

**EL 3485 TALLARINGA
ANNUAL TECHNICAL REPORT**

18 January 2006 – 17 January 2007

Quasar Resources Pty Ltd

Author: J Barnes
Date: 3 July 2007
Distribution: Quasar Resources (1)
PIRSA (2)

The contents of this report remain the property of Quasar Resources Pty Ltd and may not be published in whole or in part nor used in a company prospectus without the written consent of the company.

TABLE OF CONTENTS

BIBLIOGRAPHIC DATA SHEET	ii
SUMMARY	1
CONCLUSIONS AND RECOMMENDATIONS	2
INTRODUCTION	3
GEOLOGY	3
EXPLORATION PROGRAMME	3
EXPENDITURE	5

Figure 1 AEM Flight Line Location

BIBLIOGRAPHIC DATA SHEET

REPORT TITLE	Tallaringa Project, Exploration Licence 3485 Annual Technical Report for the period 18 January 2006 – 17 January 2007.
PROSPECT NAME	Tallaringa
TENEMENT NUMBER	3485
OWNER	Quasar Resources Pty Ltd
COMMODITIES	Uranium
TECTONIC UNITS	
STRATIGRAPHIC UNITS	
1:250 000 MAP SHEET	Tallaringa
1:100 000 MAP SHEET	Tallaringa
KEYWORDS	

SUMMARY

Fugro Airborne Surveys has completed an Airborne Electromagnetic Survey (AEM) 1074 line kilometres were flown over this exploration licence, the data has been received and is awaiting processing.

(AEM data - see Government of South Australia Mineral Resources Website)

CONCLUSIONS AND RECOMMENDATIONS

In the next period of tenure from 18 January 2007 – 17 January 2008 the following work program is recommended.

Geophysics

The Tempest EM survey will be processed, validated and inverted. The results of the inversion will be used to model the basement sequences; map the location of the palaeochannels incised into Proterozoic basement, and be used to define basement conductive features that require follow-up drilling.
(AEM data - see Government of South Australia Mineral Resources Website)

Drilling

Follow-up drill testing will be completed in an effort to explore

- Prospective palaeochannel sequences hosting sandstone-style uranium mineralisation
- Prospective conductive features located in Proterozoic in the basement sequences

INTRODUCTION

The Tallaringa Exploration Licence (EL 3485) is situated in the Tallaringa Conservation Park on the Gawler Craton.

Exploration Licence 3485 covers 958km² and is approximately 150kms west-northwest of Coober Pedy and the sealed Stuart Highway. The Tarcoola to Darwin railway line is approximately 100kms west-northwest of the licence area.

Quasar Resources was granted EL 3485 on 18 January 2006 for a period of one year.

GEOLOGY

The exploration licence is located over ground that forms part of the Northern Gawler Craton. The Gawler Craton is a stable crystalline basement province comprising Archaean to Meso-Proterozoic rocks obscured by Neo-Proterozoic to Cainozoic age sedimentary strata.

EXPLORATION PROGRAMME

Fugro Airborne Surveys were contracted to fly an Airborne Electromagnetic Survey (AEM). The AEM surveys were collected using a fixed wing system. The Transmitter loop is a 6 turn loop fixed around the aircraft, with the receiver trailing in a bird approximately 120m behind and 30m below the aircraft. Both X and Z component data is collected at a frequency of 25 Hz and magnetic data is collected simultaneously. The data was collected in an east-west orientation with 1km line spacing. Tie lines were collected in a north south orientation with 10km line spacing.

1074 line kilometres (See Figure 1) were flown over this exploration licence, the data has been received and is awaiting processing.

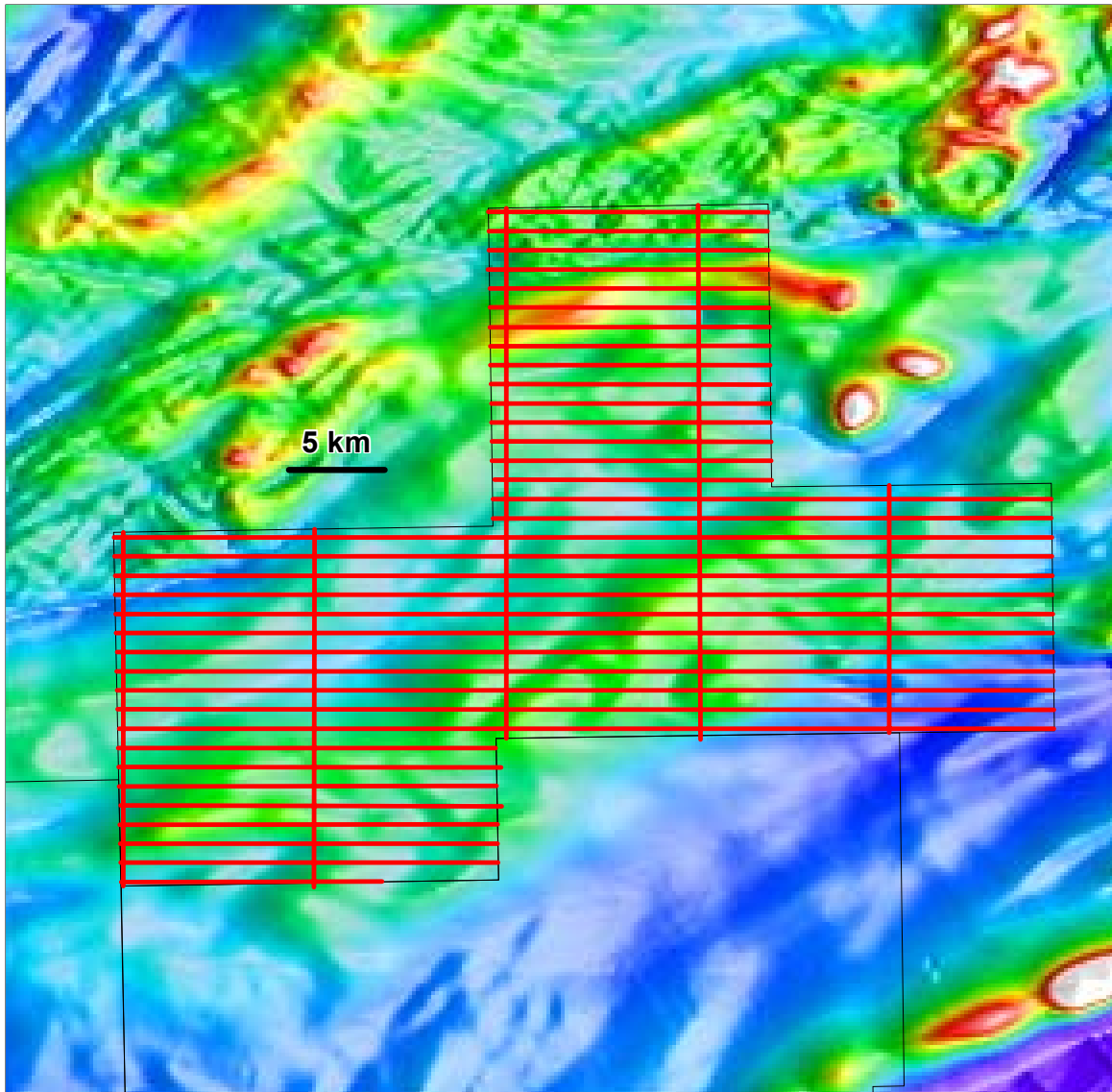


Figure 1 – AEM line kilometres over EL 3485

EXPENDITURE

EL 3485 Tallaringa

Expenditure 18 Jan 06 - 31 Jan 07

	\$
Surveying-Geophysical	
Airborne	184,230.00
Consulting Fees	217.40
Consulting - Geophysics	1,651.19
Hire Equipment Charges	0.06
Licenses	10.00
Rents	76.50
Employee Medicals	4.00
Consumable Supplies	3.97
Freight & Shipping Charges	0.10
Office Equip & Computer	
Repair	-5.45
Telephone - Mobile Phone	0.89
Telephone - Satellite Phone	1.19
Travel - HR King Air Flights	343.57
Travel - M /Vehicle Taxi Fares	4.68
Books & Subscriptions	2.94
Capital Costs Expensed	7.27
Dues & Memberships	20.40
Management Fee	1,778.44
Manpower	11,036.16
Office Software & Comp	
Support	698.07
Seminars & Conferences	21.95
Stationery & Printing	5.02
Staff Training - External	30.07
Office Support	1,350.00
	<u><u>\$200,097.34</u></u>

Gawler, South Australia
TEMPEST
Geophysical Survey

Acquisition and Processing Report
for
Quasar Resources Pty Ltd

Prepared by : M. Lawrence
L. Stenning
Authorised for release by :
.....

Survey flown: July - August 2006

by



Fugro Airborne Surveys
65 Brockway Road, Floreat. WA 6014, Australia
Tel: (61-8) 9273 6400 Fax: (61-8) 9273 6466

FAS JOB # 1798

CONTENTS

1. SURVEY OPERATIONS AND LOGISTICS	4
1.1 INTRODUCTION	4
1.2 SURVEY BASE	4
1.3 SURVEY PERSONNEL	4
1.4 AREA MAP	ERROR! BOOKMARK NOT DEFINED.
2. SURVEY SPECIFICATIONS AND PARAMETERS	6
2.1 AREA CO-ORDINATES	6
2.2 SURVEY AREA PARAMETERS	7
2.3 FLIGHT PLANS	7
2.4 JOB SAFETY PLAN	7
3. AIRCRAFT EQUIPMENT AND SPECIFICATIONS	8
3.1 AIRCRAFT	8
3.2 TEMPEST SYSTEM SPECIFICATIONS	8
3.2.1 EM Receiver and Logging Computer	8
3.2.2 TEMPEST Transmitter	9
3.2.3 TEMPEST 3-Axis Towed Bird Assembly	9
3.3 PDAS 1000 SURVEY COMPUTER	9
3.3.1 Cesium Vapour Magnetometer Sensor	9
3.3.2 Magnetometer Processor Board	9
3.3.3 Fluxgate Magnetometer	9
3.3.4 GPS Receiver	9
3.3.5 Differential GPS Demodulator	9
3.4 NAVIGATION SYSTEM	10
3.5 ALTIMETER SYSTEM	10
3.5.1 Radar Altimeter	10
3.5.2 Barometric Altimeter	10
3.6 VIDEO TRACKING SYSTEM	10
3.7 DATA RECORDED BY THE AIRBORNE ACQUISITION EQUIPMENT	10
4. GROUND DATA ACQUISITION EQUIPMENT AND SPECIFICATIONS	11
4.1 MAGNETIC BASE STATION	11
4.2 GPS BASE STATION	11
5. EM AND OTHER CALIBRATIONS AND MONITORING	12
5.1 PRE-FLIGHT BAROMETER CALIBRATION: LINE C1511	12
5.2 PRE-FLIGHT ZERO: LINE C9001	12
5.3 PRE-FLIGHT SWOOPS: LINE C9002	12
5.4 POST-FLIGHT ZERO: LINE C9003	12
5.5 POST-FLIGHT BAROMETER CALIBRATION: LINE C1611	12
5.6 ADDITIVE EM MEASUREMENTS: LINES C9004, C9005, AND C9007	12
5.7 DYNAMIC MAGNETOMETER COMPENSATION	12
5.8 PARALLAX CHECKS	13
5.9 RADAR ALTIMETER CALIBRATION	13
5.10 HEADING ERROR CHECKS	13
6. DATA PROCESSING	14
6.1 FIELD DATA PROCESSING	14
6.1.1 Quality Control Specifications	14
6.1.2 In-Field Data Processing	14
6.2 FINAL DATA PROCESSING	14
6.2.1 Magnetics	14
6.2.2 Derived Topography	15
6.2.3 Electromagnetic Data Processing	16

6.2.4	Conductivity Depth Images (CDI).....	19
6.2.5	System Specifications for Modelling TEMPEST Data.....	19
6.2.6	Delivered Products	20
7.	REFERENCES	21
	APPENDIX I – FLIGHT PLAN.....	22
	APPENDIX II – WEEKLY ACQUISITION REPORTS	25
	APPENDIX III – FLIGHT SUMMARY (LINE LISTING)	29
	APPENDIX IV – LOCATED DATA FORMAT	33
	APPENDIX V – LIST OF ALL SUPPLIED DATA AND PRODUCTS	55

1. SURVEY OPERATIONS AND LOGISTICS

1.1 Introduction

Between the 11th of July 2006 and the 6th of August 2006, Fugro Airborne Surveys Pty. Ltd. (FAS) undertook an airborne TEMPEST electromagnetic and magnetic survey for Quasar Resources Pty Ltd, over the Gawler Project areas near Coober Pedy in South Australia. The survey was flown over four areas with total coverage of the survey amounting to 7134.6 line kilometres flown in 18 flights. The survey was flown using a CASA C212-200 Turbo Prop 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

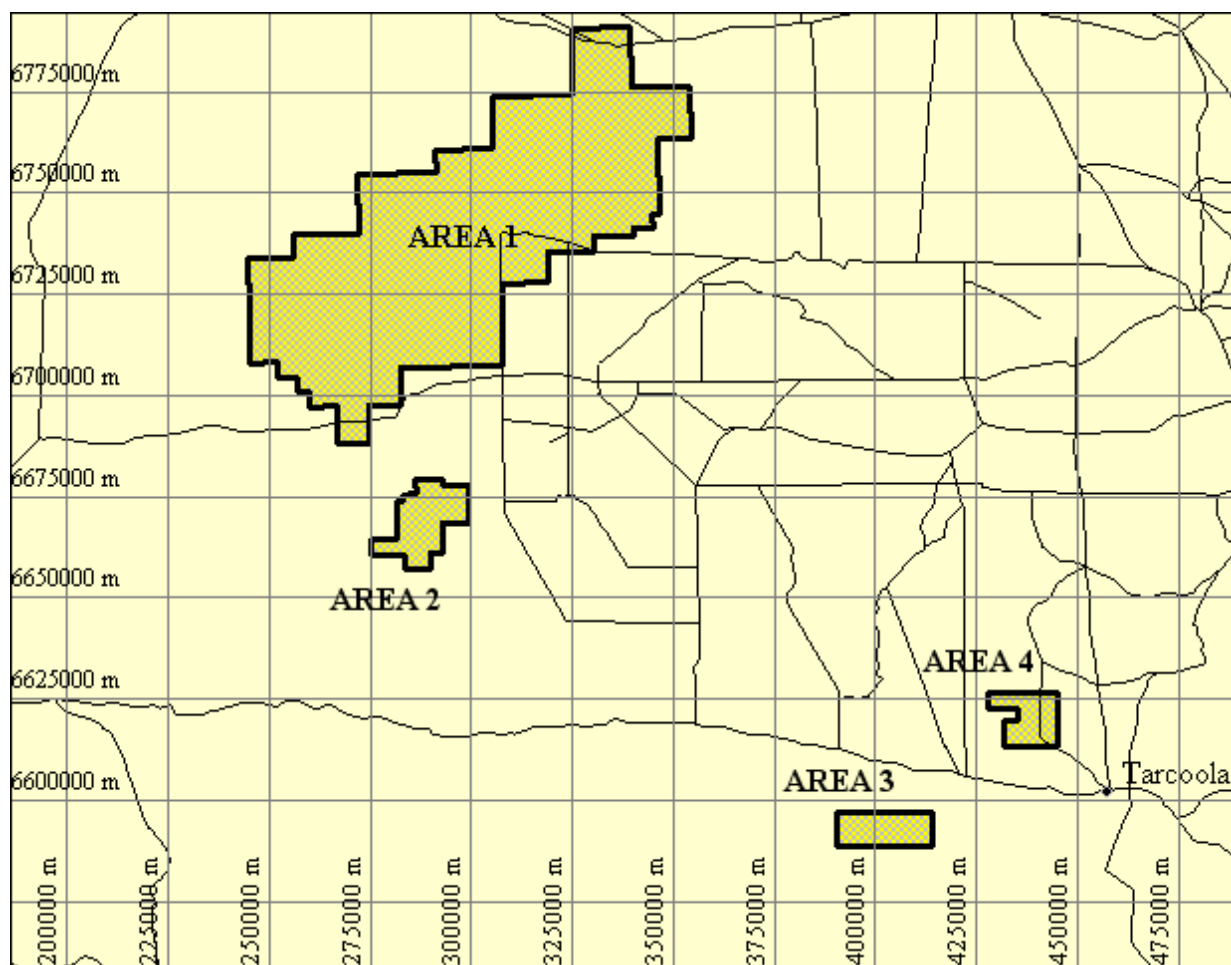
The survey was based out of Coober Pedy, South Australia. The survey aircraft was operated from the Coober Pedy airport with the aircraft fuel available on site. A temporary office was set up in a room at the Opal Inn, Coober Pedy, where all survey operations were run and the post-flight data verification was performed.

1.3 Survey Personnel

The following personnel were involved in this project:

Project Supervision - Acquisition	Bart Anderson
- Processing	Kathlene Oliver
On-site Crew Leader	John Stewart
Pilot/s	Tim Haldane, Max Eichorn
System Operator/s	John Stewart
Technician	John Stewart
Engineer	Dick Carden
Field Data Processing	Denis Cowey, Kah Tho Lee
Office Data Processing	Matthew Lawrence

1.4 Survey Location Diagram



Gawler Survey Areas 1, 2, 3 and 4

Datum: WGS84
Projection: UTM
Zone: 53

2. SURVEY SPECIFICATIONS AND PARAMETERS

2.1 Area Co-ordinates

The survey area was located within UTM Zone 53S, Central Meridian = 135
(Note - Co-ordinates in WGS84 Zone 53)

Area 1			Area 2		
	Easting	Northing		Easting	Northing
1	309127	6706174	1	282211	6659473
2	283845	6705710	2	274185	6659312
3	284024	6696475	3	274057	6665546
4	275972	6696315	4	280482	6665676
5	276160	6687078	5	280299	6674916
6	265573	6686858	6	281907	6674947
7	265379	6696097	7	281871	6676794
8	258935	6695959	8	285086	6676858
9	258856	6699654	9	285015	6680553
10	255634	6699584	10	293987	6680723
11	255553	6703279	11	294021	6678876
12	250717	6703172	12	300453	6678995
13	250636	6706867	13	300668	6667218
14	244186	6706722	14	294243	6667098
15	243862	6720925	15	294382	6659708
16	243541	6735129	16	291172	6659647
17	254856	6735380	17	291243	6655953
18	254736	6740924	18	282284	6655778
19	270908	6741262			
20	270610	6756044	Area 3		
21	290041	6756418		Easting	Northing
22	289939	6761962	1	390248	6597392
23	304205	6762215	2	414298	6597392
24	303942	6775146	3	414298	6588525
25	323758	6775466	4	390248	6588525
26	323504	6792092			
27	340658	6792342	Area 4		
28	340865	6777566		Easting	Northing
29	346082	6777637	1	445236	6626820
30	355461	6777760	2	445236	6613253
31	355658	6762292	3	431668	6613212
32	347561	6762185	4	431668	6619811
33	347811	6743715	5	435213	6619811
34	346194	6743693	6	435245	6622242
35	346244	6740000	7	427782	6622242
36	341396	6739932	8	427782	6626820
37	341422	6738086			
38	331725	6737945			
39	331780	6734252			
40	320470	6734076			
41	320589	6726688			
42	308939	6726495			

2.2 Survey Area Parameters

Job Number	-	1798
Survey Company	-	Fugro Airborne Surveys Pty Ltd
Date Flown	-	11th July 2006 – 6 th August 2006
Client	-	Quasar Resources Pty Ltd
EM System	-	25 Hz TEMPEST
Navigation	-	Real-time differential GPS
Datum	-	GDA94 (Zone 53)
Area Name	-	Gawler (1-4), South Australia
Nominal Terrain Clearance	-	120 m
Traverse Line Spacing	-	1000 m
Traverse Line Direction	-	090 – 270 deg
Traverse Line Numbers	-	10010 – 11050, 20010 – 20240, 30010 – 30090, 40010 - 40140
Tie Line Spacing	-	10000 m
Tie Line Direction	-	000 – 180 deg
Tie Line Numbers	-	17070 – 17110, 27101 – 27040, 37010 – 37030, 47010 - 47030
Line Kilometres - Area 1	-	6096.4 km
Line Kilometres - Area 2	-	532.1 km
Line Kilometres - Area 3	-	254.8 km
Line Kilometres - Area 4	-	251.1 km
Total Survey Line Kilometres	-	7134.4 km

2.3 Flight Plans

The flight plans are given in Appendix 1.

2.4 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	-	C212-200 Turbo Prop
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	-	244 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	-	68,320 Am ²
• Average moment	-	34,1600 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	-	0.2 nT
• GPS cycle rate	-	1 second

3.2.1 EM Receiver and Logging Computer

The EM receiver computer is a Picodas PDAS-1000 data acquisition system. 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 DSP signal processing boards by the timing card, which ensures that all waveform generation and sampling is accomplished with high accuracy. The timing card is synchronised to GPS through the use of the 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 PDAS 1000 Survey Computer

The SURVEY computer is a PICODAS PDAS-1000 data acquisition system. 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 VGA 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 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 Picodas magnetometer processor board is used for de-coupling and processing the Larmor frequency output of the magnetometer sensor. The processor board interfaces with the PDAS 1000 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 Picodas PNAV 2001 Navigation Computer is used for real-time navigation. The PNAV computer loads 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 WGS-84 latitude and longitude positional data received from the Novatel GPSCard 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 analog HSI indicator. 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 PNAV is interlocked to the SURVEY computer for auto selection and verification of the line to be flown. The GPS information passed to the PNAV 2001 navigation computer is corrected using the received real time differential data, enabling the aircraft to fly as close to the intended track as possible.

3.5 Altimeter System

3.5.1 Radar Altimeter

Model:	Sperry Stars RT-220 radio altimeter system
Sample interval:	1.0 second
Accuracy:	+/- 1.5 % of indicated altitude.

The Sperry 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 Barometric Altimeter

Output of a Digiquartz 215A-101 pressure 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 tape recorded by a PAL VHS colour video system is synchronised with the geophysical record by a digital fiducial display, which is recorded along with GPS latitude and longitude information and survey line number.

3.7 Data Recorded by the Airborne Acquisition Equipment

Raw EM data including fiducial, local time, X, Y, Z axis sensor response, current monitor and bird auxiliary sensor output are recorded on the EM receiver computer as “G” EM files.

The Survey computer records all other survey data including aeromagnetic and GPS data using as “S” Survey files, and “R” Rover files containing GPS raw range data for post processing.

4. GROUND DATA ACQUISITION EQUIPMENT AND SPECIFICATIONS

4.1 Magnetic Base Station

Two Geometrics G856 magnetometers were 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 5 seconds 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 stations were located approximately 80 m apart at Coober Pedy airport.

4.2 GPS Base Station

A GPS base logging station was set up at the survey base office. The GPS antenna was positioned on the roof, above room 45 of the Opal Inn, Coober Pedy.

The GPS base system was comprised of a Novatel GPS PC card mounted in a portable IBM 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: 29° 00' 52.49651" S

Long: 134° 45' 15.27791" E

Height: 236.222 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 Pre-Flight Barometer Calibration: Line C1511

A recording of the barometer output at a known elevation is carried out before take-off to assist with calibration and determination of drift during the flight. The barometer is used as a back-up to the GPS for aircraft altitude.

5.2 Pre-Flight Zero: Line C9001

This manoeuvre is performed once the aircraft is established en route to the survey area. Background EM levels are recorded and assessed by the airborne operator to determine if:-

- a. the system noise level is acceptable,
- b. the response had not varied significantly from previous flights, and
- c. the spheric level is acceptable.

These data are recorded for approximately 90 seconds.

5.3 Pre-Flight Swoops: Line C9002

This manoeuvre is conducted immediately after the pre sortie zero. During this manoeuvre the relative position of the towed sensor is deliberately made to vary relative to the aircraft. The EM data are monitored by the airborne operator to confirm correct operation of the system during the manoeuvre.

5.4 Post-Flight Zero: Line C9003

This calibration is performed immediately following the completion of the survey sorties. Background EM levels are recorded to characterise any changes occurred in the system over the duration of the flight. These data are recorded for approximately 90 seconds.

5.5 Post-Flight Barometer Calibration: Line C1611

A recording of the barometer output is repeated following landing at the end of the flight to assist with calibration and determination of drift during the flight.

5.6 Additive EM Measurements: Lines C9004, C9005, and C9007

A recording of the background signal through the X, Y and Z receiver coil inputs is carried out before and/or after acquisition of data for survey lines on each flight. These measurements may be made with the transmitter on (C9004, C9005) or with the transmitter off (C9007). The signal from the receiver coils is removed from the signal pathway by disconnecting the power to the bird at the winch inside the aircraft.

5.7 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 11th and 18th of July 2006.

5.8 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	0.6 s
GPS	0 s
Radar Altimeter	0.6 s
EM - X	0.2 s
EM - Z	1.4 s

5.9 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, WA 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.

5.10 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 – flight line spacing should not exceed 125% of the nominal spacing over a continuous distance exceeding 5 km or where lines cross.

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 Magnetism 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 Magnetism

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
Area 1	56124 nT
Area 2	56120 nT
Area 3	56110 nT
Area 4	56120 nT

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

The International Geomagnetic Reference Field (IGRF) 2005 model (updated for secular variation 2006.6) was removed from the levelled total field magnetics. An IGRF base value was then added to the data.

Area	Base Value
Area 1	56885 nT
Area 2	56470 nT
Area 3	56473 nT
Area 4	56470 nT

Following this, a FAS proprietary microlevelling process was 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 radar altimeter.

The ground elevation, relative to the WGS84 spheroid used by GPS receiver units, is obtained by subtracting the terrain clearance from the aircraft altitude, noting the vertical separation between the GPS antenna and the radar altimeter, and applying suitable parallax corrections between the two measurements.

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 location of the GPS base station, variations in the radar altimeter characteristics over ground of varying surface texture, and the finite footprint of the radar altimeter.

Following this, a FAS proprietary microlevelling process was applied in order to more subtly level the data.

The accuracy of the elevation calculation is directly dependent on the accuracy of the two input parameters, radar altitude and GPS altitude. The radar altitude value may be erroneous in areas of heavy tree cover, where the altimeter reflects the distance to the tree canopy rather than the ground. The GPS altitude value is primarily dependent on the number of available satellites. Although post-processing of GPS data will yield X and Y accuracies in the order of 1-2 metres, the accuracy of the altitude value is usually much less, sometimes in the ± 5 metre range. Further inaccuracies may be introduced during the interpolation and gridding process.

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, 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, 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 35 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 are 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 2.3m above the belly of the aircraft. The laser altimeter sensor is mounted in the belly of the aircraft. Therefore a total of 2.4m (0.1m + 2.3m) 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 -0.9 degrees for pitch and -0.1 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 $\mu\text{V}/\text{sq.m}/0.2\text{s}$. 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 $\log_{10}(\text{pV}/\sqrt{\text{Hz}}/\text{sq.m})$. 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 $\log_{10}(\text{pV}/\sqrt{\text{Hz}}/\text{sq.m})$. 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 $\log_{10}(\text{pV}/\sqrt{\text{Hz}}/\text{sq.m})$. 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" data for each area were input into version 5.10 of EMFlow to calculate Conductivity Depth Images (CDI). Conductivity values were calculated then run through *Sigtime*. This processing was completed for the Z component data as it is better suited to broad flat-lying conductors.

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 200m below surface (using a depth increment of 2m) for areas 1, 3 & 4; and to a depth of 100m (using a depth increment of 1m) for area 2. The conductivity ranges were as follows: area 1 = 30-3000mS/m, area 2 = 40-4000mS/m, areas 3 & 4 = 20-2000mS/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 metres behind & 35 metres below the aircraft

6.2.5.2 Parallax

The located data files utilise the following parallax values :-

- magnetics = 0.6 fiducials (3 observations from the zero parallax position),
- radar altimeter = 0.6 fiducials (3 observations from the zero parallax position),
- EM X-component = 0.2 fiducials (1 observation from the zero parallax position),
- EM Z-component = 1.4 fiducials (7 observations from the zero parallax position),

These EM parallax values are optimised for aligning the EM response amplitudes for horizontal or broad steeply dipping conductors, which account for the majority of responses in regolith-dominated terrains such as this.

