoona Syncline, including intervals of up to 2.4% Zn+Pb, 0.26g/t Au and 26g/t Ag.

The second phase of drilling was completed during April 2008. The drilling of 3,817m by Silver City Drilling outlined further lateritic/saprolitic nickel-cobalt mineralisation grading up to 1.15% Ni (with 0.045% Co, 0.037% Cu and 0.18% Zn; CBAC182, 25-26m) and 0.33% Co (with 0.21% Ni and 0.07% Cu; CBAC185, 30-31m). There are significant intervals of mineralisation up to 30m wide (CBAC185, 20-50m @ 0.13% Co, 0.18% Ni and 0.05% Cu).

Subsequent review and re-analysis of the 2008 lateritic nickel-cobalt drilling program has outlined associated occurrences of anomalous scandium ranging up to 51 ppm Sc.

These results have identified a zone of scattered lateritic and saprolitic nickel-cobalt-scandium mineralization over a strike length of 3-5 km. The mineralisation occurs to depths of 50m beneath shallow soil and sand cover 5-15m thick and is relatively enriched in cobalt relative to typical lateritic nickel deposits. The latest results outline a number of pods or exploration targets. However, because of the widely spaced drill lines and line spacing of existing aeromagnetics for targeting, the pods are open both along strike and in some cases across strike.

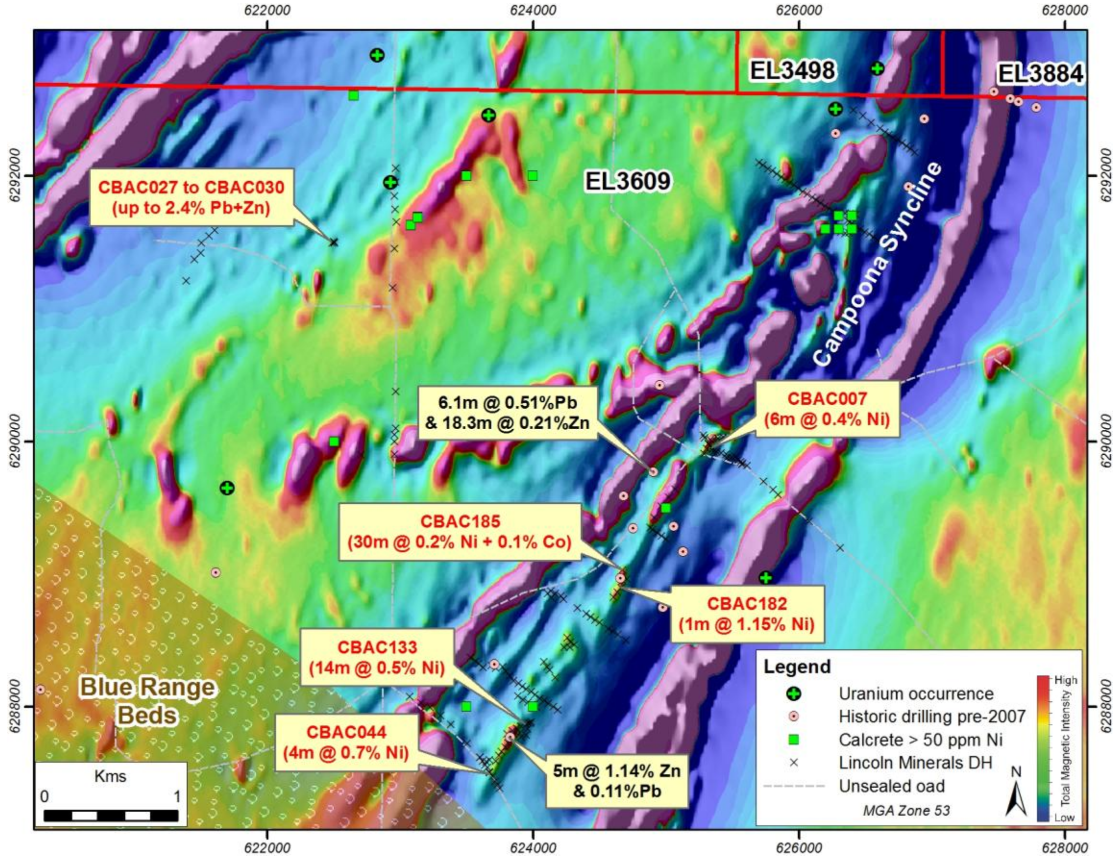

Figure 3: Lincoln Minerals 2007-08 drill holes intersecting nickel-cobalt mineralisation