For optimum gridded display of the response for discrete vertical or narrow conductors, the following EM parallax values are appropriate :-

- EM X-component = 1.8 fiducials (9 observations from the zero parallax position, or 8 observations from the “horizontal” parallax position),
- EM Z-component = 0.6 fiducials (3 observations from the zero parallax position, or -4 observations from the “horizontal” parallax position).

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

6.2.6 Delivered Products

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

Digital ascii located data in flat ascii and AMIRA formats, and Geosoft GDB format were produced, containing the raw and final, X and Z EM data as well as magnetics and digital elevation. The header files can be found in Appendix IV.

Gridded TMI, 1VDTMI, DEM, Depth to Resistive Basement, 15 Channels of X and Z components and EM Time Constants for X and Z.

Stacked CDI sections and CDI-multiplots (of EM Z-component) were produced and delivered as hardcopy plots and digital png and hpg files.

Flight path, TMI, 1VD_TMI, DEM & Depth to Resistive Basement maps in hardcopy and digital (.prn)

Location diagrams and flight paths saved as .png files.

Acquisition and processing report in hardcopy and digital format.

7. REFERENCES

- Garner, S.J., Thiel, D.V., 2000, Broadband (ULF-VLF) surface impedance measurements using MIMDAS: Exploration Geophysics, 31, 173-178.
- Green, A., 1998. Altitude correction of time domain AEM data for image display and geological mapping, using the Apparent Dipole Depth (ADD) method. Expl. Geoph. 29, 87-91.
- Green, A., 1998. The use of multivariate statistical techniques for the analysis and display of AEM data. Expl. Geoph. 29, 77-82.
- Green, A., Lin, Z., 1996. Effect of uncertain or changing system geometry on airborne transient electromagnetic data: CSIRO Expl. and Mining Research News No. 6, August 1996, 9-11, CSIRO Division of Exploration and Mining.
- Lane, R., 2000, Conductive unit parameters : summarising complex conductivity distributions: Paper accepted for presentation at the SEG Annual Meeting, August 2000.
- Lane, R., Green, A., Golding, C., Owers, M., Pik, P., Plunkett, C., Sattel, D., Thorn, B., 2000, An example of 3D conductivity mapping using the TEMPEST airborne electromagnetic system: Exploration Geophysics, 31, 162-172.
- Lane, R., Leeming, P., Owers, M., Triggs, D., 1999, Undercover assignment for TEMPEST: Preview, Issue 82, 17-21.
- Lane, R., Pracilio, G., 2000: Visualisation of sub-surface conductivity derived from airborne EM, SAGEEP 2000, 101-111.

APPENDIX I – Flight Plan

JOB_Number	1798											
CLIENT	Heathgate Res.											
AREA_NAME	Gawler North											
PLANNED_BY	KTL											
SPHEROID	22	W.G.S_1984	6378137.0	298.257223563	0.9996							
DELTAXYZ	0.0	0.0	0.0	0.0	0.0	0.0	0.0					
HEMISPHERE	SOUTH											
UTM_ORIGIN	53	135	135									
BOUNDARY	1	309127	6706174	-29.760014	+133.025897	-294536.0	+1330133.2	12				
BOUNDARY	2	283845	6705710	-29.760043	+132.764481	-294536.2	+1324552.1	12				
BOUNDARY	3	284024	6696475	-29.843356	+132.764489	-295036.1	+1324552.2	12				
BOUNDARY	4	275972	6696315	-29.843362	+132.681158	-295036.1	+1324052.2	12				
BOUNDARY	5	276160	6687078	-29.926689	+132.681175	-295536.1	+1324052.2	12				
BOUNDARY	6	265573	6686858	-29.926694	+132.571537	-295536.1	+1323417.5	12				
BOUNDARY	7	265379	6696097	-29.843357	+132.571550	-295036.1	+1323417.6	12				
BOUNDARY	8	258935	6695959	-29.843359	+132.504878	-295036.1	+1323017.6	12				
BOUNDARY	9	258856	6699654	-29.810024	+132.504889	-294836.1	+1323017.6	12				
BOUNDARY	10	255634	6699584	-29.810021	+132.471559	-294836.1	+1322817.6	12				
BOUNDARY	11	255553	6703279	-29.776695	+132.471560	-294636.1	+1322817.6	12				
BOUNDARY	12	250717	6703172	-29.776694	+132.421559	-294636.1	+1322517.6	12				
BOUNDARY	13	250636	6706867	-29.743360	+132.421565	-294436.1	+1322517.6	12				
BOUNDARY	14	244186	6706722	-29.743352	+132.354904	-294436.1	+1322117.7	12				
BOUNDARY	15	243862	6720925	-29.615239	+132.354914	-293654.9	+1322117.7	12				
BOUNDARY	16	243541	6735129	-29.487120	+132.354933	-292913.6	+1322117.8	12				
BOUNDARY	17	254856	6735380	-29.487126	+132.471596	-292913.7	+1322817.7	12				
BOUNDARY	18	254736	6740924	-29.437110	+132.471600	-292613.6	+1322817.8	12				
BOUNDARY	19	270908	6741262	-29.437127	+132.638263	-292613.7	+1323817.7	12				
BOUNDARY	20	270610	6756044	-29.303772	+132.638273	-291813.6	+1323817.8	12				
BOUNDARY	21	290041	6756418	-29.303782	+132.838278	-291813.6	+1325017.8	12				
BOUNDARY	22	289939	6761962	-29.253768	+132.838281	-291513.6	+1325017.8	12				
BOUNDARY	23	304205	6762215	-29.253779	+132.985063	-291513.6	+1325906.2	12				
BOUNDARY	24	303942	6775146	-29.137099	+132.984641	-290813.6	+1325904.7	12				
BOUNDARY	25	323758	6775466	-29.137116	+133.188294	-290813.6	+1331117.9	12				
BOUNDARY	26	323504	6792092	-28.987096	+133.188309	-285913.5	+1331117.9	12				
BOUNDARY	27	340658	6792342	-28.987097	+133.364366	-285913.6	+1332151.7	12				
BOUNDARY	28	340865	6777566	-29.120435	+133.364388	-290713.6	+1332151.8	12				
BOUNDARY	29	346082	6777637	-29.120434	+133.417997	-290713.6	+1332504.8	12				
BOUNDARY	30	355461	6777760	-29.120427	+133.514385	-290713.5	+1333051.8	12				
BOUNDARY	31	355658	6762292	-29.260016	+133.514403	-291536.1	+1333051.9	12				
BOUNDARY	32	347561	6762185	-29.260025	+133.431078	-291536.1	+1332551.9	12				
BOUNDARY	33	347811	6743715	-29.426694	+133.431099	-292536.1	+1332552.0	12				
BOUNDARY	34	346194	6743693	-29.426695	+133.414432	-292536.1	+1332452.0	12				

MASTER_PT	1	309127	6706174	-29.760014	+133.025897		*
MASTER_NEW	0	Not implemented.					*
KM_IN_AREA	5378	568					*
KM+OVERFLY	5378	568					*
JOB_Number	1798						*
CLIENT	Heathgate Res.						*

AREA_NAME	Gawler South							*
PLANNED_BY	KTL							*
								*
SPHEROID	22	W.G.S_1984	6378137.0	298.257223563	0.9996		*	
DELTAXYZ	0.0	0.0	0.0	0.0	0.0	0.0	*	
HEMISPHERE	SOUTH							*
UTM_ORIGIN	53	135	135				*	
BOUNDARY	1	282211	6659473	-30.176700	+132.738173	-301036.1	+1324417.4 12 *	
BOUNDARY	2	274185	6659312	-30.176689	+132.654843	-301036.1	+1323917.4 12 *	
BOUNDARY	3	274057	6665546	-30.120454	+132.654843	-300713.6	+1323917.4 12 *	
BOUNDARY	4	280482	6665676	-30.120456	+132.721513	-300713.6	+1324317.4 12 *	
BOUNDARY	5	280299	6674916	-30.037107	+132.721525	-300213.6	+1324317.5 12 *	
BOUNDARY	6	281907	6674947	-30.037115	+132.738191	-300213.6	+1324417.5 12 *	
BOUNDARY	7	281871	6676794	-30.020449	+132.738197	-300113.6	+1324417.5 12 *	
BOUNDARY	8	285086	6676858	-30.020445	+132.771528	-300113.6	+1324617.5 12 *	
BOUNDARY	9	285015	6680553	-29.987107	+132.771537	-295913.6	+1324617.5 12 *	
BOUNDARY	10	293987	6680723	-29.987115	+132.864521	-295913.6	+1325152.3 12 *	
BOUNDARY	11	294021	6678876	-30.003782	+132.864517	-300013.6	+1325152.3 12 *	
BOUNDARY	12	300453	6678995	-30.003774	+132.931177	-300013.6	+1325552.2 12 *	
BOUNDARY	13	300668	6667218	-30.110021	+132.931202	-300636.1	+1325552.3 12 *	
BOUNDARY	14	294243	6667098	-30.110036	+132.864530	-300636.1	+1325152.3 12 *	
BOUNDARY	15	294382	6659708	-30.176699	+132.864537	-301036.1	+1325152.3 12 *	
BOUNDARY	16	291172	6659647	-30.176703	+132.831212	-301036.1	+1324952.4 12 *	
BOUNDARY	17	291243	6655953	-30.210031	+132.831218	-301236.1	+1324952.4 12 *	
BOUNDARY	18	282284	6655778	-30.210032	+132.738169	-301236.1	+1324417.4 12 *	
SQUARE_KMS	417.956							*
								*
NAVTYPE	NOVATEL							*
NAVMODE	U.T.M							*
PLAN_TYPE	Normal							*
LINE_TYPE	S.LINE	X.LINE	0	0			*	
HEADING	90	180					*	
SPACING	1000	5000	1000	1000			*	
OVER_LINE	1	1					*	
OVERFLY	0	0					*	
MIN_LENGTH	8	8					*	
FIRST_LINE	10	10					*	
INCREMENT	1	1					*	
X_TRACK	100	100					*	
MASTER_PT	1	282211	6659473	-30.176700	+132.738173		*	
MASTER_NEW	0	Not implemented.					*	
KM_IN_AREA	415	77					*	
KM+OVERFLY	415	77					*	

JOB_Number	1798						*
CLIENT	Quasar Res.						*
AREA_NAME	South						*
PLANNED_BY	KTL						*
							*
SPHEROID	22	W.G.S_1984	6378137.0	298.257223563	0.9996		*
DELTAXYZ	0.0	0.0	0.0	0.0	0.0	0.0	*
HEMISPHERE	SOUTH						*
UTM_ORIGIN	53	135	135				*
BOUNDARY	1	390248	6597392	-30.751356	+133.853357	-304504.9	+1335112.1 12 *
BOUNDARY	2	414298	6597392	-30.753333	+134.104592	-304512.0	+1340616.5 12 *
BOUNDARY	3	414298	6588525	-30.833335	+134.103850	-305000.0	+1340613.9 12 *
BOUNDARY	4	390248	6588525	-30.831351	+133.852407	-304952.9	+1335108.7 12 *
SQUARE_KMS	213.251						*
							*

NAVTYPE	NOVATEL				*
NAVMODE	U.T.M				*
PLAN_TYPE	Normal				*
LINE_TYPE	S.LINE	X.LINE	0	0	*
HEADING	90	180			*
SPACING	1000	10000	1000	1000	*
OVER_LINE	1	1			*
OVERFLY	0	0			*
MIN_LENGTH	2	2			*
FIRST_LINE	10	10			*
INCREMENT	1	1			*
X_TRACK	100	100			*
MASTER_PT	1	390248	6597392	-30.751356 +133.853357	*
MASTER_NEW	0	Not implemented.			*
KM_IN_AREA	216	27			*
KM+OVERFLY	216	27			*

JOB_Number	1798				*		
CLIENT	Quasar Res.				*		
AREA_NAME	North				*		
PLANNED_BY	KTL				*		
					*		
SPHEROID	22	W.G.S_1984	6378137.0	298.257223563	0.9996	*	
DELTAXYZ	0.0	0.0	0.0	0.0	0.0	0.0	*
HEMISPHERE	SOUTH						*
UTM_ORIGIN	53	135	135				*
BOUNDARY	1	445236	6626820	-30.489624	+134.429372	-302922.6	+1342545.7 12 *
BOUNDARY	2	445236	6613253	-30.612044	+134.428656	-303643.4	+1342543.2 12 *
BOUNDARY	3	431668	6613212	-30.611715	+134.287108	-303642.2	+1341713.6 12 *
BOUNDARY	4	431668	6619811	-30.552172	+134.287544	-303307.8	+1341715.2 12 *
BOUNDARY	5	435213	6619811	-30.552369	+134.324508	-303308.5	+1341928.2 12 *
BOUNDARY	6	435245	6622242	-30.530435	+134.324984	-303149.6	+1341929.9 12 *
BOUNDARY	7	427782	6622242	-30.530009	+134.247199	-303148.0	+1341449.9 12 *
BOUNDARY	8	427782	6626820	-30.488701	+134.247517	-302919.3	+1341451.1 12 *
SQUARE_KMS	193.489						*
							*
NAVTYPE	NOVATEL						*
NAVMODE	U.T.M						*
PLAN_TYPE	Normal						*
LINE_TYPE	S.LINE	X.LINE	0	0			*
HEADING	90	180					*
SPACING	1000	7000	1000	1000			*
OVER_LINE	1	1					*
OVERFLY	0	0					*
MIN_LENGTH	2	2					*
FIRST_LINE	10	10					*
INCREMENT	1	1					*
X_TRACK	100	100					*
MASTER_PT	1	445236	6626820	-30.489624	+134.429372		*
MASTER_NEW	0	Not implemented.					*
KM_IN_AREA	202	32					*
KM+OVERFLY	202	32					*

APPENDIX II – Weekly Acquisition Reports

Week Commencing: **Monday 10-Jul-06**
Job Number: 1798
Total km: 6436.2

Aircraft: VH - TEM
Base: Opal Inn Coober
Country: Australia
Area Name: Gawler North

Operators: John Stewart
Data Proc: Kha Toh Lee / Glen Gooch
Crew Leader: John Stewart
Accom: Opal Inn

Pilots: Tim Haldane, Max Eichorn
Techs: John Stewart
Client: Quasar Resources
Contact #: 0429109240

Date	Flight Number	Crew		Time		M/R		Oil		Fuel BURN	This Flight		To Date		Standby (0, 0.5, 1)	Comments
		Pit(s)	Op	T/O	Land	Hrs	L	R	L		Prod	Refly	Prod	Refly		
Monday 10-Jul-06	NA															
Julian Day 191																
Day -1																
Tuesday 11-Jul-06	1	G.K, M.C	A.C	16:10	16:54	0.7				330	0.0					Weather:Overcast Remarks:Bird removed from aircraft for Balance, Dick Carden arrived from Jabiru
Julian Day 192																
Day 0											0.0	0.0	0.0	0.0		Safety Meeting:No New issues
Wednesday 12-Jul-06	2	G.K, M.C	A.C	7:30	8:34	1.1				463	0.0					Weather:Overcast Remarks:Bird balance complete, unable to fly survey due to EM DAS issue, fault finding has revealed a dead bios battery and possible card seating issue.
Julian Day 193																
Day 1											0.0	0.0	0.0	0.0	1.0	Safety Meeting:No new issues Weather:Strong Winds Stormy conditions unsuitable for Survey Remarks: Test Fit of Bird carried out despite EM DAS issues, Balance needs adjusting EM DAS has bios issues, new batteries arrived late afternoon thanks to D Woodbridge
Thursday 13-Jul-06																
Julian Day 194																
Day 2											0.0	0.0	0.0	0.0	1.0	Safety Meeting:No new issues Weather:Strong Winds, Rain, Stormy conditions unsuitable for Survey Remarks:Bird Checked and rebalanced, EM DAS issues resolved, A/c 200 hr completed. Bird spectra has revealed possible Earthing issues AC to investigate
Friday 14-Jul-06								1								
Julian Day 195																Safety Meeting:No new issues
Day 3											0.0	0.0	0.0	0.0		Weather:Strong Winds, Rain Stormy conditions unsuitable for Survey Remarks:AC worked on sylem D.C worked on aircraft and removed batteries for recharging.
Saturday 15-Jul-06																
Julian Day 105																
Day 4											0.0	0.0	0.0	0.0		Safety Meeting:no new issues.
Sunday 16-Jul-06	3	G.K, M.C	A.C	10:15	11:15	1.0				456						Weather:Strong Winds, gusting at 28 knots.
Julian Day 106																Remarks:Test flight on bird conducted, results exhibit a spectra that no longer has system noise but show that the bird needs degausing.
Day 5											0.0	0.0	0.0	0.0		Safety Meeting:Please see safety meeting report.
Total Job Hours	2.8	Weekly Totals				2.8	0	1		1249	0.0	0.0	Total Standby		3.0	
		Total Aircraft Hours					Ltrs/Hr			446			% Complete		3.0	0.0 %
		Hours to Next Periodic					Running Avg			0.0 km/day			km Remaining			6436.2 km
		Anticipated Hours Next week								0.0 km/hr						

Survey Equipment Problems:

Pilots: Tim Haldane, Max Eichorn
Techs: John Stewart
Client: Quasar Resources
Contact #: 0429109240

Aircraft: VH - TEM
Base: Opal Inn Coober
Country: Australia
Area Name: Gawler North

Monday 17-Jul-06

Date	Flight Number	Crew		Time		M/R		Oil		Fuel BURN	This Flight		To Date		Standby (0, 0.5, 1)	Comments
		Plt(s)	Op	T/O	Land	Hrs	L	R	Prod		Refly					
Monday 17-Jul-06	4	G.K, M.C	A.C	7:39	8:43	1.1				394	0.0	0.0				Weather: Cold some cloud developing in the afternoon, gusty winds at 18 knots Remarks: Successful production in the afternoon flight. The lidar is not functioning.
Julian 198	5	G.K, M.C	A.C	13:40	17:32	3.9				1489	374.3	0.0				Comp Box completed.
Day																Safety: No new issues.
Tuesday 18-Jul-06	6	G.K, M.E	A.C	15:48	17:20	1.5				584	0.0					Weather: Some cloud, Cold gusty winds 10 knots Remarks: Comp box reflow, new pilot refamil with aircraft.
Julian 199																
Day 7																
Wednesday 19-Jul-06	7	G.K, M.E	A.C	7:50	13:16	5.4				2119	799.4	0.0				Safety: No new issues, M.E to be given copy of JSP.
Julian 200																Weather: Some cloud, Cold gusty winds 10 knots Remarks: Good production pending QC
Day 8																Safety Meeting: No new issues
Thursday 20-Jul-06	8	G.K, M.E	A.C	6:54	10:12	3.3				1260	436.0					Weather: Some cloud, Cold gusty winds 10 knots Remarks: Flight cut short so G.K could catch his flight for demob.
Julian 201																
Day 9																Safety Meeting No new issues
Friday 21-Jul-06																Weather: Fine Remarks: Standby waiting for T.H to arrive. A.C driving to Port Augusta to pick up T.H
Julian 202																
Day 10																Safety Meeting: No New issues
Saturday 22-Jul-06																Weather: Fine Remarks: A.C and T.H driving from Port Augusta to Coober Pedy. PM flt not viable
Julian 203																
Day 11																Safety Meeting:
Sunday 23-Jul-06	9	T.H, M.E	A.C	8:30	12:50	4.3				1625	580.8	103.0				Weather: Some cloud with some low fog over area, building winds. Remarks: Data all confirmed good by processing. Refly's due to severe coil knocks over regions of interest in previous flights
Julian 204																Safety Please see safety meeting minutes.
Day 12																
Total Job Hours		Weekly Totals				19.5		0		7471		2190.5		103.0		
		Total Aircraft Hours						Ltrs/Hr		382		Total Standby		0.0		
		Hours to Next Periodic										% Complete		34.0		%
		Anticipated Hours Next week										km Remaining		4245.7		km

Survey Equipment Problems:

Week Commencing: **Monday 24-Jul-06**

Aircraft: VH - TEM

Operators: John Stewart

Pilots: Tim Haldane, Max Eichorn

Job Number: 1798

Base: Opal Inn Coober

Data Proc: Kha Toh Lee / Glen Gooch

Techs: John Stewart

Total km: 6436.2

Country: Australia

Crew Leader: John Stewart

Client: Quasar Resources

Area Name: Gawler North

Accom: Opal Inn

Contact #: 0429109240

Date	Flight Number	Crew		Time		M/R Hrs	Oil		Fuel BURN	This Flight		To Date		Standby (0, 0.5, 1)	Comments
		Pit(s)	Op	T/O	Land		L	R		Prod	Refly	Prod	Refly		
Monday 24-Jul-06	10	T.H., M.E	A.C	12:00	17:13	5.2			1946	850.0					Weather: Early morning fog lifting in the afternoon, afternoon winds gusting 15 knots. Remarks: Production pending QC
Julian Day 205															
Day 13				Hours Today		5.2				850.0	0.0	3040.5	103.0		Safety Meeting: The crew is still concerned about the flight following unit.
Tuesday 25-Jul-06		T.H., M.E	A.C												Weather: Remarks:
Julian Day 206															
Day 14				Hours Today		0.0				0.0	0.0	3040.5	103.0		Safety Meeting:
Wednesday 26-Jul-06		T.H., M.E	A.C												Weather: Remarks:
Julian Day 207															
Day 15				Hours Today		0.0				0.0	0.0	3040.5	103.0		Safety Meeting:
Thursday 27-Jul-06		T.H., M.E	J.S.												Weather: Remarks: Pilot Rest Day
Julian Day 208															
Day 16				Hours Today		0.0				0.0	0.0	3040.5	103.0		Safety Meeting:
Friday 28-Jul-06		T.H., M.E	J.S.											1.0	Weather: Some Rain Over Night. Strong Winds so No Survey Remarks
Julian Day 209															
Day 17				Hours Today		0.0				0.0	0.0	3040.5	103.0		Safety Meeting: Meeting: No New Issues
Saturday 29-Jul-06	3	T.H., M.E	J.S.												Weather: Clear Cold in Morning 8 - 18 Deg., Winds Increasing. Remarks: Area #4 Completed, Area #3 Tie Lines Flown
Julian Day 210										261.6					
Day 18				Hours Today		0.0				261.6	0.0	3302.1	103.0		Safety Meeting: Meeting: No New Issues
Sunday 30-Jul-06	11	T.H., M.E	J.S.	8:15	13:15	5.0			2350	798.0					Weather: Clear Cold in Morning 8 - 18 Deg., Winds Increasing. Remarks Area #1, Lines 1053 - 1062 Flown.
Julian Day 211															
Day 19				Hours Today		5.0				798.0	0.0	4100.1	103.0		Safety Meeting: Meeting: No New Issues
Total Job Hours		Weekly Totals		Total Aircraft Hours		10.2	0	0	4296	1909.6	0.0	Total Standby		1.0	
				Hours to Next Periodic			Ltrs/Hr Running Avg		272.8 km/day			% Complete		4.0	
				Anticipated Hours Next week			186.9 km/hr					km Remaining		63.7 %	2336.1 km

Survey Equipment Problems:

Pilots: Tim Haldane, Max Eichhorn
Techs: John Stewart
Client: Quasar Resources
Contact #: 0429109240

Date		Flight Number	Crew		Time		M/R		Oil		Fuel		This Flight		To Date		Standby (0, 0.5, 1)	Comments
			Plt(s)	Op	T/O	Land	Hrs	L	R	Added	Prod	Refly	Prod	Refly				
Monday	31-Jul-06	12	T.H., M.E	J.S.	8:12	13:24	5.2				2071	829.0						Weather: Cold in Morning, Winds calm - 10 Knots. Temp. 9 - 19 Deg. Remarks:
Julian	212																	
Day	20				Hours Today		5.2					829.0	0.0	103.0				Safety Meeting: No New issues
Tuesday	1-Aug-06	13	T.H., M.E	J.S.	7:12	12:27	5.3				2080	662.0						Weather:Cold Overcast Strong Winds with a Front coming through. Remarks: All EM Data not recorded on Hard Disk so most of data lost.
Julian	213																	
Day	21				Hours Today		5.3					662.0	0.0	103.0				Safety Meeting: No New issues
Wednesday	2-Aug-06	14	T.H., M.E	J.S.	8:10	12:34	4.4				1820	577.8	65.2					Weather:4/8 Cloud in Morning, Winds Increased During Flight Remarks: Flight Cut Short Due to Turbulence
Julian	214																	
Day	22				Hours Today		4.4					577.8	65.2	168.2				Safety Meeting: No New issues
Thursday	3-Aug-06	15	T.H., M.E	J.S.	8:15	9:51	1.6				900							Weather:Fog over Survey Area. Cleared, Winds Increased
		16			11:00	16:30	5.5				2020	200.0	480.0					Remarks:
Julian	215																	
Day	23				Hours Today		7.1					200.0	480.0	648.2				Safety Meeting: No New issues
Friday	4-Aug-06		T.H., M.E	J.S.														Weather:
																		Remarks: Pilot Rest Day
Julian	216																	Kha Toh Lee Departs for Perth. Glen Gooch Arrived.
Day	24				Hours Today		0.0					0.0	0.0	648.2				Safety Meeting: No New issues
Saturday	5-Aug-06	17	T.H., M.E	J.S.	7:12	12:54	5.7				2278	67.3	470.0					Weather: Cold in Morning Temp. 6 - 17Deg. Nth Winds Increased to 15Knots
																		Remarks: Low Freq. Noise Level Suddenly Increased During Flight.
Julian	217																	
Day	25				Hours Today		5.7					67.3	470.0	1118.2				Safety Meeting: No New issues
Sunday	6-Aug-06	18	T.H., M.E	J.S.	9:00	13:00	4.0				1634		220.0					Weather: Clear 10 - 18Deg. Nth Winds Increased to 10Knots
																		Remarks:Adjust Bungees and Coil Balance in Renee
Julian	218																	Area #3 3001.1 - 3007.1, Area #2 Lines 2018.1 - 2024.1
Day	26				Hours Today		4.0					0.0	220.0	1338.2				Safety Meeting: No New issues
Total Job Hours		64.2	Weekly Totals					31.7	0	0	12803	2336.1	1235.2	Total Standby		0.0		
			Total Aircraft Hours						Ltrs/Hr		405	333.7 km/day		% Complete		100.0	%	
			Hours to Next Periodic				82.1	Running Avg			73.8 km/hr		km Remaining		0.0	km		
			Anticipated Hours Next week															
Survey Equipment Problems: Bungees and Coil Balance had to be Adjusted in Renee.																		

APPENDIX III – Flight Summary (Line Listing)

AREA 1

Total number of lines : 116

Flt	Line	Start X	Start Y	End X	End Y	Kms
7	10010	341196	6791635	323067	6791643	18.13
7	10020	322978	6790642	341175	6790645	18.20
7	10030	341244	6789673	323101	6789642	18.14
7	10040	323014	6788642	341216	6788641	18.20
7	10050	341223	6787643	323139	6787637	18.08
7	10060	323074	6786647	341125	6786648	18.05
7	10070	341244	6785643	323163	6785642	18.08
7	10080	323121	6784644	341188	6784633	18.07
7	10090	341308	6783627	323281	6783637	18.03
7	10100	323158	6782652	341153	6782640	18.00
7	10110	341366	6781629	323197	6781644	18.17
7	10120	323181	6780642	341283	6780645	18.10
7	10130	341371	6779652	323298	6779642	18.07
7	10140	323183	6778637	341246	6778642	18.06
7	10150	356015	6777648	323244	6777639	32.77
7	10160	323215	6776648	355971	6776638	32.76
7	10170	355983	6775639	323091	6775646	32.89
7	10180	303459	6774640	355907	6774644	52.45
7	10190	356070	6773628	303519	6773639	52.55
7	10200	303469	6772634	356014	6772637	52.54
7	10210	356078	6771648	303526	6771635	52.55
7	10220	303536	6770639	355921	6770632	52.38
7	10230	356084	6769667	303557	6769638	52.53
7	10240	303580	6768636	356073	6768640	52.49
9	10251	356114	6767640	303667	6767614	52.45
7	10260	303561	6766636	356045	6766642	52.48
8	10270	356133	6765646	303733	6765632	52.40
9	10281	303599	6764685	356084	6764638	52.49
8	10290	356139	6763648	303708	6763642	52.43
8	10300	302542	6762643	356104	6762644	53.56
8	10310	348098	6761648	289470	6761641	58.63
8	10320	289458	6760645	348057	6760648	58.60
8	10330	348139	6759647	289538	6759637	58.60
8	10340	289457	6758644	348068	6758644	58.61
9	10350	348152	6757636	289627	6757637	58.53
9	10360	288423	6756778	348088	6756642	59.67
9	10370	348152	6755657	270131	6755634	78.02
9	10380	270087	6754637	348001	6754647	77.91
9	10390	348220	6753643	270344	6753635	77.88
9	10400	270139	6752657	348183	6752641	78.04
9	10410	348197	6751645	270211	6751651	77.99
9	10420	270219	6750638	348076	6750637	77.86
10	10430	348261	6749637	270299	6749637	77.96
10	10440	270270	6748638	348095	6748641	77.82
10	10450	348273	6747645	270308	6747637	77.96
10	10460	270281	6746630	348158	6746637	77.88
10	10470	348291	6745647	270323	6745639	77.97
10	10480	270340	6744644	348165	6744639	77.82
10	10490	347255	6743638	270593	6743636	76.66
10	10500	270344	6742553	346680	6742635	76.34
10	10510	346734	6741642	270593	6741639	76.14
10	10520	254206	6740643	346627	6740643	92.42
12	10530	343656	6739644	254285	6739638	89.37
12	10540	254269	6738641	341868	6738647	87.60
12	10550	339451	6737607	254302	6737638	85.15

12	10560	254296	6736616	332199	6736648	77.90
12	10570	332249	6735640	244016	6735639	88.23
12	10580	243032	6734635	332222	6734643	89.19
12	10590	324442	6733637	243090	6733627	81.35
12	10600	243083	6732659	320994	6732643	77.91
12	10610	321048	6731649	243126	6731633	77.92
12	10620	243113	6730636	321005	6730643	77.89
13	10630	321093	6729632	243175	6729623	77.92
13	10640	243156	6728650	321031	6728632	77.88
13	10650	321082	6727641	243255	6727635	77.83
13	10660	243222	6726636	321100	6726640	77.88
13	10670	309444	6725616	243284	6725634	66.16
13	10680	243259	6724572	309425	6724643	66.17
15	10691	309477	6723636	243335	6723618	66.14
13	10700	243294	6722632	309487	6722642	66.19
13	10710	309470	6721655	243398	6721660	66.07
13	10720	243332	6720633	309500	6720643	66.17
13	10730	309524	6719648	243442	6719637	66.08
13	10740	243405	6718635	309481	6718636	66.08
14	10750	309554	6717641	243448	6717640	66.11
14	10760	243434	6716647	309514	6716640	66.08
17	10771	309572	6715651	243504	6715653	66.07
15	10780	243517	6714645	309555	6714643	66.04
15	10790	309578	6713659	243572	6713639	66.01
15	10800	243539	6712642	309541	6712640	66.00
15	10810	309607	6711645	243574	6711629	66.03
15	10820	243609	6710626	309535	6710645	65.93
15	10830	309608	6709669	243618	6709635	65.99
15	10840	243585	6708657	309617	6708638	66.03
15	10850	309642	6707597	243656	6707653	65.99
15	10860	244338	6706595	309503	6706637	65.17
16	10870	290816	6705639	250204	6705634	40.61
16	10880	250148	6704639	284321	6704641	34.17
16	10890	284425	6703639	250235	6703640	34.19
16	10901	255032	6702636	284413	6702638	29.38
16	10910	284467	6701640	255138	6701632	29.33
16	10920	255083	6700630	284446	6700633	29.36
16	10931	284460	6699607	255167	6699646	29.29
16	10941	258359	6698632	284450	6698641	26.09
16	10951	284548	6697651	258443	6697640	26.11
16	10961	258397	6696635	284531	6696636	26.13
16	10971	276501	6695635	264413	6695646	12.09
16	10981	264906	6694644	276455	6694644	11.55
16	10991	276548	6693634	264973	6693635	11.57
16	11001	264955	6692651	276558	6692647	11.60
16	11011	276557	6691659	264989	6691647	11.57
16	11021	264975	6690613	276585	6690644	11.61
16	11031	276637	6689627	265057	6689647	11.58
16	11041	265045	6688624	276637	6688655	11.59
16	11051	276657	6687633	265158	6687645	11.50
10	17010	245746	6706221	245737	6735628	29.41
10	17020	255741	6741434	255742	6699139	42.29
16	17031	265664	6686310	265745	6741634	55.32
16	17041	275720	6756684	275740	6686620	70.06
5	17050	285749	6756825	285744	6705313	51.51
5	17060	295742	6705414	295740	6762575	57.16
5	17070	305745	6775682	305741	6705728	69.95
5	17080	315728	6726121	315745	6775841	49.72
5	17090	325740	6792624	325746	6733731	58.89
5	17100	335740	6737479	335741	6792770	55.29
5	17110	345741	6778171	345744	6739597	38.57

Total Kilometres : 6096.46

AREA 2

Total number of lines : 28

Flt	Line	Start X	Start Y	End X	End Y	Kms
16	20010	294505	6679756	284522	6679729	9.98
16	20020	284528	6678715	300935	6678721	16.41
16	20030	300998	6677732	284557	6677725	16.44
16	20040	281361	6676723	300998	6676723	19.64
16	20050	301062	6675763	281418	6675726	19.64
16	20060	279803	6674724	300988	6674717	21.19
17	20070	301056	6673719	279814	6673738	21.24
17	20080	279835	6672723	301068	6672726	21.23
17	20090	301074	6671724	279901	6671722	21.17
17	20100	279838	6670742	301113	6670721	21.28
17	20110	301131	6669724	279924	6669719	21.21
17	20120	279908	6668760	301101	6668725	21.19
17	20130	301199	6667731	279952	6667716	21.25
17	20140	279943	6666756	301131	6666729	21.19
17	20150	294766	6665736	273591	6665721	21.18
17	20160	273523	6664721	294780	6664720	21.26
17	20170	294847	6663754	273589	6663719	21.26
18	20181	273626	6662748	294835	6662715	21.21
18	20191	294870	6661728	273656	6661726	21.21
18	20201	273615	6660724	294873	6660727	21.26
18	20211	294928	6659759	273697	6659711	21.23
18	20221	281707	6658746	291647	6658725	9.94
18	20231	291744	6657762	281791	6657706	9.95
18	20241	281720	6656661	291717	6656720	10.00
16	27010	280861	6675429	280866	6658954	16.48
16	27020	285583	6655371	285838	6681056	25.69
16	27030	290857	6681211	290867	6655576	25.64
16	27040	295852	6666580	295860	6679421	12.84

Total Kilometres : 532.18

AREA 3

Total number of lines : 12

Flt	Line	Start X	Start Y	End X	End Y	Kms
18	30011	389731	6596932	414773	6596942	25.04
18	30021	414849	6595945	389783	6595943	25.07
18	30031	389761	6594953	414787	6594939	25.03
18	30041	414814	6593942	389775	6593943	25.04
18	30051	389739	6592953	414779	6592939	25.04
18	30061	414815	6591965	389762	6591939	25.05
18	30071	389755	6590955	414768	6590935	25.01
11	30080	414788	6589925	389786	6589947	25.00
11	30090	389733	6588931	414744	6588933	25.01
11	37010	392256	6597913	392246	6588069	9.84
11	37020	402298	6588014	402247	6597885	9.87
11	37030	412248	6597883	412251	6588038	9.85

Total Kilometres : 254.85

AREA 4

Total number of lines : 17

Flt	Line	Start X	Start Y	End X	End Y	Kms
11	40010	427288	6626470	445732	6626551	18.44
11	40020	445781	6625550	427286	6625548	18.50
11	40030	427258	6624558	445749	6624549	18.49
11	40040	445769	6623538	427275	6623557	18.49
11	40050	427242	6622542	445716	6622548	18.47
11	40060	445749	6621595	434754	6621551	11.00
11	40070	434721	6620569	445718	6620563	11.00
11	40080	445758	6619557	431217	6619557	14.54
11	40090	431176	6618555	445717	6618559	14.54
11	40100	445744	6617599	431170	6617542	14.57
11	40110	431173	6616555	445720	6616548	14.55
11	40120	445782	6615542	431166	6615546	14.62
11	40130	431124	6614518	445724	6614549	14.60
11	40140	445732	6613544	431160	6613548	14.57
11	47010	429772	6627335	429776	6621738	5.60
11	47020	436770	6612720	436779	6627273	14.55
11	47030	443794	6627342	443768	6612742	14.60

Total Kilometres : 251.13

APPENDIX IV – Located Data Format

Headers for final data file

GAWLER AREA 1

```

COMM JOB NUMBER: 1798
COMM AREA NUMBER: 1
COMM SURVEY COMPANY: Fugro Airborne Surveys
COMM CLIENT: Quasar Resources Pty Ltd
COMM SURVEY TYPE: 25Hz TEMPEST Survey
COMM AREA NAME: Gawler - Area 1
COMM STATE: SA
COMM COUNTRY: Australia
COMM SURVEY FLOWN: July, 2006
COMM LOCATED DATA CREATED: Oct 2006
COMM
COMM DATUM: GDA94
COMM PROJECTION: MGA
COMM ZONE: 53S
COMM
COMM SURVEY SPECIFICATIONS
COMM
COMM TRAVERSE LINE SPACING: 1000 m
COMM TRAVERSE LINE DIRECTION: 090-270 deg
COMM TIE LINE SPACING: 10000 m
COMM TIE LINE DIRECTION: 000-180 deg
COMM NOMINAL TERRAIN CLEARANCE: 120 m
COMM FINAL LINE KILOMETRES: 6096.4 km
COMM
COMM LINE NUMBERING
COMM
COMM TRAVERSE LINE NUMBERS: 10010 - 11050
COMM TIE LINE NUMBERS: 17010 - 17110
COMM
COMM SURVEY EQUIPMENT
COMM
COMM AIRCRAFT: CASA-212, TEM
COMM
COMM MAGNETOMETER: Scintrex Cs-2 Cesium Vapour
COMM INSTALLATION: stinger mount
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 RECEIVER DISTANCE BEHIND THE TRANSMITTER: -120 m
COMM RECEIVER DISTANCE BELOW THE TRANSMITTER: -35 m
COMM
COMM RADAR ALTIMETER: Sperry RT-220
COMM RECORDING INTERVAL: 0.2 s
COMM
COMM NAVIGATION: real-time differential GPS
COMM RECORDING INTERVAL: 1.0 s
COMM
COMM ACQUISITION SYSTEM: PDAS-1000
COMM

```

COMM DATA PROCESSING
 COMM
 COMM MAGNETIC DATA
 COMM DIURNAL BASE VALUE APPLIED 56124 nT
 COMM PARALLAX CORRECTION APPLIED 0.6 s
 COMM IGRF BASE VALUE APPLIED 56885 nT
 COMM IGRF MODEL 2005 EXTRAPOLATED TO 2006.6
 COMM DATA HAVE BEEN MICROLEVELLED
 COMM
 COMM ELECTROMAGNETIC DATA
 COMM SYSTEM PARALLAX REMOVED, AS FOLLOWS
 COMM X-COMPONENT EM DATA 0.2 s
 COMM Z-COMPONENT EM DATA 1.4 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 CONDUCTIVITIES CALCULATED USING corrected EM DATA
 COMM
 COMM DIGITAL TERRAIN DATA
 COMM PARALLAX CORRECTION APPLIED TO RADAR ALIMETER DATA 0.6 s
 COMM PARALLAX CORRECTION APPLIED TO GPS ALIMETER DATA 0.0 s
 COMM DTM CALCULATED [DTM = GPS ALTITUDE - RADAR ALTITUDE]
 COMM DATA HAVE BEEN MICROLEVELLED
 COMM -----
 COMM The accuracy of the elevation calculation is directly dependent on
 COMM the accuracy of the two input parameters, radar altitude and GPS
 COMM altitude. The radar altitude value may be erroneous in areas of heavy
 COMM tree cover, where the altimeter reflects the distance to the tree
 COMM canopy rather than the ground. The GPS altitude value is primarily
 COMM dependent on the number of available satellites. Although
 COMM 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
 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 LOCATED DATA FORMAT

COMM

COMM Output field format : DOS - Flat ascii

COMM Number of fields : 227

COMM

COMM	Field	Channel	Description	Units	Undefined	Format
COMM	----	-----	-----	----	-----	-----
COMM						
COMM	1	LINE	Line		-9999999	i6
COMM	2	FLIGHT	Flight		-9999999	i4
COMM	3	FID	Fiducial	(s)	-9999999	f8.1
COMM	4	LATITUDE	Latitude GDA94	(deg)	-9999999	f13.6
COMM	5	LONGITUDE	Longitude GDA94	(deg)	-9999999	f13.6
COMM	6	EASTING	Easting MGA53S	(m)	-9999999	f11.2
COMM	7	NORTHING	Northing MGA53S	(m)	-9999999	f12.2
COMM	8	TxHeight	GPS height	(m)	-9999999	f8.2
COMM	9	TxRalt_raw	Raw Radar Altimeter	(m)	-9999999	f8.2
COMM	10	TxRalt_final	Final Radar Altimeter	(m)	-9999999	f8.2
COMM	11	DTM	DTM	(m)	-9999999	f8.2
COMM	12	MAG	Levelled TMI	(nT)	-9999999	f10.3
COMM	13	MAG_1VD	Levelled TMI 1VD	(nT/m)	-9999999	f12.3
COMM	14	Pitch_Raw	Raw Tx loop pitch	(deg)	-9999999	f10.3
COMM	15	Roll_Raw	Raw Tx loop roll	(deg)	-9999999	f10.3
COMM	16	HSep_Raw	Raw Tx-Rx horizontal separation	(m)	-9999999	f8.2
COMM	17	VSep_Raw	Raw Tx-Rx vertical separation	(m)	-9999999	f8.2
COMM	18	Pitch_Final	Final Tx loop pitch	(deg)	-9999999	f10.3
COMM	19	Roll_Final	Final Tx loop roll	(deg)	-9999999	f10.3
COMM	20	HSep_Final	Final Tx-Rx horizontal separation	(m)	-9999999	f8.2
COMM	21	VSep_Final	Final Tx-Rx vertical separation	(m)	-9999999	f8.2
COMM	22	EMX_dBdt[1]	Raw dBdt EMX01 Window	(fT/s)	-9999999	f12.6
COMM	23	EMX_dBdt[2]	Raw dBdt EMX02 Window	(fT/s)	-9999999	f12.6
COMM	24	EMX_dBdt[3]	Raw dBdt EMX03 Window	(fT/s)	-9999999	f12.6
COMM	25	EMX_dBdt[4]	Raw dBdt EMX04 Window	(fT/s)	-9999999	f12.6
COMM	26	EMX_dBdt[5]	Raw dBdt EMX05 Window	(fT/s)	-9999999	f12.6
COMM	27	EMX_dBdt[6]	Raw dBdt EMX06 Window	(fT/s)	-9999999	f12.6
COMM	28	EMX_dBdt[7]	Raw dBdt EMX07 Window	(fT/s)	-9999999	f12.6
COMM	29	EMX_dBdt[8]	Raw dBdt EMX08 Window	(fT/s)	-9999999	f12.6
COMM	30	EMX_dBdt[9]	Raw dBdt EMX09 Window	(fT/s)	-9999999	f12.6
COMM	31	EMX_dBdt[10]	Raw dBdt EMX10 Window	(fT/s)	-9999999	f12.6
COMM	32	EMX_dBdt[11]	Raw dBdt EMX11 Window	(fT/s)	-9999999	f12.6
COMM	33	EMX_dBdt[12]	Raw dBdt EMX12 Window	(fT/s)	-9999999	f12.6
COMM	34	EMX_dBdt[13]	Raw dBdt EMX13 Window	(fT/s)	-9999999	f12.6
COMM	35	EMX_dBdt[14]	Raw dBdt EMX14 Window	(fT/s)	-9999999	f12.6
COMM	36	EMX_dBdt[15]	Raw dBdt EMX15 Window	(fT/s)	-9999999	f12.6
COMM	37	EMX_Raw[1]	Raw B-field EMX01 Window	(fT)	-9999999	f12.6
COMM	38	EMX_Raw[2]	Raw B-field EMX02 Window	(fT)	-9999999	f12.6
COMM	39	EMX_Raw[3]	Raw B-field EMX03 Window	(fT)	-9999999	f12.6
COMM	40	EMX_Raw[4]	Raw B-field EMX04 Window	(fT)	-9999999	f12.6
COMM	41	EMX_Raw[5]	Raw B-field EMX05 Window	(fT)	-9999999	f12.6
COMM	42	EMX_Raw[6]	Raw B-field EMX06 Window	(fT)	-9999999	f12.6
COMM	43	EMX_Raw[7]	Raw B-field EMX07 Window	(fT)	-9999999	f12.6
COMM	44	EMX_Raw[8]	Raw B-field EMX08 Window	(fT)	-9999999	f12.6
COMM	45	EMX_Raw[9]	Raw B-field EMX09 Window	(fT)	-9999999	f12.6
COMM	46	EMX_Raw[10]	Raw B-field EMX10 Window	(fT)	-9999999	f12.6
COMM	47	EMX_Raw[11]	Raw B-field EMX11 Window	(fT)	-9999999	f12.6
COMM	48	EMX_Raw[12]	Raw B-field EMX12 Window	(fT)	-9999999	f12.6
COMM	49	EMX_Raw[13]	Raw B-field EMX13 Window	(fT)	-9999999	f12.6

COMM 50	EMX_Raw[14]	Raw B-field EMX14 Window	(fT)	-9999999	f12.6
COMM 51	EMX_Raw[15]	Raw B-field EMX15 Window	(fT)	-9999999	f12.6
COMM 52	EMX_Final[1]	Final B-field EMX01 Window	(fT)	-9999999	f12.6
COMM 53	EMX_Final[2]	Final B-field EMX02 Window	(fT)	-9999999	f12.6
COMM 54	EMX_Final[3]	Final B-field EMX03 Window	(fT)	-9999999	f12.6
COMM 55	EMX_Final[4]	Final B-field EMX04 Window	(fT)	-9999999	f12.6
COMM 56	EMX_Final[5]	Final B-field EMX05 Window	(fT)	-9999999	f12.6
COMM 57	EMX_Final[6]	Final B-field EMX06 Window	(fT)	-9999999	f12.6
COMM 58	EMX_Final[7]	Final B-field EMX07 Window	(fT)	-9999999	f12.6
COMM 59	EMX_Final[8]	Final B-field EMX08 Window	(fT)	-9999999	f12.6
COMM 60	EMX_Final[9]	Final B-field EMX09 Window	(fT)	-9999999	f12.6
COMM 61	EMX_Final[10]	Final B-field EMX10 Window	(fT)	-9999999	f12.6
COMM 62	EMX_Final[11]	Final B-field EMX11 Window	(fT)	-9999999	f12.6
COMM 63	EMX_Final[12]	Final B-field EMX12 Window	(fT)	-9999999	f12.6
COMM 64	EMX_Final[13]	Final B-field EMX13 Window	(fT)	-9999999	f12.6
COMM 65	EMX_Final[14]	Final B-field EMX14 Window	(fT)	-9999999	f12.6
COMM 66	EMX_Final[15]	Final B-field EMX15 Window	(fT)	-9999999	f12.6
COMM 67	X_Sferics	X_Sferics		-9999999	f10.3
COMM 68	X_Lowfreq	X_Lowfreq		-9999999	f10.3
COMM 69	X_Powerline	X_Powerline		-9999999	f10.3
COMM 70	X_VLF1	X_18.2kHz		-9999999	f10.3
COMM 71	X_VLF2	X_19.8kHz		-9999999	f10.3
COMM 72	X_VLF3	X_21.4kHz		-9999999	f10.3
COMM 73	X_VLF4	X_22.2kHz		-9999999	f10.3
COMM 74	X_Geofact	X_Geometric factor		-9999999	f10.3
COMM 75	EMZ_dBdt[1]	Raw dBdt EMZ01 Window	(fT/s)	-9999999	f12.6
COMM 76	EMZ_dBdt[2]	Raw dBdt EMZ02 Window	(fT/s)	-9999999	f12.6
COMM 77	EMZ_dBdt[3]	Raw dBdt EMZ03 Window	(fT/s)	-9999999	f12.6
COMM 78	EMZ_dBdt[4]	Raw dBdt EMZ04 Window	(fT/s)	-9999999	f12.6
COMM 79	EMZ_dBdt[5]	Raw dBdt EMZ05 Window	(fT/s)	-9999999	f12.6
COMM 80	EMZ_dBdt[6]	Raw dBdt EMZ06 Window	(fT/s)	-9999999	f12.6
COMM 81	EMZ_dBdt[7]	Raw dBdt EMZ07 Window	(fT/s)	-9999999	f12.6
COMM 82	EMZ_dBdt[8]	Raw dBdt EMZ08 Window	(fT/s)	-9999999	f12.6
COMM 83	EMZ_dBdt[9]	Raw dBdt EMZ09 Window	(fT/s)	-9999999	f12.6
COMM 84	EMZ_dBdt[10]	Raw dBdt EMZ10 Window	(fT/s)	-9999999	f12.6
COMM 85	EMZ_dBdt[11]	Raw dBdt EMZ11 Window	(fT/s)	-9999999	f12.6
COMM 86	EMZ_dBdt[12]	Raw dBdt EMZ12 Window	(fT/s)	-9999999	f12.6
COMM 87	EMZ_dBdt[13]	Raw dBdt EMZ13 Window	(fT/s)	-9999999	f12.6
COMM 88	EMZ_dBdt[14]	Raw dBdt EMZ14 Window	(fT/s)	-9999999	f12.6
COMM 89	EMZ_dBdt[15]	Raw dBdt EMZ15 Window	(fT/s)	-9999999	f12.6
COMM 90	EMZ_Raw[1]	Raw B-field EMZ01 Window	(fT)	-9999999	f12.6
COMM 91	EMZ_Raw[2]	Raw B-field EMZ02 Window	(fT)	-9999999	f12.6
COMM 92	EMZ_Raw[3]	Raw B-field EMZ03 Window	(fT)	-9999999	f12.6
COMM 93	EMZ_Raw[4]	Raw B-field EMZ04 Window	(fT)	-9999999	f12.6
COMM 94	EMZ_Raw[5]	Raw B-field EMZ05 Window	(fT)	-9999999	f12.6
COMM 95	EMZ_Raw[6]	Raw B-field EMZ06 Window	(fT)	-9999999	f12.6
COMM 96	EMZ_Raw[7]	Raw B-field EMZ07 Window	(fT)	-9999999	f12.6
COMM 97	EMZ_Raw[8]	Raw B-field EMZ08 Window	(fT)	-9999999	f12.6
COMM 98	EMZ_Raw[9]	Raw B-field EMZ09 Window	(fT)	-9999999	f12.6
COMM 99	EMZ_Raw[10]	Raw B-field EMZ10 Window	(fT)	-9999999	f12.6
COMM100	EMZ_Raw[11]	Raw B-field EMZ11 Window	(fT)	-9999999	f12.6
COMM101	EMZ_Raw[12]	Raw B-field EMZ12 Window	(fT)	-9999999	f12.6
COMM102	EMZ_Raw[13]	Raw B-field EMZ13 Window	(fT)	-9999999	f12.6
COMM103	EMZ_Raw[14]	Raw B-field EMZ14 Window	(fT)	-9999999	f12.6
COMM104	EMZ_Raw[15]	Raw B-field EMZ15 Window	(fT)	-9999999	f12.6
COMM105	EMZ_Final[1]	Final B-field EMZ01 Window	(fT)	-9999999	f12.6
COMM106	EMZ_Final[2]	Final B-field EMZ02 Window	(fT)	-9999999	f12.6
COMM107	EMZ_Final[3]	Final B-field EMZ03 Window	(fT)	-9999999	f12.6
COMM108	EMZ_Final[4]	Final B-field EMZ04 Window	(fT)	-9999999	f12.6
COMM109	EMZ_Final[5]	Final B-field EMZ05 Window	(fT)	-9999999	f12.6
COMM110	EMZ_Final[6]	Final B-field EMZ06 Window	(fT)	-9999999	f12.6
COMM111	EMZ_Final[7]	Final B-field EMZ07 Window	(fT)	-9999999	f12.6
COMM112	EMZ_Final[8]	Final B-field EMZ08 Window	(fT)	-9999999	f12.6
COMM113	EMZ_Final[9]	Final B-field EMZ09 Window	(fT)	-9999999	f12.6
COMM114	EMZ_Final[10]	Final B-field EMZ10 Window	(fT)	-9999999	f12.6
COMM115	EMZ_Final[11]	Final B-field EMZ11 Window	(fT)	-9999999	f12.6
COMM116	EMZ_Final[12]	Final B-field EMZ12 Window	(fT)	-9999999	f12.6
COMM117	EMZ_Final[13]	Final B-field EMZ13 Window	(fT)	-9999999	f12.6
COMM118	EMZ_Final[14]	Final B-field EMZ14 Window	(fT)	-9999999	f12.6
COMM119	EMZ_Final[15]	Final B-field EMZ15 Window	(fT)	-9999999	f12.6
COMM120	Z_Sferics	Z_Sferics		-9999999	f10.3