Figure 4: Typical chip tray showing ~15m of shallow cover

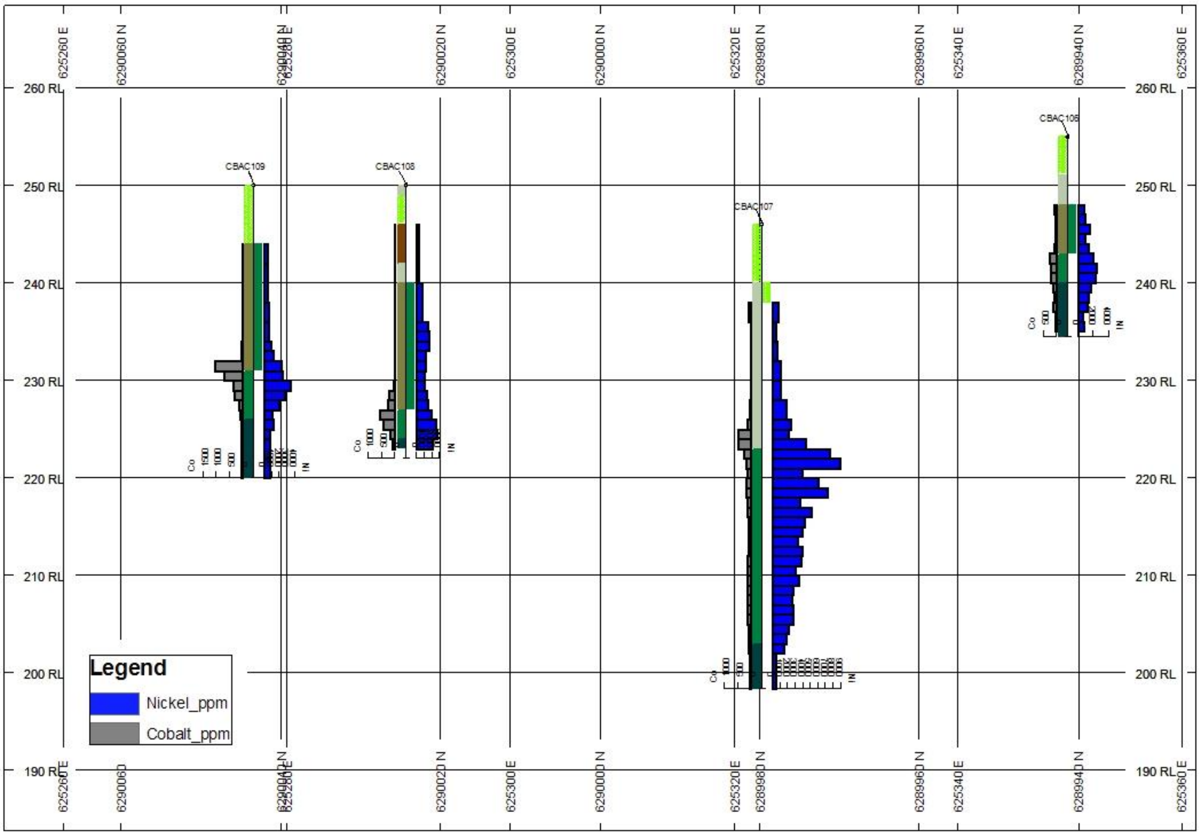

Figure 5: Simplified cross section displaying nickel-cobalt intercepts

Previous Exploration

Exploration by CRA Exploration and Shell Metals/Billiton (Env 3573) centred on the Campoona Syncline where there is high background base metal geochemistry (up to 0.9% Pb in outcrop samples) and Sirotem anomalies associated with BIFs. Many Sirotem anomalies were attributed to graphitic schist and uranium anomalies were mainly in surficial sands. One drillhole 5km ENE of Cockabidnie Corner intersected 6.1m @ 0.51% Pb and 18.3m @ 0.21% Zn. Drilling by Western Mining in the same general area intersected intervals up to 5m @ 1.14% Zn and 0.11% Pb (Env 6566).

A 10 x background gas-in-soil radon anomaly was located by the Pancontinental Mining-PNC-Afmeco Joint Venture 1.5km north-northeast of Cockabidnie Corner with coincident uranium in borehole water and hematite alteration in both the Mesoproterozoic cover and underlying graphitic schist basement (Env. 3551). Neither the source of the radon nor uranium anomalies were identified from RAB and core drilling but the anomaly highlights the potential in this region for unconformity-related uranium mineralisation.