COMM121	Z_Lowfreq	Z_Lowfreq				-9999999	f10.3
COMM122	Z_Powerline	Z_Powerline				-9999999	f10.3
COMM123	Z_VLF1	Z_18.2kHz				-9999999	f10.3
COMM124	Z_VLF2	Z_19.8kHz				-9999999	f10.3
COMM125	Z_VLF3	Z_21.4kHz				-9999999	f10.3
COMM126	Z_VLF4	Z_22.2kHz				-9999999	f10.3
COMM127	Z_Geofact	Z_Geometric factor				-9999999	f10.3
COMM128	CNDZ[1]	Conductivity_Z001	0-2	m	(mS/m)	-9999999	f10.3
COMM129	CNDZ[2]	Conductivity_Z002	2-4	m	(mS/m)	-9999999	f10.3
COMM130	CNDZ[3]	Conductivity_Z003	4-6	m	(mS/m)	-9999999	f10.3
COMM131	CNDZ[4]	Conductivity_Z004	6-8	m	(mS/m)	-9999999	f10.3
COMM132	CNDZ[5]	Conductivity_Z005	8-10	m	(mS/m)	-9999999	f10.3
COMM133	CNDZ[6]	Conductivity_Z006	10-12	m	(mS/m)	-9999999	f10.3
COMM134	CNDZ[7]	Conductivity_Z007	12-14	m	(mS/m)	-9999999	f10.3
COMM135	CNDZ[8]	Conductivity_Z008	14-16	m	(mS/m)	-9999999	f10.3
COMM136	CNDZ[9]	Conductivity_Z009	16-18	m	(mS/m)	-9999999	f10.3
COMM137	CNDZ[10]	Conductivity_Z010	18-20	m	(mS/m)	-9999999	f10.3
COMM138	CNDZ[11]	Conductivity_Z011	20-22	m	(mS/m)	-9999999	f10.3
COMM139	CNDZ[12]	Conductivity_Z012	22-24	m	(mS/m)	-9999999	f10.3
COMM140	CNDZ[13]	Conductivity_Z013	24-26	m	(mS/m)	-9999999	f10.3
COMM141	CNDZ[14]	Conductivity_Z014	26-28	m	(mS/m)	-9999999	f10.3
COMM142	CNDZ[15]	Conductivity_Z015	28-30	m	(mS/m)	-9999999	f10.3
COMM143	CNDZ[16]	Conductivity_Z016	30-32	m	(mS/m)	-9999999	f10.3
COMM144	CNDZ[17]	Conductivity_Z017	32-34	m	(mS/m)	-9999999	f10.3
COMM145	CNDZ[18]	Conductivity_Z018	34-36	m	(mS/m)	-9999999	f10.3
COMM146	CNDZ[19]	Conductivity_Z019	36-38	m	(mS/m)	-9999999	f10.3
COMM147	CNDZ[20]	Conductivity_Z020	38-40	m	(mS/m)	-9999999	f10.3
COMM148	CNDZ[21]	Conductivity_Z021	40-42	m	(mS/m)	-9999999	f10.3
COMM149	CNDZ[22]	Conductivity_Z022	42-44	m	(mS/m)	-9999999	f10.3
COMM150	CNDZ[23]	Conductivity_Z023	44-46	m	(mS/m)	-9999999	f10.3
COMM151	CNDZ[24]	Conductivity_Z024	46-48	m	(mS/m)	-9999999	f10.3
COMM152	CNDZ[25]	Conductivity_Z025	48-50	m	(mS/m)	-9999999	f10.3
COMM153	CNDZ[26]	Conductivity_Z026	50-52	m	(mS/m)	-9999999	f10.3
COMM154	CNDZ[27]	Conductivity_Z027	52-54	m	(mS/m)	-9999999	f10.3
COMM155	CNDZ[28]	Conductivity_Z028	54-56	m	(mS/m)	-9999999	f10.3
COMM156	CNDZ[29]	Conductivity_Z029	56-58	m	(mS/m)	-9999999	f10.3
COMM157	CNDZ[30]	Conductivity_Z030	58-60	m	(mS/m)	-9999999	f10.3
COMM158	CNDZ[31]	Conductivity_Z031	60-62	m	(mS/m)	-9999999	f10.3
COMM159	CNDZ[32]	Conductivity_Z032	62-64	m	(mS/m)	-9999999	f10.3
COMM160	CNDZ[33]	Conductivity_Z033	64-66	m	(mS/m)	-9999999	f10.3
COMM161	CNDZ[34]	Conductivity_Z034	66-68	m	(mS/m)	-9999999	f10.3
COMM162	CNDZ[35]	Conductivity_Z035	68-70	m	(mS/m)	-9999999	f10.3
COMM163	CNDZ[36]	Conductivity_Z036	70-72	m	(mS/m)	-9999999	f10.3
COMM164	CNDZ[37]	Conductivity_Z037	72-74	m	(mS/m)	-9999999	f10.3
COMM165	CNDZ[38]	Conductivity_Z038	74-76	m	(mS/m)	-9999999	f10.3
COMM166	CNDZ[39]	Conductivity_Z039	76-78	m	(mS/m)	-9999999	f10.3
COMM167	CNDZ[40]	Conductivity_Z040	78-80	m	(mS/m)	-9999999	f10.3
COMM168	CNDZ[41]	Conductivity_Z041	80-82	m	(mS/m)	-9999999	f10.3
COMM169	CNDZ[42]	Conductivity_Z042	82-84	m	(mS/m)	-9999999	f10.3
COMM170	CNDZ[43]	Conductivity_Z043	84-86	m	(mS/m)	-9999999	f10.3
COMM171	CNDZ[44]	Conductivity_Z044	86-88	m	(mS/m)	-9999999	f10.3
COMM172	CNDZ[45]	Conductivity_Z045	88-90	m	(mS/m)	-9999999	f10.3
COMM173	CNDZ[46]	Conductivity_Z046	90-92	m	(mS/m)	-9999999	f10.3
COMM174	CNDZ[47]	Conductivity_Z047	92-94	m	(mS/m)	-9999999	f10.3
COMM175	CNDZ[48]	Conductivity_Z048	94-96	m	(mS/m)	-9999999	f10.3
COMM176	CNDZ[49]	Conductivity_Z049	96-98	m	(mS/m)	-9999999	f10.3
COMM177	CNDZ[50]	Conductivity_Z050	98-100	m	(mS/m)	-9999999	f10.3
COMM178	CNDZ[51]	Conductivity_Z051	100-102	m	(mS/m)	-9999999	f10.3
COMM179	CNDZ[52]	Conductivity_Z052	102-104	m	(mS/m)	-9999999	f10.3
COMM180	CNDZ[53]	Conductivity_Z053	104-106	m	(mS/m)	-9999999	f10.3
COMM181	CNDZ[54]	Conductivity_Z054	106-108	m	(mS/m)	-9999999	f10.3
COMM182	CNDZ[55]	Conductivity_Z055	108-110	m	(mS/m)	-9999999	f10.3
COMM183	CNDZ[56]	Conductivity_Z056	110-112	m	(mS/m)	-9999999	f10.3
COMM184	CNDZ[57]	Conductivity_Z057	112-114	m	(mS/m)	-9999999	f10.3
COMM185	CNDZ[58]	Conductivity_Z058	114-116	m	(mS/m)	-9999999	f10.3
COMM186	CNDZ[59]	Conductivity_Z059	116-118	m	(mS/m)	-9999999	f10.3
COMM187	CNDZ[60]	Conductivity_Z060	118-120	m	(mS/m)	-9999999	f10.3
COMM188	CNDZ[61]	Conductivity_Z061	120-122	m	(mS/m)	-9999999	f10.3
COMM189	CNDZ[62]	Conductivity_Z062	122-124	m	(mS/m)	-9999999	f10.3
COMM190	CNDZ[63]	Conductivity_Z063	124-126	m	(mS/m)	-9999999	f10.3
COMM191	CNDZ[64]	Conductivity_Z064	126-128	m	(mS/m)	-9999999	f10.3

COMM192	CNDZ[65]	Conductivity_Z065	128-130 m	(mS/m)	-9999999	f10.3
COMM193	CNDZ[66]	Conductivity_Z066	130-132 m	(mS/m)	-9999999	f10.3
COMM194	CNDZ[67]	Conductivity_Z067	132-134 m	(mS/m)	-9999999	f10.3
COMM195	CNDZ[68]	Conductivity_Z068	134-136 m	(mS/m)	-9999999	f10.3
COMM196	CNDZ[69]	Conductivity_Z069	136-138 m	(mS/m)	-9999999	f10.3
COMM197	CNDZ[70]	Conductivity_Z070	138-140 m	(mS/m)	-9999999	f10.3
COMM198	CNDZ[71]	Conductivity_Z071	140-142 m	(mS/m)	-9999999	f10.3
COMM199	CNDZ[72]	Conductivity_Z072	142-144 m	(mS/m)	-9999999	f10.3
COMM200	CNDZ[73]	Conductivity_Z073	144-146 m	(mS/m)	-9999999	f10.3
COMM201	CNDZ[74]	Conductivity_Z074	146-148 m	(mS/m)	-9999999	f10.3
COMM202	CNDZ[75]	Conductivity_Z075	148-150 m	(mS/m)	-9999999	f10.3
COMM203	CNDZ[76]	Conductivity_Z076	150-152 m	(mS/m)	-9999999	f10.3
COMM204	CNDZ[77]	Conductivity_Z077	152-154 m	(mS/m)	-9999999	f10.3
COMM205	CNDZ[78]	Conductivity_Z078	154-156 m	(mS/m)	-9999999	f10.3
COMM206	CNDZ[79]	Conductivity_Z079	156-158 m	(mS/m)	-9999999	f10.3
COMM207	CNDZ[80]	Conductivity_Z080	158-160 m	(mS/m)	-9999999	f10.3
COMM208	CNDZ[81]	Conductivity_Z081	160-162 m	(mS/m)	-9999999	f10.3
COMM209	CNDZ[82]	Conductivity_Z082	162-164 m	(mS/m)	-9999999	f10.3
COMM210	CNDZ[83]	Conductivity_Z083	164-166 m	(mS/m)	-9999999	f10.3
COMM211	CNDZ[84]	Conductivity_Z084	166-168 m	(mS/m)	-9999999	f10.3
COMM212	CNDZ[85]	Conductivity_Z085	168-170 m	(mS/m)	-9999999	f10.3
COMM213	CNDZ[86]	Conductivity_Z086	170-172 m	(mS/m)	-9999999	f10.3
COMM214	CNDZ[87]	Conductivity_Z087	172-174 m	(mS/m)	-9999999	f10.3
COMM215	CNDZ[88]	Conductivity_Z088	174-176 m	(mS/m)	-9999999	f10.3
COMM216	CNDZ[89]	Conductivity_Z089	176-178 m	(mS/m)	-9999999	f10.3
COMM217	CNDZ[90]	Conductivity_Z090	178-180 m	(mS/m)	-9999999	f10.3
COMM218	CNDZ[91]	Conductivity_Z091	180-182 m	(mS/m)	-9999999	f10.3
COMM219	CNDZ[92]	Conductivity_Z092	182-184 m	(mS/m)	-9999999	f10.3
COMM220	CNDZ[93]	Conductivity_Z093	184-186 m	(mS/m)	-9999999	f10.3
COMM221	CNDZ[94]	Conductivity_Z094	186-188 m	(mS/m)	-9999999	f10.3
COMM222	CNDZ[95]	Conductivity_Z095	188-190 m	(mS/m)	-9999999	f10.3
COMM223	CNDZ[96]	Conductivity_Z096	190-192 m	(mS/m)	-9999999	f10.3
COMM224	CNDZ[97]	Conductivity_Z097	192-194 m	(mS/m)	-9999999	f10.3
COMM225	CNDZ[98]	Conductivity_Z098	194-196 m	(mS/m)	-9999999	f10.3
COMM226	CNDZ[99]	Conductivity_Z099	196-198 m	(mS/m)	-9999999	f10.3
COMM227	CNDZ[100]	Conductivity_Z100	198-200 m	(mS/m)	-9999999	f10.3

GAWLER AREA 2

COMM JOB NUMBER: 1798
 COMM AREA NUMBER: 2
 COMM SURVEY COMPANY: Fugro Airborne Surveys
 COMM CLIENT: Quasar Resources Pty Ltd
 COMM SURVEY TYPE: 25Hz TEMPEST Survey
 COMM AREA NAME: Gawler - Area 2
 COMM STATE: SA
 COMM COUNTRY: Australia
 COMM SURVEY FLOWN: July, 2006
 COMM LOCATED DATA CREATED: Oct 2006
 COMM
 COMM DATUM: GDA94
 COMM PROJECTION: MGA
 COMM ZONE: 53S
 COMM
 COMM SURVEY SPECIFICATIONS
 COMM
 COMM TRAVERSE LINE SPACING: 1000 m
 COMM TRAVERSE LINE DIRECTION: 090-270 deg
 COMM TIE LINE SPACING: 10000 m
 COMM TIE LINE DIRECTION: 000-180 deg
 COMM NOMINAL TERRAIN CLEARANCE: 120 m
 COMM FINAL LINE KILOMETRES: 532.1 km
 COMM
 COMM LINE NUMBERING
 COMM
 COMM TRAVERSE LINE NUMBERS: 20010 - 20240

COMM TIE LINE NUMBERS: 27010 – 27040
 COMM
 COMM SURVEY EQUIPMENT
 COMM
 COMM AIRCRAFT: CASA-212, TEM
 COMM
 COMM MAGNETOMETER: Scintrex Cs-2 Cesium Vapour
 COMM INSTALLATION: stinger mount
 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 RECEIVER DISTANCE BEHIND THE TRANSMITTER: -120 m
 COMM RECEIVER DISTANCE BELOW THE TRANSMITTER: -35 m
 COMM
 COMM RADAR ALTIMETER: Sperry RT-220
 COMM RECORDING INTERVAL: 0.2 s
 COMM
 COMM NAVIGATION: real-time differential GPS
 COMM RECORDING INTERVAL: 1.0 s
 COMM
 COMM ACQUISITION SYSTEM: PDAS-1000
 COMM
 COMM DATA PROCESSING
 COMM
 COMM MAGNETIC DATA
 COMM DIURNAL BASE VALUE APPLIED 56120 nT
 COMM PARALLAX CORRECTION APPLIED 0.6 s
 COMM IGRF BASE VALUE APPLIED 56470 nT
 COMM IGRF MODEL 2005 EXTRAPOLATED TO 2006.6
 COMM DATA HAVE BEEN MICROLEVELLED
 COMM
 COMM ELECTROMAGNETIC DATA
 COMM SYSTEM PARALLAX REMOVED, AS FOLLOWS
 COMM X-COMPONENT EM DATA 0.2 s
 COMM Z-COMPONENT EM DATA 1.4 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 CONDUCTIVITIES CALCULATED USING corrected EM DATA
 COMM
 COMM DIGITAL TERRAIN DATA
 COMM PARALLAX CORRECTION APPLIED TO RADAR ALIMETER DATA 0.6 s
 COMM PARALLAX CORRECTION APPLIED TO GPS ALIMETER DATA 0.0 s
 COMM DTM CALCULATED [DTM = GPS ALTITUDE – RADAR ALTITUDE]
 COMM DATA HAVE BEEN MICROLEVELLED
 COMM -----
 COMM The accuracy of the elevation calculation is directly dependent on
 COMM the accuracy of the two input parameters, radar altitude and GPS
 COMM altitude. The radar altitude value may be erroneous in areas of heavy
 COMM tree cover, where the altimeter reflects the distance to the tree
 COMM canopy rather than the ground. The GPS altitude value is primarily
 COMM dependent on the number of available satellites. Although
 COMM 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

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 LOCATED DATA FORMAT

COMM

COMM Output field format : DOS - Flat ascii

COMM Number of fields : 227

COMM

COMM Field	Channel	Description	Units	Undefined Format
COMM -----	-----	-----	-----	-----
COMM 1	LINE	Line		-9999999 i6
COMM 2	FLIGHT	Flight		-9999999 i4
COMM 3	FID	Fiducial	(s)	-9999999 f8.1
COMM 4	LATITUDE	Latitude GDA94	(deg)	-9999999 f13.6
COMM 5	LONGITUDE	Longitude GDA94	(deg)	-9999999 f13.6
COMM 6	EASTING	Easting MGA53S	(m)	-9999999 f11.2
COMM 7	NORTHING	Northing MGA53S	(m)	-9999999 f12.2
COMM 8	TxHeight	GPS height	(m)	-9999999 f8.2
COMM 9	TxRalt_raw	Raw Radar Altimeter	(m)	-9999999 f8.2
COMM 10	TxRalt_final	Final Radar Altimeter	(m)	-9999999 f8.2
COMM 11	DTM	DTM	(m)	-9999999 f8.2
COMM 12	MAG	Levelled TMI	(nT)	-9999999 f10.3
COMM 13	MAG_1VD	Levelled TMI 1VD	(nT/m)	-9999999 f12.3
COMM 14	Pitch_Raw	Raw Tx loop pitch	(deg)	-9999999 f10.3
COMM 15	Roll_Raw	Raw Tx loop roll	(deg)	-9999999 f10.3
COMM 16	HSep_Raw	Raw Tx-Rx horizontal separation	(m)	-9999999 f8.2
COMM 17	VSep_Raw	Raw Tx-Rx vertical separation	(m)	-9999999 f8.2
COMM 18	Pitch_Final	Final Tx loop pitch	(deg)	-9999999 f10.3

COMM 19	Roll_Final	Final Tx loop roll	(deg)	-9999999	f10.3
COMM 20	HSep_Final	Final Tx-Rx horizontal separation	(m)	-9999999	f8.2
COMM 21	VSep_Final	Final Tx-Rx vertical separation	(m)	-9999999	f8.2
COMM 22	EMX_dBdt[1]	Raw dBdt EMX01 Window	(fT/s)	-9999999	f12.6
COMM 23	EMX_dBdt[2]	Raw dBdt EMX02 Window	(fT/s)	-9999999	f12.6
COMM 24	EMX_dBdt[3]	Raw dBdt EMX03 Window	(fT/s)	-9999999	f12.6
COMM 25	EMX_dBdt[4]	Raw dBdt EMX04 Window	(fT/s)	-9999999	f12.6
COMM 26	EMX_dBdt[5]	Raw dBdt EMX05 Window	(fT/s)	-9999999	f12.6
COMM 27	EMX_dBdt[6]	Raw dBdt EMX06 Window	(fT/s)	-9999999	f12.6
COMM 28	EMX_dBdt[7]	Raw dBdt EMX07 Window	(fT/s)	-9999999	f12.6
COMM 29	EMX_dBdt[8]	Raw dBdt EMX08 Window	(fT/s)	-9999999	f12.6
COMM 30	EMX_dBdt[9]	Raw dBdt EMX09 Window	(fT/s)	-9999999	f12.6
COMM 31	EMX_dBdt[10]	Raw dBdt EMX10 Window	(fT/s)	-9999999	f12.6
COMM 32	EMX_dBdt[11]	Raw dBdt EMX11 Window	(fT/s)	-9999999	f12.6
COMM 33	EMX_dBdt[12]	Raw dBdt EMX12 Window	(fT/s)	-9999999	f12.6
COMM 34	EMX_dBdt[13]	Raw dBdt EMX13 Window	(fT/s)	-9999999	f12.6
COMM 35	EMX_dBdt[14]	Raw dBdt EMX14 Window	(fT/s)	-9999999	f12.6
COMM 36	EMX_dBdt[15]	Raw dBdt EMX15 Window	(fT/s)	-9999999	f12.6
COMM 37	EMX_Raw[1]	Raw B-field EMX01 Window	(fT)	-9999999	f12.6
COMM 38	EMX_Raw[2]	Raw B-field EMX02 Window	(fT)	-9999999	f12.6
COMM 39	EMX_Raw[3]	Raw B-field EMX03 Window	(fT)	-9999999	f12.6
COMM 40	EMX_Raw[4]	Raw B-field EMX04 Window	(fT)	-9999999	f12.6
COMM 41	EMX_Raw[5]	Raw B-field EMX05 Window	(fT)	-9999999	f12.6
COMM 42	EMX_Raw[6]	Raw B-field EMX06 Window	(fT)	-9999999	f12.6
COMM 43	EMX_Raw[7]	Raw B-field EMX07 Window	(fT)	-9999999	f12.6
COMM 44	EMX_Raw[8]	Raw B-field EMX08 Window	(fT)	-9999999	f12.6
COMM 45	EMX_Raw[9]	Raw B-field EMX09 Window	(fT)	-9999999	f12.6
COMM 46	EMX_Raw[10]	Raw B-field EMX10 Window	(fT)	-9999999	f12.6
COMM 47	EMX_Raw[11]	Raw B-field EMX11 Window	(fT)	-9999999	f12.6
COMM 48	EMX_Raw[12]	Raw B-field EMX12 Window	(fT)	-9999999	f12.6
COMM 49	EMX_Raw[13]	Raw B-field EMX13 Window	(fT)	-9999999	f12.6
COMM 50	EMX_Raw[14]	Raw B-field EMX14 Window	(fT)	-9999999	f12.6
COMM 51	EMX_Raw[15]	Raw B-field EMX15 Window	(fT)	-9999999	f12.6
COMM 52	EMX_Final[1]	Final B-field EMX01 Window	(fT)	-9999999	f12.6
COMM 53	EMX_Final[2]	Final B-field EMX02 Window	(fT)	-9999999	f12.6
COMM 54	EMX_Final[3]	Final B-field EMX03 Window	(fT)	-9999999	f12.6
COMM 55	EMX_Final[4]	Final B-field EMX04 Window	(fT)	-9999999	f12.6
COMM 56	EMX_Final[5]	Final B-field EMX05 Window	(fT)	-9999999	f12.6
COMM 57	EMX_Final[6]	Final B-field EMX06 Window	(fT)	-9999999	f12.6
COMM 58	EMX_Final[7]	Final B-field EMX07 Window	(fT)	-9999999	f12.6
COMM 59	EMX_Final[8]	Final B-field EMX08 Window	(fT)	-9999999	f12.6
COMM 60	EMX_Final[9]	Final B-field EMX09 Window	(fT)	-9999999	f12.6
COMM 61	EMX_Final[10]	Final B-field EMX10 Window	(fT)	-9999999	f12.6
COMM 62	EMX_Final[11]	Final B-field EMX11 Window	(fT)	-9999999	f12.6
COMM 63	EMX_Final[12]	Final B-field EMX12 Window	(fT)	-9999999	f12.6
COMM 64	EMX_Final[13]	Final B-field EMX13 Window	(fT)	-9999999	f12.6
COMM 65	EMX_Final[14]	Final B-field EMX14 Window	(fT)	-9999999	f12.6
COMM 66	EMX_Final[15]	Final B-field EMX15 Window	(fT)	-9999999	f12.6
COMM 67	X_Sferics	X_Sferics		-9999999	f10.3
COMM 68	X_Lowfreq	X_Lowfreq		-9999999	f10.3
COMM 69	X_Powerline	X_Powerline		-9999999	f10.3
COMM 70	X_VLF1	X_18.2kHz		-9999999	f10.3
COMM 71	X_VLF2	X_19.8kHz		-9999999	f10.3
COMM 72	X_VLF3	X_21.4kHz		-9999999	f10.3
COMM 73	X_VLF4	X_22.2kHz		-9999999	f10.3
COMM 74	X_Geofact	X_Geometric factor		-9999999	f10.3
COMM 75	EMZ_dBdt[1]	Raw dBdt EMZ01 Window	(fT/s)	-9999999	f12.6
COMM 76	EMZ_dBdt[2]	Raw dBdt EMZ02 Window	(fT/s)	-9999999	f12.6
COMM 77	EMZ_dBdt[3]	Raw dBdt EMZ03 Window	(fT/s)	-9999999	f12.6
COMM 78	EMZ_dBdt[4]	Raw dBdt EMZ04 Window	(fT/s)	-9999999	f12.6
COMM 79	EMZ_dBdt[5]	Raw dBdt EMZ05 Window	(fT/s)	-9999999	f12.6
COMM 80	EMZ_dBdt[6]	Raw dBdt EMZ06 Window	(fT/s)	-9999999	f12.6
COMM 81	EMZ_dBdt[7]	Raw dBdt EMZ07 Window	(fT/s)	-9999999	f12.6
COMM 82	EMZ_dBdt[8]	Raw dBdt EMZ08 Window	(fT/s)	-9999999	f12.6
COMM 83	EMZ_dBdt[9]	Raw dBdt EMZ09 Window	(fT/s)	-9999999	f12.6
COMM 84	EMZ_dBdt[10]	Raw dBdt EMZ10 Window	(fT/s)	-9999999	f12.6
COMM 85	EMZ_dBdt[11]	Raw dBdt EMZ11 Window	(fT/s)	-9999999	f12.6
COMM 86	EMZ_dBdt[12]	Raw dBdt EMZ12 Window	(fT/s)	-9999999	f12.6
COMM 87	EMZ_dBdt[13]	Raw dBdt EMZ13 Window	(fT/s)	-9999999	f12.6
COMM 88	EMZ_dBdt[14]	Raw dBdt EMZ14 Window	(fT/s)	-9999999	f12.6
COMM 89	EMZ_dBdt[15]	Raw dBdt EMZ15 Window	(fT/s)	-9999999	f12.6

COMM 90	EMZ_Raw[1]	Raw B-field EMZ01 Window	(fT)	-9999999	f12.6
COMM 91	EMZ_Raw[2]	Raw B-field EMZ02 Window	(fT)	-9999999	f12.6
COMM 92	EMZ_Raw[3]	Raw B-field EMZ03 Window	(fT)	-9999999	f12.6
COMM 93	EMZ_Raw[4]	Raw B-field EMZ04 Window	(fT)	-9999999	f12.6
COMM 94	EMZ_Raw[5]	Raw B-field EMZ05 Window	(fT)	-9999999	f12.6
COMM 95	EMZ_Raw[6]	Raw B-field EMZ06 Window	(fT)	-9999999	f12.6
COMM 96	EMZ_Raw[7]	Raw B-field EMZ07 Window	(fT)	-9999999	f12.6
COMM 97	EMZ_Raw[8]	Raw B-field EMZ08 Window	(fT)	-9999999	f12.6
COMM 98	EMZ_Raw[9]	Raw B-field EMZ09 Window	(fT)	-9999999	f12.6
COMM 99	EMZ_Raw[10]	Raw B-field EMZ10 Window	(fT)	-9999999	f12.6
COMM100	EMZ_Raw[11]	Raw B-field EMZ11 Window	(fT)	-9999999	f12.6
COMM101	EMZ_Raw[12]	Raw B-field EMZ12 Window	(fT)	-9999999	f12.6
COMM102	EMZ_Raw[13]	Raw B-field EMZ13 Window	(fT)	-9999999	f12.6
COMM103	EMZ_Raw[14]	Raw B-field EMZ14 Window	(fT)	-9999999	f12.6
COMM104	EMZ_Raw[15]	Raw B-field EMZ15 Window	(fT)	-9999999	f12.6
COMM105	EMZ_Final[1]	Final B-field EMZ01 Window	(fT)	-9999999	f12.6
COMM106	EMZ_Final[2]	Final B-field EMZ02 Window	(fT)	-9999999	f12.6
COMM107	EMZ_Final[3]	Final B-field EMZ03 Window	(fT)	-9999999	f12.6
COMM108	EMZ_Final[4]	Final B-field EMZ04 Window	(fT)	-9999999	f12.6
COMM109	EMZ_Final[5]	Final B-field EMZ05 Window	(fT)	-9999999	f12.6
COMM110	EMZ_Final[6]	Final B-field EMZ06 Window	(fT)	-9999999	f12.6
COMM111	EMZ_Final[7]	Final B-field EMZ07 Window	(fT)	-9999999	f12.6
COMM112	EMZ_Final[8]	Final B-field EMZ08 Window	(fT)	-9999999	f12.6
COMM113	EMZ_Final[9]	Final B-field EMZ09 Window	(fT)	-9999999	f12.6
COMM114	EMZ_Final[10]	Final B-field EMZ10 Window	(fT)	-9999999	f12.6
COMM115	EMZ_Final[11]	Final B-field EMZ11 Window	(fT)	-9999999	f12.6
COMM116	EMZ_Final[12]	Final B-field EMZ12 Window	(fT)	-9999999	f12.6
COMM117	EMZ_Final[13]	Final B-field EMZ13 Window	(fT)	-9999999	f12.6
COMM118	EMZ_Final[14]	Final B-field EMZ14 Window	(fT)	-9999999	f12.6
COMM119	EMZ_Final[15]	Final B-field EMZ15 Window	(fT)	-9999999	f12.6
COMM120	Z_Sferics	Z_Sferics		-9999999	f10.3
COMM121	Z_Lowfreq	Z_Lowfreq		-9999999	f10.3
COMM122	Z_Powerline	Z_Powerline		-9999999	f10.3
COMM123	Z_VLF1	Z_18.2kHz		-9999999	f10.3
COMM124	Z_VLF2	Z_19.8kHz		-9999999	f10.3
COMM125	Z_VLF3	Z_21.4kHz		-9999999	f10.3
COMM126	Z_VLF4	Z_22.2kHz		-9999999	f10.3
COMM127	Z_Geofact	Z_Geometric factor		-9999999	f10.3
COMM128	CNDZ[1]	Conductivity_Z001	0-1 m (mS/m)	-9999999	f10.3
COMM129	CNDZ[2]	Conductivity_Z002	1-2 m (mS/m)	-9999999	f10.3
COMM130	CNDZ[3]	Conductivity_Z003	2-3 m (mS/m)	-9999999	f10.3
COMM131	CNDZ[4]	Conductivity_Z004	3-4 m (mS/m)	-9999999	f10.3
COMM132	CNDZ[5]	Conductivity_Z005	4-5 m (mS/m)	-9999999	f10.3
COMM133	CNDZ[6]	Conductivity_Z006	5-6 m (mS/m)	-9999999	f10.3
COMM134	CNDZ[7]	Conductivity_Z007	6-7 m (mS/m)	-9999999	f10.3
COMM135	CNDZ[8]	Conductivity_Z008	7-8 m (mS/m)	-9999999	f10.3
COMM136	CNDZ[9]	Conductivity_Z009	8-9 m (mS/m)	-9999999	f10.3
COMM137	CNDZ[10]	Conductivity_Z010	9-10 m (mS/m)	-9999999	f10.3
COMM138	CNDZ[11]	Conductivity_Z011	10-11 m (mS/m)	-9999999	f10.3
COMM139	CNDZ[12]	Conductivity_Z012	11-12 m (mS/m)	-9999999	f10.3
COMM140	CNDZ[13]	Conductivity_Z013	12-13 m (mS/m)	-9999999	f10.3
COMM141	CNDZ[14]	Conductivity_Z014	13-14 m (mS/m)	-9999999	f10.3
COMM142	CNDZ[15]	Conductivity_Z015	14-15 m (mS/m)	-9999999	f10.3
COMM143	CNDZ[16]	Conductivity_Z016	15-16 m (mS/m)	-9999999	f10.3
COMM144	CNDZ[17]	Conductivity_Z017	16-17 m (mS/m)	-9999999	f10.3
COMM145	CNDZ[18]	Conductivity_Z018	17-18 m (mS/m)	-9999999	f10.3
COMM146	CNDZ[19]	Conductivity_Z019	18-19 m (mS/m)	-9999999	f10.3
COMM147	CNDZ[20]	Conductivity_Z020	19-20 m (mS/m)	-9999999	f10.3
COMM148	CNDZ[21]	Conductivity_Z021	20-21 m (mS/m)	-9999999	f10.3
COMM149	CNDZ[22]	Conductivity_Z022	21-22 m (mS/m)	-9999999	f10.3
COMM150	CNDZ[23]	Conductivity_Z023	22-23 m (mS/m)	-9999999	f10.3
COMM151	CNDZ[24]	Conductivity_Z024	23-24 m (mS/m)	-9999999	f10.3
COMM152	CNDZ[25]	Conductivity_Z025	24-25 m (mS/m)	-9999999	f10.3
COMM153	CNDZ[26]	Conductivity_Z026	25-26 m (mS/m)	-9999999	f10.3
COMM154	CNDZ[27]	Conductivity_Z027	26-27 m (mS/m)	-9999999	f10.3
COMM155	CNDZ[28]	Conductivity_Z028	27-28 m (mS/m)	-9999999	f10.3
COMM156	CNDZ[29]	Conductivity_Z029	28-29 m (mS/m)	-9999999	f10.3
COMM157	CNDZ[30]	Conductivity_Z030	29-30 m (mS/m)	-9999999	f10.3
COMM158	CNDZ[31]	Conductivity_Z031	30-31 m (mS/m)	-9999999	f10.3
COMM159	CNDZ[32]	Conductivity_Z032	31-32 m (mS/m)	-9999999	f10.3
COMM160	CNDZ[33]	Conductivity_Z033	32-33 m (mS/m)	-9999999	f10.3

COMM161	CNDZ [34]	Conductivity_Z034	33-34	m	(mS/m)	-9999999	f10.3
COMM162	CNDZ [35]	Conductivity_Z035	34-35	m	(mS/m)	-9999999	f10.3
COMM163	CNDZ [36]	Conductivity_Z036	35-36	m	(mS/m)	-9999999	f10.3
COMM164	CNDZ [37]	Conductivity_Z037	36-37	m	(mS/m)	-9999999	f10.3
COMM165	CNDZ [38]	Conductivity_Z038	37-38	m	(mS/m)	-9999999	f10.3
COMM166	CNDZ [39]	Conductivity_Z039	38-39	m	(mS/m)	-9999999	f10.3
COMM167	CNDZ [40]	Conductivity_Z040	39-40	m	(mS/m)	-9999999	f10.3
COMM168	CNDZ [41]	Conductivity_Z041	40-41	m	(mS/m)	-9999999	f10.3
COMM169	CNDZ [42]	Conductivity_Z042	41-42	m	(mS/m)	-9999999	f10.3
COMM170	CNDZ [43]	Conductivity_Z043	42-43	m	(mS/m)	-9999999	f10.3
COMM171	CNDZ [44]	Conductivity_Z044	43-44	m	(mS/m)	-9999999	f10.3
COMM172	CNDZ [45]	Conductivity_Z045	44-45	m	(mS/m)	-9999999	f10.3
COMM173	CNDZ [46]	Conductivity_Z046	45-46	m	(mS/m)	-9999999	f10.3
COMM174	CNDZ [47]	Conductivity_Z047	46-47	m	(mS/m)	-9999999	f10.3
COMM175	CNDZ [48]	Conductivity_Z048	47-48	m	(mS/m)	-9999999	f10.3
COMM176	CNDZ [49]	Conductivity_Z049	48-49	m	(mS/m)	-9999999	f10.3
COMM177	CNDZ [50]	Conductivity_Z050	49-50	m	(mS/m)	-9999999	f10.3
COMM178	CNDZ [51]	Conductivity_Z051	50-51	m	(mS/m)	-9999999	f10.3
COMM179	CNDZ [52]	Conductivity_Z052	51-52	m	(mS/m)	-9999999	f10.3
COMM180	CNDZ [53]	Conductivity_Z053	52-53	m	(mS/m)	-9999999	f10.3
COMM181	CNDZ [54]	Conductivity_Z054	53-54	m	(mS/m)	-9999999	f10.3
COMM182	CNDZ [55]	Conductivity_Z055	54-55	m	(mS/m)	-9999999	f10.3
COMM183	CNDZ [56]	Conductivity_Z056	55-56	m	(mS/m)	-9999999	f10.3
COMM184	CNDZ [57]	Conductivity_Z057	56-57	m	(mS/m)	-9999999	f10.3
COMM185	CNDZ [58]	Conductivity_Z058	57-58	m	(mS/m)	-9999999	f10.3
COMM186	CNDZ [59]	Conductivity_Z059	58-59	m	(mS/m)	-9999999	f10.3
COMM187	CNDZ [60]	Conductivity_Z060	59-60	m	(mS/m)	-9999999	f10.3
COMM188	CNDZ [61]	Conductivity_Z061	60-61	m	(mS/m)	-9999999	f10.3
COMM189	CNDZ [62]	Conductivity_Z062	61-62	m	(mS/m)	-9999999	f10.3
COMM190	CNDZ [63]	Conductivity_Z063	62-63	m	(mS/m)	-9999999	f10.3
COMM191	CNDZ [64]	Conductivity_Z064	63-64	m	(mS/m)	-9999999	f10.3
COMM192	CNDZ [65]	Conductivity_Z065	64-65	m	(mS/m)	-9999999	f10.3
COMM193	CNDZ [66]	Conductivity_Z066	65-66	m	(mS/m)	-9999999	f10.3
COMM194	CNDZ [67]	Conductivity_Z067	66-67	m	(mS/m)	-9999999	f10.3
COMM195	CNDZ [68]	Conductivity_Z068	67-68	m	(mS/m)	-9999999	f10.3
COMM196	CNDZ [69]	Conductivity_Z069	68-69	m	(mS/m)	-9999999	f10.3
COMM197	CNDZ [70]	Conductivity_Z070	69-70	m	(mS/m)	-9999999	f10.3
COMM198	CNDZ [71]	Conductivity_Z071	70-71	m	(mS/m)	-9999999	f10.3
COMM199	CNDZ [72]	Conductivity_Z072	71-72	m	(mS/m)	-9999999	f10.3
COMM200	CNDZ [73]	Conductivity_Z073	72-73	m	(mS/m)	-9999999	f10.3
COMM201	CNDZ [74]	Conductivity_Z074	73-74	m	(mS/m)	-9999999	f10.3
COMM202	CNDZ [75]	Conductivity_Z075	74-75	m	(mS/m)	-9999999	f10.3
COMM203	CNDZ [76]	Conductivity_Z076	75-76	m	(mS/m)	-9999999	f10.3
COMM204	CNDZ [77]	Conductivity_Z077	76-77	m	(mS/m)	-9999999	f10.3
COMM205	CNDZ [78]	Conductivity_Z078	77-78	m	(mS/m)	-9999999	f10.3
COMM206	CNDZ [79]	Conductivity_Z079	78-79	m	(mS/m)	-9999999	f10.3
COMM207	CNDZ [80]	Conductivity_Z080	79-80	m	(mS/m)	-9999999	f10.3
COMM208	CNDZ [81]	Conductivity_Z081	80-81	m	(mS/m)	-9999999	f10.3
COMM209	CNDZ [82]	Conductivity_Z082	81-82	m	(mS/m)	-9999999	f10.3
COMM210	CNDZ [83]	Conductivity_Z083	82-83	m	(mS/m)	-9999999	f10.3
COMM211	CNDZ [84]	Conductivity_Z084	83-84	m	(mS/m)	-9999999	f10.3
COMM212	CNDZ [85]	Conductivity_Z085	84-85	m	(mS/m)	-9999999	f10.3
COMM213	CNDZ [86]	Conductivity_Z086	85-86	m	(mS/m)	-9999999	f10.3
COMM214	CNDZ [87]	Conductivity_Z087	86-87	m	(mS/m)	-9999999	f10.3
COMM215	CNDZ [88]	Conductivity_Z088	87-88	m	(mS/m)	-9999999	f10.3
COMM216	CNDZ [89]	Conductivity_Z089	88-89	m	(mS/m)	-9999999	f10.3
COMM217	CNDZ [90]	Conductivity_Z090	89-90	m	(mS/m)	-9999999	f10.3
COMM218	CNDZ [91]	Conductivity_Z091	90-91	m	(mS/m)	-9999999	f10.3
COMM219	CNDZ [92]	Conductivity_Z092	91-92	m	(mS/m)	-9999999	f10.3
COMM220	CNDZ [93]	Conductivity_Z093	92-93	m	(mS/m)	-9999999	f10.3
COMM221	CNDZ [94]	Conductivity_Z094	93-94	m	(mS/m)	-9999999	f10.3
COMM222	CNDZ [95]	Conductivity_Z095	94-95	m	(mS/m)	-9999999	f10.3
COMM223	CNDZ [96]	Conductivity_Z096	95-96	m	(mS/m)	-9999999	f10.3
COMM224	CNDZ [97]	Conductivity_Z097	96-97	m	(mS/m)	-9999999	f10.3
COMM225	CNDZ [98]	Conductivity_Z098	97-98	m	(mS/m)	-9999999	f10.3
COMM226	CNDZ [99]	Conductivity_Z099	98-99	m	(mS/m)	-9999999	f10.3
COMM227	CNDZ [100]	Conductivity_Z100	99-100	m	(mS/m)	-9999999	f10.3

GAWLER AREA 3

COMM JOB NUMBER: 1798
COMM AREA NUMBER: 3
COMM SURVEY COMPANY: Fugro Airborne Surveys
COMM CLIENT: Quasar Resources Pty Ltd
COMM SURVEY TYPE: 25Hz TEMPEST Survey
COMM AREA NAME: Gawler - Area 3
COMM STATE: SA
COMM COUNTRY: Australia
COMM SURVEY FLOWN: July, 2006
COMM LOCATED DATA CREATED: Oct 2006
COMM
COMM DATUM: GDA94
COMM PROJECTION: MGA
COMM ZONE: 53S
COMM
COMM SURVEY SPECIFICATIONS
COMM
COMM TRAVERSE LINE SPACING: 1000 m
COMM TRAVERSE LINE DIRECTION: 090-270 deg
COMM TIE LINE SPACING: 10000 m
COMM TIE LINE DIRECTION: 000-180 deg
COMM NOMINAL TERRAIN CLEARANCE: 120 m
COMM FINAL LINE KILOMETRES: 254.8 km
COMM
COMM LINE NUMBERING
COMM
COMM TRAVERSE LINE NUMBERS: 30010 - 30090
COMM TIE LINE NUMBERS: 37010 - 37030
COMM
COMM SURVEY EQUIPMENT
COMM
COMM AIRCRAFT: CASA-212, TEM
COMM
COMM MAGNETOMETER: Scintrex Cs-2 Cesium Vapour
COMM INSTALLATION: stinger mount
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 RECEIVER DISTANCE BEHIND THE TRANSMITTER: -120 m
COMM RECEIVER DISTANCE BELOW THE TRANSMITTER: -35 m
COMM
COMM RADAR ALTIMETER: Sperry RT-220
COMM RECORDING INTERVAL: 0.2 s
COMM
COMM NAVIGATION: real-time differential GPS
COMM RECORDING INTERVAL: 1.0 s
COMM
COMM ACQUISITION SYSTEM: PDAS-1000
COMM
COMM DATA PROCESSING
COMM
COMM MAGNETIC DATA
COMM DIURNAL BASE VALUE APPLIED 56110 nT
COMM PARALLAX CORRECTION APPLIED 0.6 s
COMM IGRF BASE VALUE APPLIED 56473 nT
COMM IGRF MODEL 2005 EXTRAPOLATED TO 2006.6

COMM DATA HAVE BEEN MICROLEVELLED
COMM
COMM ELECTROMAGNETIC DATA
COMM SYSTEM PARALLAX REMOVED, AS FOLLOWS
COMM X-COMPONENT EM DATA 0.2 s
COMM Z-COMPONENT EM DATA 1.4 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 CONDUCTIVITIES CALCULATED USING corrected EM DATA
COMM
COMM DIGITAL TERRAIN DATA
COMM PARALLAX CORRECTION APPLIED TO RADAR ALIMETER DATA 0.6 s
COMM PARALLAX CORRECTION APPLIED TO GPS ALIMETER DATA 0.0 s
COMM DTM CALCULATED [DTM = GPS ALTITUDE - RADAR ALTITUDE]
COMM DATA HAVE BEEN MICROLEVELLED
COMM -----
COMM The accuracy of the elevation calculation is directly dependent on
COMM the accuracy of the two input parameters, radar altitude and GPS
COMM altitude. The radar altitude value may be erroneous in areas of heavy
COMM tree cover, where the altimeter reflects the distance to the tree
COMM canopy rather than the ground. The GPS altitude value is primarily
COMM dependent on the number of available satellites. Although
COMM 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
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 LOCATED DATA FORMAT

COMM

COMM Output field format : DOS - Flat ascii

COMM Number of fields : 227

COMM

COMM	Field	Channel	Description	Units	Undefined	Format
COMM	----	-----	-----	----	-----	-----
COMM	1	LINE	Line		-9999999	i6
COMM	2	FLIGHT	Flight		-9999999	i4
COMM	3	FID	Fiducial	(s)	-9999999	f8.1
COMM	4	LATITUDE	Latitude GDA94	(deg)	-9999999	f13.6
COMM	5	LONGITUDE	Longitude GDA94	(deg)	-9999999	f13.6
COMM	6	EASTING	Easting MGA53S	(m)	-9999999	f11.2
COMM	7	NORTHING	Northing MGA53S	(m)	-9999999	f12.2
COMM	8	TxHeight	GPS height	(m)	-9999999	f8.2
COMM	9	TxRalt_raw	Raw Radar Altimeter	(m)	-9999999	f8.2
COMM	10	TxRalt_final	Final Radar Altimeter	(m)	-9999999	f8.2
COMM	11	DTM	DTM	(m)	-9999999	f8.2
COMM	12	MAG	Levelled TMI	(nT)	-9999999	f10.3
COMM	13	MAG_1VD	Levelled TMI 1VD	(nT/m)	-9999999	f12.3
COMM	14	Pitch_Raw	Raw Tx loop pitch	(deg)	-9999999	f10.3
COMM	15	Roll_Raw	Raw Tx loop roll	(deg)	-9999999	f10.3
COMM	16	HSep_Raw	Raw Tx-Rx horizontal separation	(m)	-9999999	f8.2
COMM	17	VSep_Raw	Raw Tx-Rx vertical separation	(m)	-9999999	f8.2
COMM	18	Pitch_Final	Final Tx loop pitch	(deg)	-9999999	f10.3
COMM	19	Roll_Final	Final Tx loop roll	(deg)	-9999999	f10.3
COMM	20	HSep_Final	Final Tx-Rx horizontal separation	(m)	-9999999	f8.2
COMM	21	VSep_Final	Final Tx-Rx vertical separation	(m)	-9999999	f8.2
COMM	22	EMX_dBdt[1]	Raw dBdt EMX01 Window	(fT/s)	-9999999	f12.6
COMM	23	EMX_dBdt[2]	Raw dBdt EMX02 Window	(fT/s)	-9999999	f12.6
COMM	24	EMX_dBdt[3]	Raw dBdt EMX03 Window	(fT/s)	-9999999	f12.6
COMM	25	EMX_dBdt[4]	Raw dBdt EMX04 Window	(fT/s)	-9999999	f12.6
COMM	26	EMX_dBdt[5]	Raw dBdt EMX05 Window	(fT/s)	-9999999	f12.6
COMM	27	EMX_dBdt[6]	Raw dBdt EMX06 Window	(fT/s)	-9999999	f12.6
COMM	28	EMX_dBdt[7]	Raw dBdt EMX07 Window	(fT/s)	-9999999	f12.6
COMM	29	EMX_dBdt[8]	Raw dBdt EMX08 Window	(fT/s)	-9999999	f12.6
COMM	30	EMX_dBdt[9]	Raw dBdt EMX09 Window	(fT/s)	-9999999	f12.6
COMM	31	EMX_dBdt[10]	Raw dBdt EMX10 Window	(fT/s)	-9999999	f12.6
COMM	32	EMX_dBdt[11]	Raw dBdt EMX11 Window	(fT/s)	-9999999	f12.6
COMM	33	EMX_dBdt[12]	Raw dBdt EMX12 Window	(fT/s)	-9999999	f12.6
COMM	34	EMX_dBdt[13]	Raw dBdt EMX13 Window	(fT/s)	-9999999	f12.6
COMM	35	EMX_dBdt[14]	Raw dBdt EMX14 Window	(fT/s)	-9999999	f12.6
COMM	36	EMX_dBdt[15]	Raw dBdt EMX15 Window	(fT/s)	-9999999	f12.6
COMM	37	EMX_Raw[1]	Raw B-field EMX01 Window	(fT)	-9999999	f12.6
COMM	38	EMX_Raw[2]	Raw B-field EMX02 Window	(fT)	-9999999	f12.6
COMM	39	EMX_Raw[3]	Raw B-field EMX03 Window	(fT)	-9999999	f12.6
COMM	40	EMX_Raw[4]	Raw B-field EMX04 Window	(fT)	-9999999	f12.6
COMM	41	EMX_Raw[5]	Raw B-field EMX05 Window	(fT)	-9999999	f12.6
COMM	42	EMX_Raw[6]	Raw B-field EMX06 Window	(fT)	-9999999	f12.6
COMM	43	EMX_Raw[7]	Raw B-field EMX07 Window	(fT)	-9999999	f12.6
COMM	44	EMX_Raw[8]	Raw B-field EMX08 Window	(fT)	-9999999	f12.6
COMM	45	EMX_Raw[9]	Raw B-field EMX09 Window	(fT)	-9999999	f12.6
COMM	46	EMX_Raw[10]	Raw B-field EMX10 Window	(fT)	-9999999	f12.6
COMM	47	EMX_Raw[11]	Raw B-field EMX11 Window	(fT)	-9999999	f12.6
COMM	48	EMX_Raw[12]	Raw B-field EMX12 Window	(fT)	-9999999	f12.6
COMM	49	EMX_Raw[13]	Raw B-field EMX13 Window	(fT)	-9999999	f12.6
COMM	50	EMX_Raw[14]	Raw B-field EMX14 Window	(fT)	-9999999	f12.6
COMM	51	EMX_Raw[15]	Raw B-field EMX15 Window	(fT)	-9999999	f12.6
COMM	52	EMX_Final[1]	Final B-field EMX01 Window	(fT)	-9999999	f12.6
COMM	53	EMX_Final[2]	Final B-field EMX02 Window	(fT)	-9999999	f12.6
COMM	54	EMX_Final[3]	Final B-field EMX03 Window	(fT)	-9999999	f12.6
COMM	55	EMX_Final[4]	Final B-field EMX04 Window	(fT)	-9999999	f12.6
COMM	56	EMX_Final[5]	Final B-field EMX05 Window	(fT)	-9999999	f12.6
COMM	57	EMX_Final[6]	Final B-field EMX06 Window	(fT)	-9999999	f12.6

COMM 58	EMX_Final[7]	Final B-field	EMX07 Window	(fT)	-9999999	f12.6
COMM 59	EMX_Final[8]	Final B-field	EMX08 Window	(fT)	-9999999	f12.6
COMM 60	EMX_Final[9]	Final B-field	EMX09 Window	(fT)	-9999999	f12.6
COMM 61	EMX_Final[10]	Final B-field	EMX10 Window	(fT)	-9999999	f12.6
COMM 62	EMX_Final[11]	Final B-field	EMX11 Window	(fT)	-9999999	f12.6
COMM 63	EMX_Final[12]	Final B-field	EMX12 Window	(fT)	-9999999	f12.6
COMM 64	EMX_Final[13]	Final B-field	EMX13 Window	(fT)	-9999999	f12.6
COMM 65	EMX_Final[14]	Final B-field	EMX14 Window	(fT)	-9999999	f12.6
COMM 66	EMX_Final[15]	Final B-field	EMX15 Window	(fT)	-9999999	f12.6
COMM 67	X_Sferics	X_Sferics			-9999999	f10.3
COMM 68	X_Lowfreq	X_Lowfreq			-9999999	f10.3
COMM 69	X_Powerline	X_Powerline			-9999999	f10.3
COMM 70	X_VLF1	X_18.2kHz			-9999999	f10.3
COMM 71	X_VLF2	X_19.8kHz			-9999999	f10.3
COMM 72	X_VLF3	X_21.4kHz			-9999999	f10.3
COMM 73	X_VLF4	X_22.2kHz			-9999999	f10.3
COMM 74	X_Geofact	X_Geometric factor			-9999999	f10.3
COMM 75	EMZ_dBdt[1]	Raw dBdt	EMZ01 Window	(fT/s)	-9999999	f12.6
COMM 76	EMZ_dBdt[2]	Raw dBdt	EMZ02 Window	(fT/s)	-9999999	f12.6
COMM 77	EMZ_dBdt[3]	Raw dBdt	EMZ03 Window	(fT/s)	-9999999	f12.6
COMM 78	EMZ_dBdt[4]	Raw dBdt	EMZ04 Window	(fT/s)	-9999999	f12.6
COMM 79	EMZ_dBdt[5]	Raw dBdt	EMZ05 Window	(fT/s)	-9999999	f12.6
COMM 80	EMZ_dBdt[6]	Raw dBdt	EMZ06 Window	(fT/s)	-9999999	f12.6
COMM 81	EMZ_dBdt[7]	Raw dBdt	EMZ07 Window	(fT/s)	-9999999	f12.6
COMM 82	EMZ_dBdt[8]	Raw dBdt	EMZ08 Window	(fT/s)	-9999999	f12.6
COMM 83	EMZ_dBdt[9]	Raw dBdt	EMZ09 Window	(fT/s)	-9999999	f12.6
COMM 84	EMZ_dBdt[10]	Raw dBdt	EMZ10 Window	(fT/s)	-9999999	f12.6
COMM 85	EMZ_dBdt[11]	Raw dBdt	EMZ11 Window	(fT/s)	-9999999	f12.6
COMM 86	EMZ_dBdt[12]	Raw dBdt	EMZ12 Window	(fT/s)	-9999999	f12.6
COMM 87	EMZ_dBdt[13]	Raw dBdt	EMZ13 Window	(fT/s)	-9999999	f12.6
COMM 88	EMZ_dBdt[14]	Raw dBdt	EMZ14 Window	(fT/s)	-9999999	f12.6
COMM 89	EMZ_dBdt[15]	Raw dBdt	EMZ15 Window	(fT/s)	-9999999	f12.6
COMM 90	EMZ_Raw[1]	Raw B-field	EMZ01 Window	(fT)	-9999999	f12.6
COMM 91	EMZ_Raw[2]	Raw B-field	EMZ02 Window	(fT)	-9999999	f12.6
COMM 92	EMZ_Raw[3]	Raw B-field	EMZ03 Window	(fT)	-9999999	f12.6
COMM 93	EMZ_Raw[4]	Raw B-field	EMZ04 Window	(fT)	-9999999	f12.6
COMM 94	EMZ_Raw[5]	Raw B-field	EMZ05 Window	(fT)	-9999999	f12.6
COMM 95	EMZ_Raw[6]	Raw B-field	EMZ06 Window	(fT)	-9999999	f12.6
COMM 96	EMZ_Raw[7]	Raw B-field	EMZ07 Window	(fT)	-9999999	f12.6
COMM 97	EMZ_Raw[8]	Raw B-field	EMZ08 Window	(fT)	-9999999	f12.6
COMM 98	EMZ_Raw[9]	Raw B-field	EMZ09 Window	(fT)	-9999999	f12.6
COMM 99	EMZ_Raw[10]	Raw B-field	EMZ10 Window	(fT)	-9999999	f12.6
COMM100	EMZ_Raw[11]	Raw B-field	EMZ11 Window	(fT)	-9999999	f12.6
COMM101	EMZ_Raw[12]	Raw B-field	EMZ12 Window	(fT)	-9999999	f12.6
COMM102	EMZ_Raw[13]	Raw B-field	EMZ13 Window	(fT)	-9999999	f12.6
COMM103	EMZ_Raw[14]	Raw B-field	EMZ14 Window	(fT)	-9999999	f12.6
COMM104	EMZ_Raw[15]	Raw B-field	EMZ15 Window	(fT)	-9999999	f12.6
COMM105	EMZ_Final[1]	Final B-field	EMZ01 Window	(fT)	-9999999	f12.6
COMM106	EMZ_Final[2]	Final B-field	EMZ02 Window	(fT)	-9999999	f12.6
COMM107	EMZ_Final[3]	Final B-field	EMZ03 Window	(fT)	-9999999	f12.6
COMM108	EMZ_Final[4]	Final B-field	EMZ04 Window	(fT)	-9999999	f12.6
COMM109	EMZ_Final[5]	Final B-field	EMZ05 Window	(fT)	-9999999	f12.6
COMM110	EMZ_Final[6]	Final B-field	EMZ06 Window	(fT)	-9999999	f12.6
COMM111	EMZ_Final[7]	Final B-field	EMZ07 Window	(fT)	-9999999	f12.6
COMM112	EMZ_Final[8]	Final B-field	EMZ08 Window	(fT)	-9999999	f12.6
COMM113	EMZ_Final[9]	Final B-field	EMZ09 Window	(fT)	-9999999	f12.6
COMM114	EMZ_Final[10]	Final B-field	EMZ10 Window	(fT)	-9999999	f12.6
COMM115	EMZ_Final[11]	Final B-field	EMZ11 Window	(fT)	-9999999	f12.6
COMM116	EMZ_Final[12]	Final B-field	EMZ12 Window	(fT)	-9999999	f12.6
COMM117	EMZ_Final[13]	Final B-field	EMZ13 Window	(fT)	-9999999	f12.6
COMM118	EMZ_Final[14]	Final B-field	EMZ14 Window	(fT)	-9999999	f12.6
COMM119	EMZ_Final[15]	Final B-field	EMZ15 Window	(fT)	-9999999	f12.6
COMM120	Z_Sferics	Z_Sferics			-9999999	f10.3
COMM121	Z_Lowfreq	Z_Lowfreq			-9999999	f10.3
COMM122	Z_Powerline	Z_Powerline			-9999999	f10.3
COMM123	Z_VLF1	Z_18.2kHz			-9999999	f10.3
COMM124	Z_VLF2	Z_19.8kHz			-9999999	f10.3
COMM125	Z_VLF3	Z_21.4kHz			-9999999	f10.3
COMM126	Z_VLF4	Z_22.2kHz			-9999999	f10.3
COMM127	Z_Geofact	Z_Geometric factor			-9999999	f10.3
COMM128	CNDZ[1]	Conductivity_Z001	0-2 m (mS/m)		-9999999	f10.3