Proposed VTEM Survey

Lincoln Minerals is proposing a Versatile Time-Domain Electromagnetic (VTEM) geophysical system to survey the Campoona Syncline area, comprising the following main instrumentation:

- The VTEM Time Domain EM system for locating conductive anomalies and mapping earth resistivities

- A high-sensitivity proton precession magnetometer for mapping geologic structure and lithology.

- A proton precession magnetometer base station for diurnal correction.

- A Radar altimeter with an accuracy of approximately 1 meter

- A GPS Navigation System providing an in-flight accuracy up to 3 meters

- Data processing and mapping, by experienced geophysicists, using the latest computer technology and state-of-the-art software.

The location of the proposed survey is shown in Figure 6.

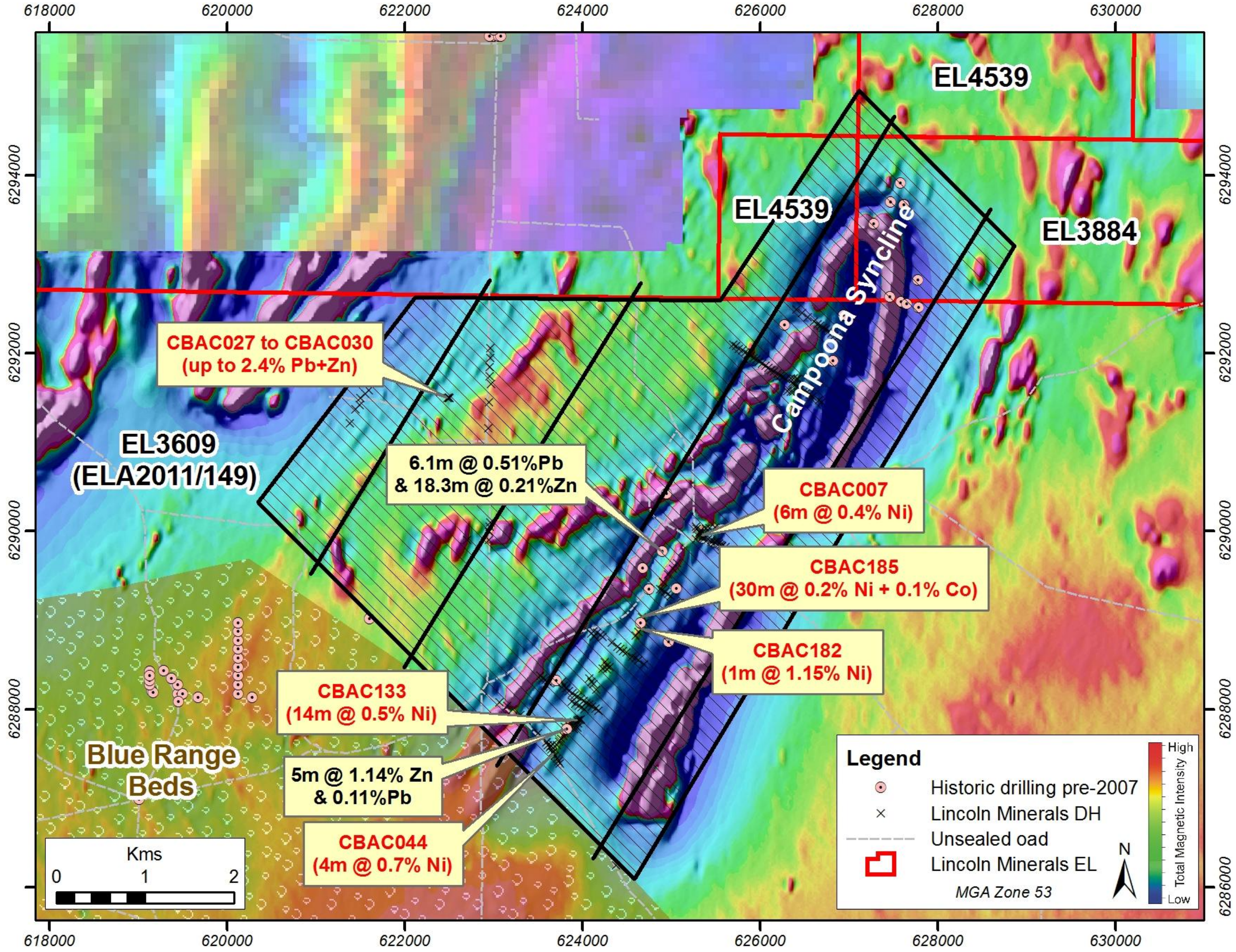

Figure 6: Location of proposed VTEM survey over the Campoona Syncline

Proposed survey details are:

	Line Spacing	Line Length	Line Direction	Tie Line Spacing	Tie Line Direction	Line kms
Campoona Syncline	100m	2.5 – 6.0 km	135 - 315			350
				1,500	045 - 225	25
						375

The proposed height of the helicopter and sensors above ground level are:

- Helicopter – 75 to 85 meters (tow cable dependant)
- EM sensor – 35 to 45 meters
- Magnetic sensor – 60 to 70 meters (tow cable dependant).

The estimated cost of the survey is:

VTEM Basic Survey Charge per line km			$350
For an estimated 375	line km		$131,250
Helicopter mob to Base of Operations			$15,000
Equipment and Crew mob to Base of Operations			$10,000
Estimated Survey Charge			**$156,250**
Additional Fuel Charges per line-km	$20.00		
Additional Fuel Charges			$7,500
Additional Accommodation Charges per line-km	$20.00		
Additional Accommodation & Meals Charges			$7,500
Estimated Total Survey Charge			**$171,250**
Additional Charge for B-Field (optional) per line-km	$15.00		
Additional Charge for B-Field (optional)			$5,750
Estimated Survey Charge with B-Field			**$177,000**

The VTEM or Versatile Time Domain Electro Magnetic system is the most innovative and successful airborne electromagnetic system to be introduced in more than 30 years. The proprietary receiver design using the advantages of modern digital electronics and signal processing delivers exceptionally low-noise levels. Coupled with a high dipole moment transmitter, the result is unparalleled resolution and depth of investigation in precision electromagnetic measurements.

Key features include:

- Superior Exploration Depth – Over 400 metres
- Low Base Frequency (25 or 30 Hz) for Penetration through conductive cover
- High Spatial Resolution – 2 to 3 metres
- Improved Interpretability due to Receiver-Transmitter symmetry
- Spotting drill targets directly off of the airborne results
- Excellent resistivity discrimination and detection of weak anomalies
- Virtually impervious to spheric activity.

The system was designed to be field configurable to best suit a large variety of different geophysical requirements from deep penetration to optimizing the discrimination within a narrow range of resistivity values.

The system is easily transportable. It can be disassembled for packaging in relatively small units for shipping to surveys around the world.

In the event of damage to the EM bird in-flight or while being transported between survey sites, the unique design allows the easy replacement of any part of the system in the field. The transmitter loop can be assembled or disassembled in 3-4 hours.

The recent surveys flown with VTEM have produced superior results over the same test areas flown by competing airborne EM surveys. VTEM has flown the Reid-Mahaffy, Caber, Perseverance and Montcalm test ranges and the results have demonstrated that VTEM provides the Industry's highest signal/noise ratio and conductor spatial resolution.

It is believed that the lateritic/saprolitic nickel-cobalt-scandium mineralisation at Cockabidnie is structurally controlled and directly overlies massive gabbroic amphibolite which is believed to be conductive and can be detected by airborne electromagnetics. As such, a Versatile Time Domain

Electromagnetic (VTEM) survey is proposed to cover the Campoona Syncline occurrences and surrounds in order to hopefully detect the known occurrences, highlight other anomalies that may represent previously undiscovered or blind deposits at shallow depths and provide walk up drill targets.

A dedicated PC-based field computer workstation will be used in the field for purposes of displaying geophysical data for quality control, calculating and displaying the navigation, producing preliminary EM anomaly information and diurnally corrected magnetic maps, and copying/verifying the digital data.

The survey crew will consist of at least the following personnel:

1. An experienced Geophysicist or Geophysical Technician/Project Manager to supervise the survey operations, perform quality control of the data and to assist in arranging the survey logistics and field operations.
2. A Geophysical Operator to maintain and operate the geophysical instruments.
3. An experienced Survey Pilot, who has demonstrated his ability to fly the geophysical instrumentation safely and within survey specifications.
4. An experienced Aircraft Mechanic will be on stand-by at the helicopter base and should be ready to be on the survey site with minimal delay.

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