COMM129	CNDZ [2]	Conductivity_Z002	2-4	m	(mS/m)	-9999999	f10.3
COMM130	CNDZ [3]	Conductivity_Z003	4-6	m	(mS/m)	-9999999	f10.3
COMM131	CNDZ [4]	Conductivity_Z004	6-8	m	(mS/m)	-9999999	f10.3
COMM132	CNDZ [5]	Conductivity_Z005	8-10	m	(mS/m)	-9999999	f10.3
COMM133	CNDZ [6]	Conductivity_Z006	10-12	m	(mS/m)	-9999999	f10.3
COMM134	CNDZ [7]	Conductivity_Z007	12-14	m	(mS/m)	-9999999	f10.3
COMM135	CNDZ [8]	Conductivity_Z008	14-16	m	(mS/m)	-9999999	f10.3
COMM136	CNDZ [9]	Conductivity_Z009	16-18	m	(mS/m)	-9999999	f10.3
COMM137	CNDZ [10]	Conductivity_Z010	18-20	m	(mS/m)	-9999999	f10.3
COMM138	CNDZ [11]	Conductivity_Z011	20-22	m	(mS/m)	-9999999	f10.3
COMM139	CNDZ [12]	Conductivity_Z012	22-24	m	(mS/m)	-9999999	f10.3
COMM140	CNDZ [13]	Conductivity_Z013	24-26	m	(mS/m)	-9999999	f10.3
COMM141	CNDZ [14]	Conductivity_Z014	26-28	m	(mS/m)	-9999999	f10.3
COMM142	CNDZ [15]	Conductivity_Z015	28-30	m	(mS/m)	-9999999	f10.3
COMM143	CNDZ [16]	Conductivity_Z016	30-32	m	(mS/m)	-9999999	f10.3
COMM144	CNDZ [17]	Conductivity_Z017	32-34	m	(mS/m)	-9999999	f10.3
COMM145	CNDZ [18]	Conductivity_Z018	34-36	m	(mS/m)	-9999999	f10.3
COMM146	CNDZ [19]	Conductivity_Z019	36-38	m	(mS/m)	-9999999	f10.3
COMM147	CNDZ [20]	Conductivity_Z020	38-40	m	(mS/m)	-9999999	f10.3
COMM148	CNDZ [21]	Conductivity_Z021	40-42	m	(mS/m)	-9999999	f10.3
COMM149	CNDZ [22]	Conductivity_Z022	42-44	m	(mS/m)	-9999999	f10.3
COMM150	CNDZ [23]	Conductivity_Z023	44-46	m	(mS/m)	-9999999	f10.3
COMM151	CNDZ [24]	Conductivity_Z024	46-48	m	(mS/m)	-9999999	f10.3
COMM152	CNDZ [25]	Conductivity_Z025	48-50	m	(mS/m)	-9999999	f10.3
COMM153	CNDZ [26]	Conductivity_Z026	50-52	m	(mS/m)	-9999999	f10.3
COMM154	CNDZ [27]	Conductivity_Z027	52-54	m	(mS/m)	-9999999	f10.3
COMM155	CNDZ [28]	Conductivity_Z028	54-56	m	(mS/m)	-9999999	f10.3
COMM156	CNDZ [29]	Conductivity_Z029	56-58	m	(mS/m)	-9999999	f10.3
COMM157	CNDZ [30]	Conductivity_Z030	58-60	m	(mS/m)	-9999999	f10.3
COMM158	CNDZ [31]	Conductivity_Z031	60-62	m	(mS/m)	-9999999	f10.3
COMM159	CNDZ [32]	Conductivity_Z032	62-64	m	(mS/m)	-9999999	f10.3
COMM160	CNDZ [33]	Conductivity_Z033	64-66	m	(mS/m)	-9999999	f10.3
COMM161	CNDZ [34]	Conductivity_Z034	66-68	m	(mS/m)	-9999999	f10.3
COMM162	CNDZ [35]	Conductivity_Z035	68-70	m	(mS/m)	-9999999	f10.3
COMM163	CNDZ [36]	Conductivity_Z036	70-72	m	(mS/m)	-9999999	f10.3
COMM164	CNDZ [37]	Conductivity_Z037	72-74	m	(mS/m)	-9999999	f10.3
COMM165	CNDZ [38]	Conductivity_Z038	74-76	m	(mS/m)	-9999999	f10.3
COMM166	CNDZ [39]	Conductivity_Z039	76-78	m	(mS/m)	-9999999	f10.3
COMM167	CNDZ [40]	Conductivity_Z040	78-80	m	(mS/m)	-9999999	f10.3
COMM168	CNDZ [41]	Conductivity_Z041	80-82	m	(mS/m)	-9999999	f10.3
COMM169	CNDZ [42]	Conductivity_Z042	82-84	m	(mS/m)	-9999999	f10.3
COMM170	CNDZ [43]	Conductivity_Z043	84-86	m	(mS/m)	-9999999	f10.3
COMM171	CNDZ [44]	Conductivity_Z044	86-88	m	(mS/m)	-9999999	f10.3
COMM172	CNDZ [45]	Conductivity_Z045	88-90	m	(mS/m)	-9999999	f10.3
COMM173	CNDZ [46]	Conductivity_Z046	90-92	m	(mS/m)	-9999999	f10.3
COMM174	CNDZ [47]	Conductivity_Z047	92-94	m	(mS/m)	-9999999	f10.3
COMM175	CNDZ [48]	Conductivity_Z048	94-96	m	(mS/m)	-9999999	f10.3
COMM176	CNDZ [49]	Conductivity_Z049	96-98	m	(mS/m)	-9999999	f10.3
COMM177	CNDZ [50]	Conductivity_Z050	98-100	m	(mS/m)	-9999999	f10.3
COMM178	CNDZ [51]	Conductivity_Z051	100-102	m	(mS/m)	-9999999	f10.3
COMM179	CNDZ [52]	Conductivity_Z052	102-104	m	(mS/m)	-9999999	f10.3
COMM180	CNDZ [53]	Conductivity_Z053	104-106	m	(mS/m)	-9999999	f10.3
COMM181	CNDZ [54]	Conductivity_Z054	106-108	m	(mS/m)	-9999999	f10.3
COMM182	CNDZ [55]	Conductivity_Z055	108-110	m	(mS/m)	-9999999	f10.3
COMM183	CNDZ [56]	Conductivity_Z056	110-112	m	(mS/m)	-9999999	f10.3
COMM184	CNDZ [57]	Conductivity_Z057	112-114	m	(mS/m)	-9999999	f10.3
COMM185	CNDZ [58]	Conductivity_Z058	114-116	m	(mS/m)	-9999999	f10.3
COMM186	CNDZ [59]	Conductivity_Z059	116-118	m	(mS/m)	-9999999	f10.3
COMM187	CNDZ [60]	Conductivity_Z060	118-120	m	(mS/m)	-9999999	f10.3
COMM188	CNDZ [61]	Conductivity_Z061	120-122	m	(mS/m)	-9999999	f10.3
COMM189	CNDZ [62]	Conductivity_Z062	122-124	m	(mS/m)	-9999999	f10.3
COMM190	CNDZ [63]	Conductivity_Z063	124-126	m	(mS/m)	-9999999	f10.3
COMM191	CNDZ [64]	Conductivity_Z064	126-128	m	(mS/m)	-9999999	f10.3
COMM192	CNDZ [65]	Conductivity_Z065	128-130	m	(mS/m)	-9999999	f10.3
COMM193	CNDZ [66]	Conductivity_Z066	130-132	m	(mS/m)	-9999999	f10.3
COMM194	CNDZ [67]	Conductivity_Z067	132-134	m	(mS/m)	-9999999	f10.3
COMM195	CNDZ [68]	Conductivity_Z068	134-136	m	(mS/m)	-9999999	f10.3
COMM196	CNDZ [69]	Conductivity_Z069	136-138	m	(mS/m)	-9999999	f10.3
COMM197	CNDZ [70]	Conductivity_Z070	138-140	m	(mS/m)	-9999999	f10.3
COMM198	CNDZ [71]	Conductivity_Z071	140-142	m	(mS/m)	-9999999	f10.3
COMM199	CNDZ [72]	Conductivity_Z072	142-144	m	(mS/m)	-9999999	f10.3

COMM200	CNDZ[73]	Conductivity_Z073	144-146 m	(mS/m)	-9999999	f10.3
COMM201	CNDZ[74]	Conductivity_Z074	146-148 m	(mS/m)	-9999999	f10.3
COMM202	CNDZ[75]	Conductivity_Z075	148-150 m	(mS/m)	-9999999	f10.3
COMM203	CNDZ[76]	Conductivity_Z076	150-152 m	(mS/m)	-9999999	f10.3
COMM204	CNDZ[77]	Conductivity_Z077	152-154 m	(mS/m)	-9999999	f10.3
COMM205	CNDZ[78]	Conductivity_Z078	154-156 m	(mS/m)	-9999999	f10.3
COMM206	CNDZ[79]	Conductivity_Z079	156-158 m	(mS/m)	-9999999	f10.3
COMM207	CNDZ[80]	Conductivity_Z080	158-160 m	(mS/m)	-9999999	f10.3
COMM208	CNDZ[81]	Conductivity_Z081	160-162 m	(mS/m)	-9999999	f10.3
COMM209	CNDZ[82]	Conductivity_Z082	162-164 m	(mS/m)	-9999999	f10.3
COMM210	CNDZ[83]	Conductivity_Z083	164-166 m	(mS/m)	-9999999	f10.3
COMM211	CNDZ[84]	Conductivity_Z084	166-168 m	(mS/m)	-9999999	f10.3
COMM212	CNDZ[85]	Conductivity_Z085	168-170 m	(mS/m)	-9999999	f10.3
COMM213	CNDZ[86]	Conductivity_Z086	170-172 m	(mS/m)	-9999999	f10.3
COMM214	CNDZ[87]	Conductivity_Z087	172-174 m	(mS/m)	-9999999	f10.3
COMM215	CNDZ[88]	Conductivity_Z088	174-176 m	(mS/m)	-9999999	f10.3
COMM216	CNDZ[89]	Conductivity_Z089	176-178 m	(mS/m)	-9999999	f10.3
COMM217	CNDZ[90]	Conductivity_Z090	178-180 m	(mS/m)	-9999999	f10.3
COMM218	CNDZ[91]	Conductivity_Z091	180-182 m	(mS/m)	-9999999	f10.3
COMM219	CNDZ[92]	Conductivity_Z092	182-184 m	(mS/m)	-9999999	f10.3
COMM220	CNDZ[93]	Conductivity_Z093	184-186 m	(mS/m)	-9999999	f10.3
COMM221	CNDZ[94]	Conductivity_Z094	186-188 m	(mS/m)	-9999999	f10.3
COMM222	CNDZ[95]	Conductivity_Z095	188-190 m	(mS/m)	-9999999	f10.3
COMM223	CNDZ[96]	Conductivity_Z096	190-192 m	(mS/m)	-9999999	f10.3
COMM224	CNDZ[97]	Conductivity_Z097	192-194 m	(mS/m)	-9999999	f10.3
COMM225	CNDZ[98]	Conductivity_Z098	194-196 m	(mS/m)	-9999999	f10.3
COMM226	CNDZ[99]	Conductivity_Z099	196-198 m	(mS/m)	-9999999	f10.3
COMM227	CNDZ[100]	Conductivity_Z100	198-200 m	(mS/m)	-9999999	f10.3

GAWLER AREA 4

COMM JOB NUMBER: 1798
 COMM AREA NUMBER: 4
 COMM SURVEY COMPANY: Fugro Airborne Surveys
 COMM CLIENT: Quasar Resources Pty Ltd
 COMM SURVEY TYPE: 25Hz TEMPEST Survey
 COMM AREA NAME: Gawler - Area 4
 COMM STATE: SA
 COMM COUNTRY: Australia
 COMM SURVEY FLOWN: July, 2006
 COMM LOCATED DATA CREATED: Oct 2006
 COMM
 COMM DATUM: GDA94
 COMM PROJECTION: MGA
 COMM ZONE: 53S
 COMM
 COMM SURVEY SPECIFICATIONS
 COMM
 COMM TRAVERSE LINE SPACING: 1000 m
 COMM TRAVERSE LINE DIRECTION: 090-270 deg
 COMM TIE LINE SPACING: 10000 m
 COMM TIE LINE DIRECTION: 000-180 deg
 COMM NOMINAL TERRAIN CLEARANCE: 120 m
 COMM FINAL LINE KILOMETRES: 251.1 km
 COMM
 COMM LINE NUMBERING
 COMM
 COMM TRAVERSE LINE NUMBERS: 40010 - 40140
 COMM TIE LINE NUMBERS: 47010 - 47030
 COMM
 COMM SURVEY EQUIPMENT
 COMM
 COMM AIRCRAFT: CASA-212, TEM
 COMM
 COMM MAGNETOMETER: Scintrex Cs-2 Cesium Vapour
 COMM INSTALLATION: stinger mount
 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 RECEIVER DISTANCE BEHIND THE TRANSMITTER: -120 m
COMM RECEIVER DISTANCE BELOW THE TRANSMITTER: -35 m
COMM
COMM RADAR ALTIMETER: Sperry RT-220
COMM RECORDING INTERVAL: 0.2 s
COMM
COMM NAVIGATION: real-time differential GPS
COMM RECORDING INTERVAL: 1.0 s
COMM
COMM ACQUISITION SYSTEM: PDAS-1000
COMM
COMM DATA PROCESSING
COMM
COMM MAGNETIC DATA
COMM DIURNAL BASE VALUE APPLIED 56120 nT
COMM PARALLAX CORRECTION APPLIED 0.6 s
COMM IGRF BASE VALUE APPLIED 56470 nT
COMM IGRF MODEL 2005 EXTRAPOLATED TO 2006.6
COMM DATA HAVE BEEN MICROLEVELLED
COMM
COMM ELECTROMAGNETIC DATA
COMM SYSTEM PARALLAX REMOVED, AS FOLLOWS
COMM X-COMPONENT EM DATA 0.2 s
COMM Z-COMPONENT EM DATA 1.4 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 CONDUCTIVITIES CALCULATED USING corrected EM DATA
COMM
COMM DIGITAL TERRAIN DATA
COMM PARALLAX CORRECTION APPLIED TO RADAR ALIMETER DATA 0.6 s
COMM PARALLAX CORRECTION APPLIED TO GPS ALIMETER DATA 0.0 s
COMM DTM CALCULATED [DTM = GPS ALTITUDE - RADAR ALTITUDE]
COMM DATA HAVE BEEN MICROLEVELLED
COMM -----
COMM The accuracy of the elevation calculation is directly dependent on
COMM the accuracy of the two input parameters, radar altitude and GPS
COMM altitude. The radar altitude value may be erroneous in areas of heavy
COMM tree cover, where the altimeter reflects the distance to the tree
COMM canopy rather than the ground. The GPS altitude value is primarily
COMM dependent on the number of available satellites. Although
COMM 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
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 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 LOCATED DATA FORMAT
 COMM
 COMM Output field format : DOS - Flat ascii
 COMM Number of fields : 227
 COMM

COMM Field	Channel	Description	Units	Undefined	Format
----	-----	-----	----	-----	-----
COMM 1	LINE	Line		-9999999	i6
COMM 2	FLIGHT	Flight		-9999999	i4
COMM 3	FID	Fiducial	(s)	-9999999	f8.1
COMM 4	LATITUDE	Latitude GDA94	(deg)	-9999999	f13.6
COMM 5	LONGITUDE	Longitude GDA94	(deg)	-9999999	f13.6
COMM 6	EASTING	Easting MGA53S	(m)	-9999999	f11.2
COMM 7	NORTHING	Northing MGA53S	(m)	-9999999	f12.2
COMM 8	TxHeight	GPS height	(m)	-9999999	f8.2
COMM 9	TxRalt_raw	Raw Radar Altimeter	(m)	-9999999	f8.2
COMM 10	TxRalt_final	Final Radar Altimeter	(m)	-9999999	f8.2
COMM 11	DTM	DTM	(m)	-9999999	f8.2
COMM 12	MAG	Levelled TMI	(nT)	-9999999	f10.3
COMM 13	MAG_1VD	Levelled TMI 1VD	(nT/m)	-9999999	f12.3
COMM 14	Pitch_Raw	Raw Tx loop pitch	(deg)	-9999999	f10.3
COMM 15	Roll_Raw	Raw Tx loop roll	(deg)	-9999999	f10.3
COMM 16	HSep_Raw	Raw Tx-Rx horizontal separation	(m)	-9999999	f8.2
COMM 17	VSep_Raw	Raw Tx-Rx vertical separation	(m)	-9999999	f8.2
COMM 18	Pitch_Final	Final Tx loop pitch	(deg)	-9999999	f10.3
COMM 19	Roll_Final	Final Tx loop roll	(deg)	-9999999	f10.3
COMM 20	HSep_Final	Final Tx-Rx horizontal separation	(m)	-9999999	f8.2
COMM 21	VSep_Final	Final Tx-Rx vertical separation	(m)	-9999999	f8.2
COMM 22	EMX_dBdt[1]	Raw dBdt EMX01 Window	(fT/s)	-9999999	f12.6
COMM 23	EMX_dBdt[2]	Raw dBdt EMX02 Window	(fT/s)	-9999999	f12.6
COMM 24	EMX_dBdt[3]	Raw dBdt EMX03 Window	(fT/s)	-9999999	f12.6
COMM 25	EMX_dBdt[4]	Raw dBdt EMX04 Window	(fT/s)	-9999999	f12.6
COMM 26	EMX_dBdt[5]	Raw dBdt EMX05 Window	(fT/s)	-9999999	f12.6
COMM 27	EMX_dBdt[6]	Raw dBdt EMX06 Window	(fT/s)	-9999999	f12.6
COMM 28	EMX_dBdt[7]	Raw dBdt EMX07 Window	(fT/s)	-9999999	f12.6

COMM 29	EMX_dBdt[8]	Raw dBdt EMX08 Window	(fT/s)	-9999999	f12.6
COMM 30	EMX_dBdt[9]	Raw dBdt EMX09 Window	(fT/s)	-9999999	f12.6
COMM 31	EMX_dBdt[10]	Raw dBdt EMX10 Window	(fT/s)	-9999999	f12.6
COMM 32	EMX_dBdt[11]	Raw dBdt EMX11 Window	(fT/s)	-9999999	f12.6
COMM 33	EMX_dBdt[12]	Raw dBdt EMX12 Window	(fT/s)	-9999999	f12.6
COMM 34	EMX_dBdt[13]	Raw dBdt EMX13 Window	(fT/s)	-9999999	f12.6
COMM 35	EMX_dBdt[14]	Raw dBdt EMX14 Window	(fT/s)	-9999999	f12.6
COMM 36	EMX_dBdt[15]	Raw dBdt EMX15 Window	(fT/s)	-9999999	f12.6
COMM 37	EMX_Raw[1]	Raw B-field EMX01 Window	(fT)	-9999999	f12.6
COMM 38	EMX_Raw[2]	Raw B-field EMX02 Window	(fT)	-9999999	f12.6
COMM 39	EMX_Raw[3]	Raw B-field EMX03 Window	(fT)	-9999999	f12.6
COMM 40	EMX_Raw[4]	Raw B-field EMX04 Window	(fT)	-9999999	f12.6
COMM 41	EMX_Raw[5]	Raw B-field EMX05 Window	(fT)	-9999999	f12.6
COMM 42	EMX_Raw[6]	Raw B-field EMX06 Window	(fT)	-9999999	f12.6
COMM 43	EMX_Raw[7]	Raw B-field EMX07 Window	(fT)	-9999999	f12.6
COMM 44	EMX_Raw[8]	Raw B-field EMX08 Window	(fT)	-9999999	f12.6
COMM 45	EMX_Raw[9]	Raw B-field EMX09 Window	(fT)	-9999999	f12.6
COMM 46	EMX_Raw[10]	Raw B-field EMX10 Window	(fT)	-9999999	f12.6
COMM 47	EMX_Raw[11]	Raw B-field EMX11 Window	(fT)	-9999999	f12.6
COMM 48	EMX_Raw[12]	Raw B-field EMX12 Window	(fT)	-9999999	f12.6
COMM 49	EMX_Raw[13]	Raw B-field EMX13 Window	(fT)	-9999999	f12.6
COMM 50	EMX_Raw[14]	Raw B-field EMX14 Window	(fT)	-9999999	f12.6
COMM 51	EMX_Raw[15]	Raw B-field EMX15 Window	(fT)	-9999999	f12.6
COMM 52	EMX_Final[1]	Final B-field EMX01 Window	(fT)	-9999999	f12.6
COMM 53	EMX_Final[2]	Final B-field EMX02 Window	(fT)	-9999999	f12.6
COMM 54	EMX_Final[3]	Final B-field EMX03 Window	(fT)	-9999999	f12.6
COMM 55	EMX_Final[4]	Final B-field EMX04 Window	(fT)	-9999999	f12.6
COMM 56	EMX_Final[5]	Final B-field EMX05 Window	(fT)	-9999999	f12.6
COMM 57	EMX_Final[6]	Final B-field EMX06 Window	(fT)	-9999999	f12.6
COMM 58	EMX_Final[7]	Final B-field EMX07 Window	(fT)	-9999999	f12.6
COMM 59	EMX_Final[8]	Final B-field EMX08 Window	(fT)	-9999999	f12.6
COMM 60	EMX_Final[9]	Final B-field EMX09 Window	(fT)	-9999999	f12.6
COMM 61	EMX_Final[10]	Final B-field EMX10 Window	(fT)	-9999999	f12.6
COMM 62	EMX_Final[11]	Final B-field EMX11 Window	(fT)	-9999999	f12.6
COMM 63	EMX_Final[12]	Final B-field EMX12 Window	(fT)	-9999999	f12.6
COMM 64	EMX_Final[13]	Final B-field EMX13 Window	(fT)	-9999999	f12.6
COMM 65	EMX_Final[14]	Final B-field EMX14 Window	(fT)	-9999999	f12.6
COMM 66	EMX_Final[15]	Final B-field EMX15 Window	(fT)	-9999999	f12.6
COMM 67	X_Sferics	X_Sferics		-9999999	f10.3
COMM 68	X_Lowfreq	X_Lowfreq		-9999999	f10.3
COMM 69	X_Powerline	X_Powerline		-9999999	f10.3
COMM 70	X_VLF1	X_18.2kHz		-9999999	f10.3
COMM 71	X_VLF2	X_19.8kHz		-9999999	f10.3
COMM 72	X_VLF3	X_21.4kHz		-9999999	f10.3
COMM 73	X_VLF4	X_22.2kHz		-9999999	f10.3
COMM 74	X_Geofact	X_Geometric factor		-9999999	f10.3
COMM 75	EMZ_dBdt[1]	Raw dBdt EMZ01 Window	(fT/s)	-9999999	f12.6
COMM 76	EMZ_dBdt[2]	Raw dBdt EMZ02 Window	(fT/s)	-9999999	f12.6
COMM 77	EMZ_dBdt[3]	Raw dBdt EMZ03 Window	(fT/s)	-9999999	f12.6
COMM 78	EMZ_dBdt[4]	Raw dBdt EMZ04 Window	(fT/s)	-9999999	f12.6
COMM 79	EMZ_dBdt[5]	Raw dBdt EMZ05 Window	(fT/s)	-9999999	f12.6
COMM 80	EMZ_dBdt[6]	Raw dBdt EMZ06 Window	(fT/s)	-9999999	f12.6
COMM 81	EMZ_dBdt[7]	Raw dBdt EMZ07 Window	(fT/s)	-9999999	f12.6
COMM 82	EMZ_dBdt[8]	Raw dBdt EMZ08 Window	(fT/s)	-9999999	f12.6
COMM 83	EMZ_dBdt[9]	Raw dBdt EMZ09 Window	(fT/s)	-9999999	f12.6
COMM 84	EMZ_dBdt[10]	Raw dBdt EMZ10 Window	(fT/s)	-9999999	f12.6
COMM 85	EMZ_dBdt[11]	Raw dBdt EMZ11 Window	(fT/s)	-9999999	f12.6
COMM 86	EMZ_dBdt[12]	Raw dBdt EMZ12 Window	(fT/s)	-9999999	f12.6
COMM 87	EMZ_dBdt[13]	Raw dBdt EMZ13 Window	(fT/s)	-9999999	f12.6
COMM 88	EMZ_dBdt[14]	Raw dBdt EMZ14 Window	(fT/s)	-9999999	f12.6
COMM 89	EMZ_dBdt[15]	Raw dBdt EMZ15 Window	(fT/s)	-9999999	f12.6
COMM 90	EMZ_Raw[1]	Raw B-field EMZ01 Window	(fT)	-9999999	f12.6
COMM 91	EMZ_Raw[2]	Raw B-field EMZ02 Window	(fT)	-9999999	f12.6
COMM 92	EMZ_Raw[3]	Raw B-field EMZ03 Window	(fT)	-9999999	f12.6
COMM 93	EMZ_Raw[4]	Raw B-field EMZ04 Window	(fT)	-9999999	f12.6
COMM 94	EMZ_Raw[5]	Raw B-field EMZ05 Window	(fT)	-9999999	f12.6
COMM 95	EMZ_Raw[6]	Raw B-field EMZ06 Window	(fT)	-9999999	f12.6
COMM 96	EMZ_Raw[7]	Raw B-field EMZ07 Window	(fT)	-9999999	f12.6
COMM 97	EMZ_Raw[8]	Raw B-field EMZ08 Window	(fT)	-9999999	f12.6
COMM 98	EMZ_Raw[9]	Raw B-field EMZ09 Window	(fT)	-9999999	f12.6
COMM 99	EMZ_Raw[10]	Raw B-field EMZ10 Window	(fT)	-9999999	f12.6

COMM100	EMZ_Raw[11]	Raw B-field EMZ11 Window	(fT)	-9999999	f12.6
COMM101	EMZ_Raw[12]	Raw B-field EMZ12 Window	(fT)	-9999999	f12.6
COMM102	EMZ_Raw[13]	Raw B-field EMZ13 Window	(fT)	-9999999	f12.6
COMM103	EMZ_Raw[14]	Raw B-field EMZ14 Window	(fT)	-9999999	f12.6
COMM104	EMZ_Raw[15]	Raw B-field EMZ15 Window	(fT)	-9999999	f12.6
COMM105	EMZ_Final[1]	Final B-field EMZ01 Window	(fT)	-9999999	f12.6
COMM106	EMZ_Final[2]	Final B-field EMZ02 Window	(fT)	-9999999	f12.6
COMM107	EMZ_Final[3]	Final B-field EMZ03 Window	(fT)	-9999999	f12.6
COMM108	EMZ_Final[4]	Final B-field EMZ04 Window	(fT)	-9999999	f12.6
COMM109	EMZ_Final[5]	Final B-field EMZ05 Window	(fT)	-9999999	f12.6
COMM110	EMZ_Final[6]	Final B-field EMZ06 Window	(fT)	-9999999	f12.6
COMM111	EMZ_Final[7]	Final B-field EMZ07 Window	(fT)	-9999999	f12.6
COMM112	EMZ_Final[8]	Final B-field EMZ08 Window	(fT)	-9999999	f12.6
COMM113	EMZ_Final[9]	Final B-field EMZ09 Window	(fT)	-9999999	f12.6
COMM114	EMZ_Final[10]	Final B-field EMZ10 Window	(fT)	-9999999	f12.6
COMM115	EMZ_Final[11]	Final B-field EMZ11 Window	(fT)	-9999999	f12.6
COMM116	EMZ_Final[12]	Final B-field EMZ12 Window	(fT)	-9999999	f12.6
COMM117	EMZ_Final[13]	Final B-field EMZ13 Window	(fT)	-9999999	f12.6
COMM118	EMZ_Final[14]	Final B-field EMZ14 Window	(fT)	-9999999	f12.6
COMM119	EMZ_Final[15]	Final B-field EMZ15 Window	(fT)	-9999999	f12.6
COMM120	Z_Sferics	Z_Sferics		-9999999	f10.3
COMM121	Z_Lowfreq	Z_Lowfreq		-9999999	f10.3
COMM122	Z_Powerline	Z_Powerline		-9999999	f10.3
COMM123	Z_VLF1	Z_18.2kHz		-9999999	f10.3
COMM124	Z_VLF2	Z_19.8kHz		-9999999	f10.3
COMM125	Z_VLF3	Z_21.4kHz		-9999999	f10.3
COMM126	Z_VLF4	Z_22.2kHz		-9999999	f10.3
COMM127	Z_Geofact	Z_Geometric factor		-9999999	f10.3
COMM128	CNDZ[1]	Conductivity_Z001	0-2 m (mS/m)	-9999999	f10.3
COMM129	CNDZ[2]	Conductivity_Z002	2-4 m (mS/m)	-9999999	f10.3
COMM130	CNDZ[3]	Conductivity_Z003	4-6 m (mS/m)	-9999999	f10.3
COMM131	CNDZ[4]	Conductivity_Z004	6-8 m (mS/m)	-9999999	f10.3
COMM132	CNDZ[5]	Conductivity_Z005	8-10 m (mS/m)	-9999999	f10.3
COMM133	CNDZ[6]	Conductivity_Z006	10-12 m (mS/m)	-9999999	f10.3
COMM134	CNDZ[7]	Conductivity_Z007	12-14 m (mS/m)	-9999999	f10.3
COMM135	CNDZ[8]	Conductivity_Z008	14-16 m (mS/m)	-9999999	f10.3
COMM136	CNDZ[9]	Conductivity_Z009	16-18 m (mS/m)	-9999999	f10.3
COMM137	CNDZ[10]	Conductivity_Z010	18-20 m (mS/m)	-9999999	f10.3
COMM138	CNDZ[11]	Conductivity_Z011	20-22 m (mS/m)	-9999999	f10.3
COMM139	CNDZ[12]	Conductivity_Z012	22-24 m (mS/m)	-9999999	f10.3
COMM140	CNDZ[13]	Conductivity_Z013	24-26 m (mS/m)	-9999999	f10.3
COMM141	CNDZ[14]	Conductivity_Z014	26-28 m (mS/m)	-9999999	f10.3
COMM142	CNDZ[15]	Conductivity_Z015	28-30 m (mS/m)	-9999999	f10.3
COMM143	CNDZ[16]	Conductivity_Z016	30-32 m (mS/m)	-9999999	f10.3
COMM144	CNDZ[17]	Conductivity_Z017	32-34 m (mS/m)	-9999999	f10.3
COMM145	CNDZ[18]	Conductivity_Z018	34-36 m (mS/m)	-9999999	f10.3
COMM146	CNDZ[19]	Conductivity_Z019	36-38 m (mS/m)	-9999999	f10.3
COMM147	CNDZ[20]	Conductivity_Z020	38-40 m (mS/m)	-9999999	f10.3
COMM148	CNDZ[21]	Conductivity_Z021	40-42 m (mS/m)	-9999999	f10.3
COMM149	CNDZ[22]	Conductivity_Z022	42-44 m (mS/m)	-9999999	f10.3
COMM150	CNDZ[23]	Conductivity_Z023	44-46 m (mS/m)	-9999999	f10.3
COMM151	CNDZ[24]	Conductivity_Z024	46-48 m (mS/m)	-9999999	f10.3
COMM152	CNDZ[25]	Conductivity_Z025	48-50 m (mS/m)	-9999999	f10.3
COMM153	CNDZ[26]	Conductivity_Z026	50-52 m (mS/m)	-9999999	f10.3
COMM154	CNDZ[27]	Conductivity_Z027	52-54 m (mS/m)	-9999999	f10.3
COMM155	CNDZ[28]	Conductivity_Z028	54-56 m (mS/m)	-9999999	f10.3
COMM156	CNDZ[29]	Conductivity_Z029	56-58 m (mS/m)	-9999999	f10.3
COMM157	CNDZ[30]	Conductivity_Z030	58-60 m (mS/m)	-9999999	f10.3
COMM158	CNDZ[31]	Conductivity_Z031	60-62 m (mS/m)	-9999999	f10.3
COMM159	CNDZ[32]	Conductivity_Z032	62-64 m (mS/m)	-9999999	f10.3
COMM160	CNDZ[33]	Conductivity_Z033	64-66 m (mS/m)	-9999999	f10.3
COMM161	CNDZ[34]	Conductivity_Z034	66-68 m (mS/m)	-9999999	f10.3
COMM162	CNDZ[35]	Conductivity_Z035	68-70 m (mS/m)	-9999999	f10.3
COMM163	CNDZ[36]	Conductivity_Z036	70-72 m (mS/m)	-9999999	f10.3
COMM164	CNDZ[37]	Conductivity_Z037	72-74 m (mS/m)	-9999999	f10.3
COMM165	CNDZ[38]	Conductivity_Z038	74-76 m (mS/m)	-9999999	f10.3
COMM166	CNDZ[39]	Conductivity_Z039	76-78 m (mS/m)	-9999999	f10.3
COMM167	CNDZ[40]	Conductivity_Z040	78-80 m (mS/m)	-9999999	f10.3
COMM168	CNDZ[41]	Conductivity_Z041	80-82 m (mS/m)	-9999999	f10.3
COMM169	CNDZ[42]	Conductivity_Z042	82-84 m (mS/m)	-9999999	f10.3
COMM170	CNDZ[43]	Conductivity_Z043	84-86 m (mS/m)	-9999999	f10.3

COMM171	CNDZ [44]	Conductivity_Z044	86-88	m	(mS/m)	-9999999	f10.3
COMM172	CNDZ [45]	Conductivity_Z045	88-90	m	(mS/m)	-9999999	f10.3
COMM173	CNDZ [46]	Conductivity_Z046	90-92	m	(mS/m)	-9999999	f10.3
COMM174	CNDZ [47]	Conductivity_Z047	92-94	m	(mS/m)	-9999999	f10.3
COMM175	CNDZ [48]	Conductivity_Z048	94-96	m	(mS/m)	-9999999	f10.3
COMM176	CNDZ [49]	Conductivity_Z049	96-98	m	(mS/m)	-9999999	f10.3
COMM177	CNDZ [50]	Conductivity_Z050	98-100	m	(mS/m)	-9999999	f10.3
COMM178	CNDZ [51]	Conductivity_Z051	100-102	m	(mS/m)	-9999999	f10.3
COMM179	CNDZ [52]	Conductivity_Z052	102-104	m	(mS/m)	-9999999	f10.3
COMM180	CNDZ [53]	Conductivity_Z053	104-106	m	(mS/m)	-9999999	f10.3
COMM181	CNDZ [54]	Conductivity_Z054	106-108	m	(mS/m)	-9999999	f10.3
COMM182	CNDZ [55]	Conductivity_Z055	108-110	m	(mS/m)	-9999999	f10.3
COMM183	CNDZ [56]	Conductivity_Z056	110-112	m	(mS/m)	-9999999	f10.3
COMM184	CNDZ [57]	Conductivity_Z057	112-114	m	(mS/m)	-9999999	f10.3
COMM185	CNDZ [58]	Conductivity_Z058	114-116	m	(mS/m)	-9999999	f10.3
COMM186	CNDZ [59]	Conductivity_Z059	116-118	m	(mS/m)	-9999999	f10.3
COMM187	CNDZ [60]	Conductivity_Z060	118-120	m	(mS/m)	-9999999	f10.3
COMM188	CNDZ [61]	Conductivity_Z061	120-122	m	(mS/m)	-9999999	f10.3
COMM189	CNDZ [62]	Conductivity_Z062	122-124	m	(mS/m)	-9999999	f10.3
COMM190	CNDZ [63]	Conductivity_Z063	124-126	m	(mS/m)	-9999999	f10.3
COMM191	CNDZ [64]	Conductivity_Z064	126-128	m	(mS/m)	-9999999	f10.3
COMM192	CNDZ [65]	Conductivity_Z065	128-130	m	(mS/m)	-9999999	f10.3
COMM193	CNDZ [66]	Conductivity_Z066	130-132	m	(mS/m)	-9999999	f10.3
COMM194	CNDZ [67]	Conductivity_Z067	132-134	m	(mS/m)	-9999999	f10.3
COMM195	CNDZ [68]	Conductivity_Z068	134-136	m	(mS/m)	-9999999	f10.3
COMM196	CNDZ [69]	Conductivity_Z069	136-138	m	(mS/m)	-9999999	f10.3
COMM197	CNDZ [70]	Conductivity_Z070	138-140	m	(mS/m)	-9999999	f10.3
COMM198	CNDZ [71]	Conductivity_Z071	140-142	m	(mS/m)	-9999999	f10.3
COMM199	CNDZ [72]	Conductivity_Z072	142-144	m	(mS/m)	-9999999	f10.3
COMM200	CNDZ [73]	Conductivity_Z073	144-146	m	(mS/m)	-9999999	f10.3
COMM201	CNDZ [74]	Conductivity_Z074	146-148	m	(mS/m)	-9999999	f10.3
COMM202	CNDZ [75]	Conductivity_Z075	148-150	m	(mS/m)	-9999999	f10.3
COMM203	CNDZ [76]	Conductivity_Z076	150-152	m	(mS/m)	-9999999	f10.3
COMM204	CNDZ [77]	Conductivity_Z077	152-154	m	(mS/m)	-9999999	f10.3
COMM205	CNDZ [78]	Conductivity_Z078	154-156	m	(mS/m)	-9999999	f10.3
COMM206	CNDZ [79]	Conductivity_Z079	156-158	m	(mS/m)	-9999999	f10.3
COMM207	CNDZ [80]	Conductivity_Z080	158-160	m	(mS/m)	-9999999	f10.3
COMM208	CNDZ [81]	Conductivity_Z081	160-162	m	(mS/m)	-9999999	f10.3
COMM209	CNDZ [82]	Conductivity_Z082	162-164	m	(mS/m)	-9999999	f10.3
COMM210	CNDZ [83]	Conductivity_Z083	164-166	m	(mS/m)	-9999999	f10.3
COMM211	CNDZ [84]	Conductivity_Z084	166-168	m	(mS/m)	-9999999	f10.3
COMM212	CNDZ [85]	Conductivity_Z085	168-170	m	(mS/m)	-9999999	f10.3
COMM213	CNDZ [86]	Conductivity_Z086	170-172	m	(mS/m)	-9999999	f10.3
COMM214	CNDZ [87]	Conductivity_Z087	172-174	m	(mS/m)	-9999999	f10.3
COMM215	CNDZ [88]	Conductivity_Z088	174-176	m	(mS/m)	-9999999	f10.3
COMM216	CNDZ [89]	Conductivity_Z089	176-178	m	(mS/m)	-9999999	f10.3
COMM217	CNDZ [90]	Conductivity_Z090	178-180	m	(mS/m)	-9999999	f10.3
COMM218	CNDZ [91]	Conductivity_Z091	180-182	m	(mS/m)	-9999999	f10.3
COMM219	CNDZ [92]	Conductivity_Z092	182-184	m	(mS/m)	-9999999	f10.3
COMM220	CNDZ [93]	Conductivity_Z093	184-186	m	(mS/m)	-9999999	f10.3
COMM221	CNDZ [94]	Conductivity_Z094	186-188	m	(mS/m)	-9999999	f10.3
COMM222	CNDZ [95]	Conductivity_Z095	188-190	m	(mS/m)	-9999999	f10.3
COMM223	CNDZ [96]	Conductivity_Z096	190-192	m	(mS/m)	-9999999	f10.3
COMM224	CNDZ [97]	Conductivity_Z097	192-194	m	(mS/m)	-9999999	f10.3
COMM225	CNDZ [98]	Conductivity_Z098	194-196	m	(mS/m)	-9999999	f10.3
COMM226	CNDZ [99]	Conductivity_Z099	196-198	m	(mS/m)	-9999999	f10.3
COMM227	CNDZ [100]	Conductivity_Z100	198-200	m	(mS/m)	-9999999	f10.3

APPENDIX V – List of all Supplied Data and Products

Final Located Data

1798_[1-4]_final.hdr = header file describing the file...

1798_[1-4]_final.asc = flat ascii file of final electromagnetics, magnetics and digital elevation data

Final located data is in flat ASCII format. Contents are shown in Appendix IV.

Data also delivered in Geosoft GDB format.

Final Gridded Products (delivered in ERMapper format GDA94 MGA53)

- Total Magnetic Intensity
- First Vertical Derivative TMI
- Digital Elevation Model
- Depth to Resistive Basement
- 15 Channels of X Component
- 15 Channels of Z Component
- EM Time Constant for X Component
- EM Time Constant for Z Component

Final Hardcopy and Digital Products

- Flight Path
- Total Magnetic Intensity
- First Vertical Derivative TMI
- Digital Elevation Model
- Depth to Resistive Basement
- Z component CDI Multiplots of each line
- Z component CDI stacked sections

Final Acquisition and Processing Report

Delivered as hardcopy and digitally



**EL 3485 TALLARINGA
ANNUAL TECHNICAL REPORT**

18 January 2007 – 17 January 2008

Quasar Resources Pty Ltd

Author: J Barnes
Date: 19 May 2008
Distribution: Quasar Resources (1)
PIRSA (2)

The contents of this report remain the property of Quasar Resources Pty Ltd and may not be published in whole or in part nor used in a company prospectus without the written consent of the company.

TABLE OF CONTENTS

BIBLIOGRAPHIC DATA SHEET	3
SUMMARY	4
CONCLUSIONS AND RECOMMENDATIONS	5
INTRODUCTION	6
GEOLOGY	6
EXPLORATION PROGRAMME	6
EXPENDITURE	6

Figure 1	Location Plan
Figure 2	AEM Flight Line Locations
Figure 3	Fugro TEMPEST (Depth to Base) image

BIBLIOGRAPHIC DATA SHEET

REPORT TITLE	Tallaringa Project, Exploration Licence 3485 Annual Technical Report for the period 18 January 2007 – 17 January 2008.
PROSPECT NAME	Tallaringa
TENEMENT NUMBER	3485
OWNER	Quasar Resources Pty Ltd
COMMODITIES	Uranium
TECTONIC UNITS	
STRATIGRAPHIC UNITS	
1:250 000 MAP SHEET	Tallaringa SH53-05
1:100 000 MAP SHEET	Tallaringa 5539
KEYWORDS	Uranium, gold, basemetals, TEMPEST

SUMMARY

The TEMPEST EM survey line locations are shown in Figure 2.

Preliminary depth to base of the palaeochannels are shown in Figure 3.

The data continues to be processed, validated and inverted. The results of the inversion will be used to model the basement sequences; map the location of the palaeochannels incised into Proterozoic basement, and be used to define basement conductive features that require follow-up drilling.

CONCLUSIONS AND RECOMMENDATIONS

The TEMPEST survey has defined the Tertiary Tallaringa palaeochannel, however further refinement of the data is required to define drill targets. In the next period of tenure from 18 January 2008 – 17 January 2009 the following work program is recommended. (AEM data - see Government of SA Mineral Resources Website)

Geophysics

- Airborne Gravity Survey is planned. The Bell Geospace airborne platform will be used if it is available. If the airborne system is unavailable a helicopter supported ground survey will be considered.

Drilling

Follow-up drill testing will be completed in an effort to explore

- Prospective palaeochannel sequences hosting sandstone-style uranium mineralisation
- Prospective conductive features located in Proterozoic in the basement sequences, particularly adjacent to the Karari Fault.

Geochemistry

Either calcrete or biogeochemistry is considered warranted to evaluate the potential for precious and basemetals in other geological settings.

INTRODUCTION

The Tallaringa Exploration Licence (EL 3485) is situated in the Tallaringa Conservation Park on the Gawler Craton (Figure 1).

Exploration Licence 3485 covers 958km² and is approximately 150kms west-northwest of Coober Pedy and the sealed Stuart Highway. The Tarcoola to Darwin railway line is approximately 100kms west-northwest of the licence area.

Quasar Resources was granted EL 3485 on 18 January 2006 for a period of two years.

GEOLOGY

The exploration licence is located over ground that forms part of the Northern Gawler Craton. The Gawler Craton is a stable crystalline basement province comprising Archaean to Meso-Proterozoic rocks obscured by Neo-Proterozoic to Cainozoic age sedimentary strata.

EXPLORATION PROGRAMME

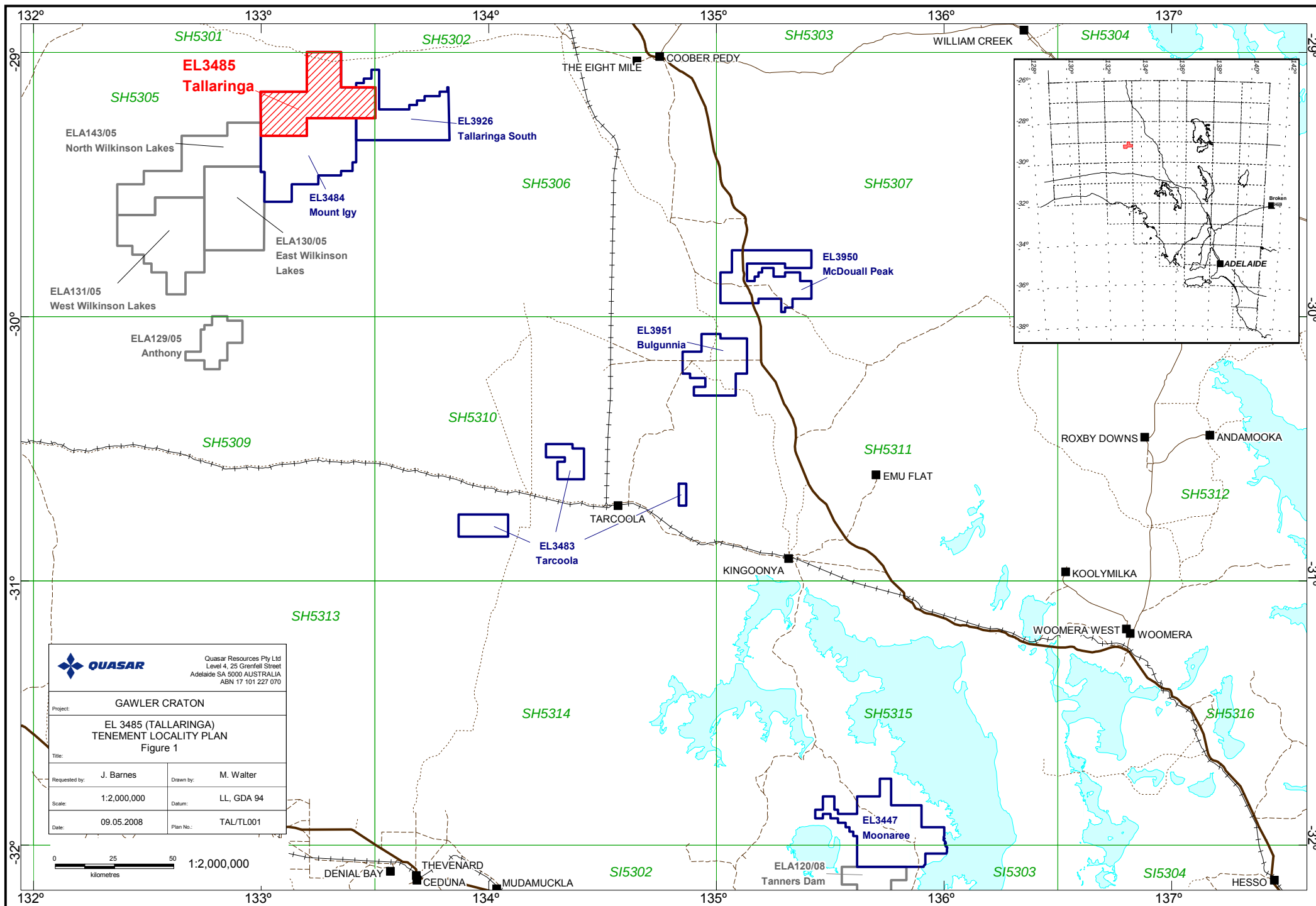
The data from the 1074 line kilometres TEMPEST survey (See Figure 2) which was flown over this exploration licence, has been received and is in the process of being inverted and interpreted, this will take some months to do. Preliminary depth to base of the palaeochannels are shown in Figure 3.

NATIVE TITLE

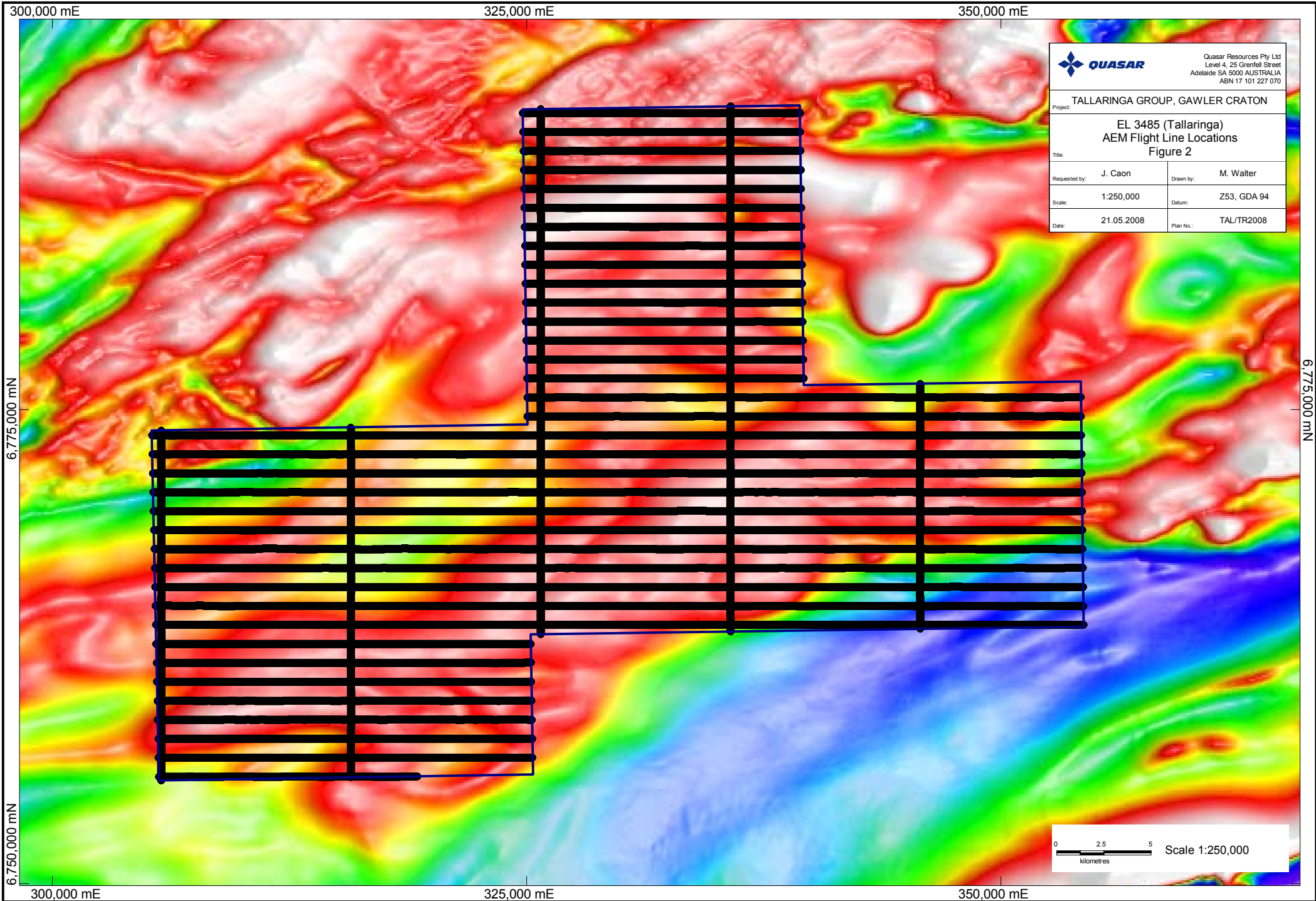
An ILUA for exploration purposes was signed with the Antakirinja Native Title Claimants.

EXPENDITURE

EL 3485 Tallaringa Expenditure 1 February 07 - 31 January 2008	
	\$
Consulting Fees	3716.34
Consulting - Geology	569.80
Consulting - Geophysics	3000.00
Licenses	4053.84
Native Title - Agreement	
Exps	3000.00
Employee Medicals	22.60
Consumable Supplies	16.59
Data & Map Purchases	77.14
Camp - Cost Allocation	268.47
Management Fee	6114.31
Manpower	34427.75
Office Support	1800.00
	<u>\$57,066.84</u>



 Quasar Resources Pty Ltd Level 4, 25 Grenfell Street Adelaide SA 5000 AUSTRALIA ABN 17 101 227 070	
Project: GAWLER CRATON	
Title: EL 3485 (TALLARINGA) TENEMENT LOCALITY PLAN Figure 1	
Requested by: J. Barnes	Drawn by: M. Walter
Scale: 1:2,000,000	Datum: LL, GDA 94
Date: 09.05.2008	Plan No.: TAL/TL001



300,000 mE

325,000 mE

350,000 mE

6,775,000 mN

6,750,000 mN

300,000 mE

325,000 mE

350,000 mE

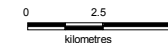
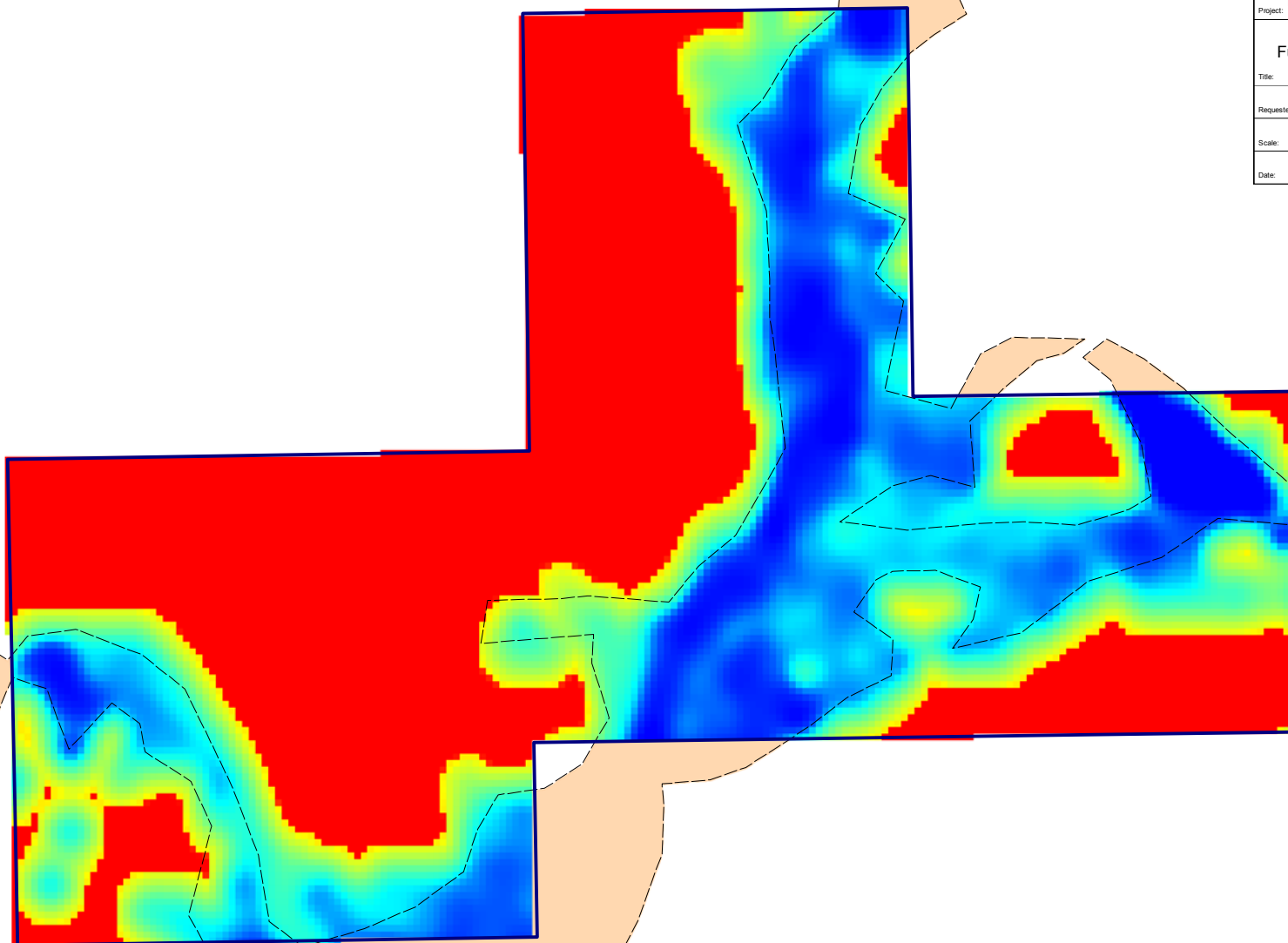


Quasar Resources Pty Ltd
Level 4, 25 Grenfell Street
Adelaide SA 5000 AUSTRALIA
ABN 17 101 227 070

Project: TALLARINGA GROUP, GAWLER CRATON

Title: EL 3485 (Tallaringa)
Fugro TEMPEST (Depth to Base) Image
Figure 3

Requested by:	J. Caon	Drawn by:	M. Walter
Scale:	1:250,000	Datum:	Z53, GDA 94
Date:	21.05.2008	Plan No.:	TAL/TR2008



Scale 1:250,000

6,775,000 mN

**EL 3485 TALLARINGA
ANNUAL TECHNICAL REPORT**

18 January 2008 – 17 January 2009

Quasar Resources Pty Ltd

Author: J Barnes / J Caon

Date:

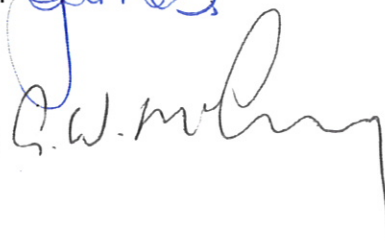
Distribution: Quasar Resources (2)

PIRSA (1)

Submitted By:



Approved By:



CR00008

The contents of this report remain the property of Quasar Resources Pty Ltd and may not be published in whole or in part nor used in a company prospectus without the written consent of the company

TABLE OF CONTENTS

BIBLIOGRAPHIC DATA SHEET	3
SUMMARY.....	4
CONCLUSIONS AND RECOMMENDATIONS	4
1. INTRODUCTION.....	5
2. GEOLOGY	5
3. GEOPHYSICS.....	5
4. NATIVE TITLE	6
5. WOOMERA PROHIBITED AREA	6
6. TALLARINGA CONSERVATION PARK.....	6
7. DEPARTMENT FOR ENVIRONMENT AND HERITAGE (DEH).....	6
8. EXPENDITURE.....	7
9. REFERENCES.....	7

APPENDICES

Appendix 1 – Magnetic and Radiometric Grid Files
(see Government of South Australia Mineral Resources Website)

Appendix 2 – Located Data Files for Magnetic and Radiometric survey
(see Government of South Australia Mineral Resources Website)

Appendix 3 – Logistics Report on Airborne Survey

BIBLIOGRAPHIC DATA SHEET

REPORT TITLE	Tallaringa Project, Exploration Licence 3485 Annual Technical Report for the period 18 January 2008 – 17 January 2009.
PROSPECT NAME	Tallaringa
TENEMENT NUMBER	3485
OWNER	Quasar Resources Pty Ltd
COMMODITIES	Uranium, gold, basemetals
TECTONIC UNITS	Officer Basin, Eucla Basin, Tallaringa Palaeochannel
STRATIGRAPHIC UNITS	Garford Formation, Algebuckina Sandstone
1:250 000 MAP SHEET	Tallaringa SH53-05
1:100 000 MAP SHEET	Tallaringa 5539
MAP GRID	Map Grid of Australia (GDA94) Zone 53
KEYWORDS	Uranium, gold, basemetals, magnetism, radiometrics

SUMMARY

Quasar Resources Pty Ltd holds title to Exploration License 3485 (Tallaringa) located on the northern Gawler Craton, South Australia. This tenement forms part of a joint venture agreement with JAURD International Tallaringa Project Pty Ltd. Quasar is the operator of the project and JAURD are earning a 25% interest in the tenement.

Over 11,000 line kilometres of detailed magnetic and radiometric data were collected in this reporting period. A work area clearance was conducted in the northern part of the tenement by the Antakarinja Land Management Council Native Title Claimants (ALMAC).

CONCLUSIONS AND RECOMMENDATIONS

Delays in Native Title clearances and unforeseen difficulties with obtaining access clearance from Department for Environment and Heritage (DEH) Land Management Branch has slowed aspects of planned exploration activities.

The newly acquired radiometric and magnetic data have been processed and analysed. Areas for followup exploration have been identified. Further processing and interpretation work on the 2003 TEMPEST airborne EM survey data has been undertaken and this has provided better definition of palaeochannel boundaries.

Recommended work in the next period includes calcrete geochemical sample collection at a nominal grid spacing of 800m. Gravity data acquisition at a minimum spacing of 1,000m is also planned. Both these surveys are likely to be helicopter supported. Prior to sampling, an additional work area clearance will be undertaken with ALMAC.

1. INTRODUCTION

The Tallaringa Exploration Licence (EL 3485) is situated in the Tallaringa Conservation Park on the Gawler Craton.

Exploration Licence 3485 covers 958km² and is approximately 150kms west-northwest of Coober Pedy and the sealed Stuart Highway. The Tarcoola to Darwin railway line is approximately 100kms east of the licence area.

Quasar Resources was granted EL 3485 on 18 January 2006 for a period of four years.

2. GEOLOGY

The exploration licence is located over ground that forms part of the Northern Gawler Craton. The Gawler Craton is a stable crystalline basement province comprising Archaean to Meso-Proterozoic rocks obscured by Neo-Proterozoic to Cainozoic age sedimentary strata. These basement rocks represent both source rocks for Tertiary hosted uranium mineralisation and potential host rocks for vein/breccia styles of mineralisation.

3. GEOPHYSICS (see Government of South Australia Mineral Resources Website)

Airborne magnetic and radiometric survey

A detailed, low level airborne geophysical survey was carried out by UTS Geophysics between the 25 November 2008 and 2 February 2009. Magnetic and 256 channel radiometric data were collected with the following specifications;

Line Spacing	100m
Line Direction	000 – 180 degrees
Tie Line Spacing	1,000m
Tie Line Direction	090 – 270 degrees
Nominal Sensor Height	50m
Total Line km	11,025

A Summary of equipment specifications used for the survey are shown below;

Aircraft	• Fixed wing FU24-950, registration: VH-UTR • Cessna, registration: VH-UTW
GPS	• Novatel • 2Hz sample rate
Navigation & Data Recording	• UTS proprietary systems
Altitude – Radar	• Bendix/King KRA-450 Radar Altimeter • 10Hz sample rate
Altitude – Barometric	• Air DB • 10Hz sample rate • 0.01mb resolution
Magnetometer	• Stinger mounted • Cesium Vapour Magnetometer • 10Hz sample rate • 0.001nT resolution
Base Station Magnetometer	• Scintrex Envimag / Geometrics GR-856 • 0.2 Hz sample rate

- | | |
|-------------|---|
| Radiometric | <ul style="list-style-type: none"> • 0.1nT resolution • Exploratum GR820 NaI (TI) • 1Hz sample Rate • 32 litre capacity |
|-------------|---|

Magnetic data is presented as images of the Total Magnetic Intensity and TMI First Vertical Derivative.

Radiometric data is shown in as Total Count and as a ternary image combining the potassium (%), thorium (ppm) and uranium (ppm) data respectively as red, green and blue.

A digital elevation model was also derived from the radar altimeter and GPS data collected an image of this data.

All data can be found in Appendix 1 as Geosoft grid files (*.grd) and Appendix 2 as GDF format ASACII located data files (*.DAT; *.DFN). The 256 channel radiometric data is also included in GDF format in Appendix 2. A full logistics report which details the equipment used, acquisition method and data processing is included in Appendix 3. Field formats of all located ASCII data files are documented in this report titled "B055 Logistics Report.pdf".

Data processing of the magnetic, radiometric and DTM data is detailed in Appendix 3.

4. NATIVE TITLE

A Work Area Clearance was requested from the Antakarinja Land Management Council Native Title Claimants (ALMAC) in October 2008 as part of the planning for on ground exploration activities. This visit was conducted on the 14 – 16 October 2008. Due to large distances of travel and poor planning by ALMAC this survey was not completed and only a portion of this licence was cleared. A further clearance will need to be requested to complete survey.

5. WOOMERA PROHIBITED AREA

This exploration licence is situated on the Woomera Prohibited Area (WPA) a Deed of Access was signed by both parties in 2008 to allow exploration. During this reporting period the WPA placed a "no-go zone" over the top northern portion of the licence area. However the WPA allowed a limited time window for us to complete all survey work as planned.

6. TALLARINGA CONSERVATION PARK

This exploration licence is situated in the Tallaringa Conservation Park which covers an area of 1,246,000 hectares and is located 100 kilometres due west of Coober Pedy. This conservation park lies on the fringe of the Great Victoria Desert and is dominated by vegetated dunes and gibber rises.

7. DEPARTMENT FOR ENVIRONMENT AND HERITAGE (DEH)

Discussions with DEH to obtain access in the Tallaringa Conservation Park continue, but agreement on access conditions could not be finalised during the reporting period.

8. EXPENDITURE

EL 3485 Tallaringa expenditure
1 Feb 08 - 31 January 09

\$

Camp - Cost Allocation	-268.47
Exploration HO - Cost Alloc	403.53
Bank Fees & Charges	21.09
Consulting - Geology	2,189.00
Consulting - Geophysics	200.00
External Services	1,574.83
Data & Map Purchases	104.55
Entertainment - Non Deductible	231.55
Freight & Shipping Charges	72.95
Legal Fees	33,765.25
Management Fee	20,479.60
Manpower	30,607.14
Meetings & Schoolings	42.44
Native Title - Clearances	8,097.86
Office Software & Comp Support	232.91
Rents	13,284.70
Salaries & Wages- Bonus/ICP	5,028.06
Office Support	1,200.00
Surveying-Geophysical Airborne	61,171.84
Travel - Chartered Flights	2,677.50
Travel - Commercial Flights	22,059.86
Travel - M/Vehicle Car Hire	182.15
Travel - M /Vehicle Taxi Fares	173.41
Travel - Accommodation & Meals	4,014.85
Other Expenses - Admin	0.02

Total Tallaringa	<u>\$207,546.62</u>
------------------	---------------------

9. REFERENCES

Barnes, J., EL 3485 Tallaringa Annual Technical Report 17 January 2007 – 18 January 2008



Logistics Report

for a

DETAILED AIRBORNE MAGNETIC, RADIOMETRIC AND DIGITAL TERRAIN SURVEY

for the

TALLARINGA PROJECT

carried out on behalf of

QUASAR RESOURCES PTY LTD

(UTS Job # B055)

FAUNTLEROY AVENUE, PERTH AIRPORT
PO BOX 126, BELMONT WA 6984

Telephone +61 8 9479 4232 Facsimile +61 8 9479 7361
A.B.N. 31 058 054 603



UTS GEOPHYSICS
High Resolution Airborne Surveys



TABLE OF CONTENTS

1	GENERAL SURVEY INFORMATION.....	3
2	SURVEY SPECIFICATIONS.....	3
3	AIRCRAFT AND SURVEY EQUIPMENT	4
	3.1 SURVEY AIRCRAFT.....	5
	3.2 DATA POSITIONING AND FLIGHT NAVIGATION.....	5
	3.3 UTS DATA ACQUISITION SYSTEM AND DIGITAL RECORDING.....	6
	3.4 ALTITUDE READINGS.....	6
	3.5 UTS STINGER MOUNTED MAGNETOMETER SYSTEM.....	6
	3.6 TOTAL FIELD MAGNETOMETER	7
	3.7 THREE COMPONENT VECTOR MAGNETOMETER.....	7
	3.8 AIRCRAFT MAGNETIC COMPENSATION	7
	3.9 DIURNAL MONITORING MAGNETOMETER	8
	3.10 BAROMETRIC ALTITUDE.....	8
	3.11 TEMPERATURE AND HUMIDITY	9
	3.12 RADIOMETRIC DATA ACQUISITION.....	9
4	PROJECT MANAGEMENT	10
5	DATA PROCESSING PROCEDURES	11
	5.1 DATA PRE-PROCESSING.....	11
	5.2 MAGNETIC DATA PROCESSING	12
	5.3 RADIOMETRIC DATA PROCESSING	13
	5.4 DIGITAL TERRAIN MODEL DATA PROCESSING.....	14
6	APPENDIX A - LOCATED DATA FORMATS	15
7	APPENDIX B - COORDINATE SYSTEM DETAILS.....	18
8	APPENDIX C - SURVEY BOUNDARY DETAILS	19
9	APPENDIX D - PROJECT DATA OVERVIEW.....	20
10	APPENDIX E – PROCESSING PARAMETERS	23

1 GENERAL SURVEY INFORMATION

UTS Geophysics conducted a low level airborne geophysical survey for the following company:

Quasar Resources Pty Ltd
Suite 2, Level 4, 25 Grenfell Street
ADELADE SA 5000

Acquisition for this survey commenced on the 25th November 2008 and was completed on the 01st January 2009. The base location used for operating the aircraft and performing in-field quality control was Coober Pedy, South Australia.

2 SURVEY SPECIFICATIONS

The area surveyed was approximately 110km out of Coober Pedy, South Australia. The survey was flown using the MGA94 coordinate system (a Universal Transverse Mercator projection) derived from the Geocentric Datum of Australia and was contained within zone 53 with a central meridian of 135 degrees. Details of the datum and projection system are provided in Appendix B of this report. Survey boundary coordinates are listed in Appendix C.

The survey data acquisition specifications for each area flown are specified in the following table:

PROJECT NAME	LINE SPACING	LINE DIRECTION	TIE LINE SPACING	TIE LINE DIRECTION	SENSOR HEIGHT	TOTAL LINE KM
Tallaringa	100m	000-180	1000m	090-270	50m	43,003
TOTAL						43,003

The specified sensor height for the magnetic samples is as stated in the above table. This sensor height may be varied where topographic relief or laws pertaining to built up areas do not allow this altitude to be maintained, or where the safety of the aircraft and equipment is endangered.

3 AIRCRAFT AND SURVEY EQUIPMENT

The UTS navigation flight control computer, data acquisition system and geophysical sensors were installed into a specialised geophysical survey aircraft.

The list of geophysical and navigation equipment used for the survey is as follows:

General Survey Equipment

- UTS proprietary flight planning and survey navigation system.
- UTS proprietary high speed digital data acquisition system.
- Novatel, 12 channel precision navigation GPS.
- OMNISTAR real time differential GPS system.
- UTS LCD pilot navigation display and external track guidance display.
- UTS post mission data verification and processing system.
- Bendix/King KRA-405 radar altimeter.

Magnetic Data Acquisition Equipment

- UTS tail stinger magnetometer installation.
- Cesium Vapour total field magnetometer.
- Fluxgate three component vector magnetometer.
- RMS Aeromagnetic Automatic Digital Compensator (AADC II).
- Diurnal monitoring magnetometer (Scintrex Envimag or Geometrics GR-856).

Radiometric Data Acquisition Equipment

- Exploranium GR-820 gamma ray spectrometer.
- Exploranium gamma ray detectors.
- Barometric altimeter (height and pressure measurements).
- Temperature and humidity sensor.

3.1 Survey Aircraft

The aircraft used for this survey was a FU24-950 series fixed wing survey aircraft, owned and operated by UTS Geophysics, registration VH-UTR. The specifications are as follows:

Power Plant

- Engine Type Single engine, Lycoming, IO-720
- Brake Horse Power 400 bhp
- Fuel Type AV-GAS

Performance

- Cruise speed 105 Kn
- Survey speed 100 Kn
- Stall speed 45 Kn
- Range 970 Km
- Endurance (no reserves) 5.6 hours
- Fuel tank capacity 490 litres



3.2 Data Positioning and Flight Navigation

Survey data positioning and flight line navigation was derived using real-time differential GPS (Global Positioning System).

Navigation was performed using a UTS designed and built electronic pilot navigation system providing computer controlled digital navigation instrumentation mounted in the cockpit as well as an externally mounted track guidance system.

GPS derived positions were used to provide both aircraft navigation and survey data location information.

The GPS systems used for the survey were:

- Aircraft GPS Model Novatel
- Sample rate 0.5 Seconds (2 Hz)
- GPS satellite tracking channels 12 parallel
- Typical differentially corrected accuracy 1-2 metres (horizontal)
3-5 metres (vertical)

3.3 UTS Data Acquisition System and Digital Recording

All geophysical sensor data and positional information measured during the survey was recorded using a UTS developed, high speed, precision data acquisition system. Survey data was downloaded onto magnetic tape on completion of each survey flight.

Instrument synchronisation times were measured and removed in real-time by the UTS data acquisition system.

3.4 Altitude Readings

Accurate survey heights above the terrain were measured using a King radar altimeter installed in the aircraft. The height of each survey data point was measured by the radar altimeter and stored by the UTS data acquisition system.

- Radar altimeter models Bendix/King KRA-405
- Accuracy 0.3 metres
- Resolution 0.1 metres
- Range 0 - 762 metres
- Sample rate 0.1 Seconds (10Hz)

The digital terrain model is calculated by subtracting the terrain clearance (radar altimeter) from the GPS height (interpolated to 0.1 Hz), and as such the accuracy is constrained by the differentially corrected GPS position.

3.5 UTS Stinger Mounted Magnetometer System

The installation platform used for the acquisition of magnetic data was a tail mounted stinger. This proprietary stinger system was constructed of carbon fibre and designed for maximum rigidity and stability.

Both the total field magnetometer and three component vector magnetometer were located within the tail stinger.



3.6 *Total Field Magnetometer*

Total field magnetic data readings for the survey were made using a Cesium Vapour Magnetometer. This precision sensor has the following specifications:



- Model Cesium Vapour Magnetometer
- Sample Rate 0.1 seconds (10Hz)
- Resolution 0.001nT
- Operating Range 15,000nT to 100,000nT

3.7 *Three Component Vector Magnetometer*

Three component vector magnetic data readings for the survey were made using a Fluxgate Magnetometer. This precision sensor has the following specifications:

- Model Fluxgate Magnetometer
- Sample Rate 0.1 seconds (10Hz)
- Resolution 0.1nT
- Operating Range -100,000nT to 100,000nT

3.8 *Aircraft Magnetic Compensation*

At the start of the survey, the system was calibrated for reduction of magnetic heading error. The heading and manoeuvre effects of the aircraft on the magnetic data was removed using an RMS Automatic Airborne Digital Compensator (AADC II).

Calibration of the aircraft heading effects were measured by flying a series of pitch, roll and yaw manoeuvres at high altitude while monitoring changes in the three axis magnetometer and the effect on total field readings. A 26 term model of the aircraft magnetic noise covering permanent, induced and eddy current fields was determined. These coefficients were then applied to the data collected during the survey in real-time.

UTS static compensation techniques were also employed to reduce the initial magnetic effects of the aircraft upon the survey data.

3.9 Diurnal Monitoring Magnetometer

A base station magnetometer was located in a low gradient area beyond the region of influence of any man made interference to monitor diurnal variations during the survey.

The specifications for the magnetometer used are as follows:

- Model Scintrex Envimag or Geometrics GR-856
- Resolution 0.1 nT
- Sample interval 5 seconds (0.2 Hz)
- Operating range 20,000nT to 90,000nT
- Temperature -20°C to +50°C



3.10 Barometric Altitude

An Air DB barometric altimeter was installed in the aircraft so as to record and monitor barometric height and pressure. The data was recorded at 0.10 second intervals and is used for the reduction of the radiometric data.

- Model Air DB barometric altimeter
- Accuracy 2 metres
- Height resolution 0.1 metres
- Height range 0 - 3500 metres
- Maximum operating pressure: 1,300 mb
- Pressure resolution: 0.01 mb
- Sample rate 10 Hz

3.11 Temperature and Humidity

Temperature and humidity measurements were made during the survey at a sample rate of 10Hz. Ambient temperature was measured with a resolution of 0.1 degree Celsius and ambient humidity to a resolution of 0.1 percent.

3.12 Radiometric Data Acquisition

The gamma ray spectrometer used for the survey was capable of recording 256 channels and was self stabilising in order to minimise spectral drift. The detectors used contain thallium activated sodium iodide crystals.

Thorium source measurements were made each survey day to monitor system resolution and sensitivity. A calibration line was also flown at the start and end of each survey day to monitor ground moisture levels and system performance.

Spectrometer model	Exploranium GR820
• Detector volume	32 litres
• Sample rate	1 Hz



4 PROJECT MANAGEMENT

Quasar Resources PTY LTD

John Caon

UTS Geophysics Perth Office

Nino Tuffilli
David Abbott
Cameron Johnston
Rebecca Steadman

5 DATA PROCESSING PROCEDURES

5.1 *Data Pre-processing*

The raw survey data was loaded from the field tapes and the recorded data trimmed to the correct survey boundary extents. Any survey lines subsequently reflight were removed from the dataset.

At the commencement of each acquisition flight, all the instrumentation clocks were synchronized to local time, and the error and latency of each instrument in providing its data measurement calculated. The results of these latency measurements were recorded into a synchronisation file, and the results used to assign GPS positions to the magnetic, radiometric and elevation data.

The synchronized, parallax corrected data was then exported as located ASCII data.

5.2 Magnetic Data Processing

The diurnal base station data was checked for spikes and steps, and suitably filtered prior to the removal of diurnal variations from the aircraft magnetic data.

The filtered diurnal measurements were subtracted from the diurnal base field and the residual corrections applied to the survey data by synchronising the diurnal data time and the aircraft survey time. The average diurnal base station value was added to the survey data.

The X and Y positioning of the data was then checked for spikes before applying the IGRF correction. Any spikes in the positions were manually edited. The updated IGRF 2005 correction was calculated at each data point (taking into account the height above sea level).

This regional magnetic gradient was subtracted from the survey data points.

Tie line levelling was applied to the data by least squares minimisation, using a polynomial fit of order 0, of the differences in magnetic values at the crossover points of the survey traverse and tie line data.

In order to remove any residual long wavelength variations in the tie line levelled data along the traverse lines, polynomial levelling was then applied.

Final micro-levelling techniques were then selectively applied to the tie line levelled data to remove minor residual variations in profile intensity

Located and gridded data were generated from the final processed magnetic data.

5.3 Radiometric Data Processing

Statistical noise reduction of the 256 channel data was performed using the Noise Adjusted Singular Variable Decomposition (NASVD) method described by Hovgaard and Grasty (1997).

Noise-adjusted singular value decomposition is performed, and the number of components to be used is determined by inspection of plots of the spectral components and by a statistical analysis of the contributions of the components. If the spectral shapes show any unusual characteristics, further analysis of the concentrations of the spectral components in the line data is performed in order to identify and eliminate any corrupt spectra. If such spectra were eliminated, the NASVD process is re-performed, in order to obtain spectral components free of any bias from corrupt spectra.

Only the dominant spectral shapes (identified as described above) were used in the spectral reconstruction process. The first 8 NASVD components were used for this process.

Channels 30-250 only are spectrally smoothed, as these contain the regions of interest and are not dominated by the lower end of the Compton continuum. The energy spectrum between the potassium and thorium peaks was recalibrated from the spectrally smoothed 256 channel measurements.

The aircraft background spectrum and the scaled unit cosmic spectrum were then subtracted from the 256 channel data. This 256 channel data was then windowed to the 5 primary channels of total count, potassium, uranium, thorium and low-energy uranium. Dead time corrections were then applied to the data. Radon background removal was performed using the Minty Spectral Ratio method (1992).

The radar altimeter data was corrected to standard temperature and pressure, and height corrected spectral stripping was then applied to the windowed data. Height attenuation corrections based on the STP radar altimeter were then performed to remove any altitude variation effects from the data.

The Uranium and Total Count channels were tie-levelled to remove the effects of residual radon background. The tie-levelling process employed was a least-squares/median filter procedure, which generated a single correction for each line of data. Mis-matches were calculated at each tie-traverse intersection and the median mismatch for each flight line was calculated as the residual levelling error for that line.

Final micro-levelling techniques were then selectively applied to the tie line levelled data to remove minor residual variations in profile intensities, as per the method outlined for magnetic data micro-levelling in 7.2 above.

5.4 *Digital Terrain Model Data Processing*

The radar altimeter data was subtracted from the GPS altimeter data leaving digital terrain data.

The digital terrain data thus derived was tie line levelled and gridded. Tie line levelled data was then examined and selectively microlevelled to produce a grid without line dependent artifacts.

For further information concerning the survey flown, please contact the following office:

Head Office Address:

UTS Geophysics
Fauntleroy Avenue, Perth Airport
REDCLIFFE WA 6104

Tel: +61 8 9479 4232
Fax: +61 8 9479 7361

Postal Address:

UTS Geophysics
P.O. Box 126
BELMONT WA 6984

Quoting reference number: B055

6 APPENDIX A - LOCATED DATA FORMATS

MAGNETIC LOCATED DATA

FIELD FORMAT DESCRIPTION			UNITS
1	I8	LINE NUMBER	
2	I4	FLIGHT/AREA NUMBER	AAFF (Area/Flight)
3	I9	DATE	YYMMDD
4	F10.1	TIME	sec
5	I8	FIDUCIAL NUMBER	
6	I4	UTM ZONE	
7	F12.6	LATITUDE (WGS84)	degrees
8	F12.6	LONGITUDE (WGS84)	degrees
9	F12.2	EASTING (MGA94)	metres
10	F12.2	NORTHING (MGA94)	metres
11	F8.1	RADAR ALTIMETER HEIGHT	metres
12	F8.1	GPS HEIGHT (WGS84)	metres
13	F8.1	TERRAIN HEIGHT (WGS84)	metres
14	F10.3	RAW MAGNETIC INTENSITY	nT
15	F10.3	DIURNAL CORRECTED TMI	nT
16	F10.3	DIURNAL AND IGRF CORRECTED TMI	nT
17	F10.3	TIE LINE LEVELLED TMI	nT
18	F10.3	FINAL TOTAL MAGNETIC INTENSITY	nT

RADIOMETRIC LOCATED DATA

FIELD FORMAT DESCRIPTION			UNITS
1	I8	LINE NUMBER	
2	4	FLIGHT/AREA NUMBER	AAFF (Area/Flight)
3	I9	DATE	YYMMDD
4	F10.1	TIME	sec
5	I8	FIDUCIAL NUMBER	
6	I4	UTM ZONE	
7	F12.6	LATITUDE (WGS84)	degrees
8	F12.6	LONGITUDE (WGS84)	degrees
9	F12.2	EASTING (MGA94)	metres
10	F12.2	NORTHING (MGA94)	metres
11	F8.1	RADAR ALTIMETER HEIGHT	metres
12	F8.1	GPS HEIGHT (WGS84)	metres
13	I5	LIVE TIME	milli sec
14	F8.1	PRESSURE	hPa
15	F6.1	TEMPERATURE	Degrees Celcius
16	F6.1	HUMIDITY	percent
17	I6	TOTAL COUNT (RAW)	Counts/sec
18	I6	POTASSIUM (RAW)	Counts/sec
19	I6	URANIUM (RAW)	Counts/sec
20	I6	THORIUM (RAW)	Counts/sec
21	I6	COSMIC (RAW)	Counts/sec
22	F8.1	TOTAL COUNT (CORRECTED)	Counts/sec
23	F8.1	POTASSIUM (CORRECTED)	Counts/sec
24	F8.1	URANIUM (CORRECTED)	Counts/sec
25	F8.1	THORIUM (CORRECTED)	Counts/sec
26	F9.4	DOSE RATE	nGy/hr
27	F9.4	POTASSIUM GRND CONCENTRATION	%
28	F9.4	URANIUM GRND CONCENTRATION	ppm
29	F9.4	THORIUM GRND CONCENTRATION	ppm

GRIDDED DATASET FORMATS

Gridding was performed using a bicubic spline algorithm.

The following grid formats have been provided:

- ER-Mapper format

LINE NUMBER FORMATS

Line numbers are identified with a six digit composite line number and have the following format - AALLLLB, where:

A or AA	Survey area number
LLLL	Survey line number 0001-8999 reserved for traverse lines 9001-9999 reserved for tie lines
B	Line attempt number, 0 is attempt 1, 1 is attempt 2 etc..

UTS FILE NAMING FORMATS

Located and gridded data provided by UTS Geophysics uses the following 8 character file naming convention to be compatible with PC DOS based systems.

File names have the following general format - JJJJAABB.EEE, where:

JJJJ	UTS Job number
AA	Area number if the survey is broken into blocks
BB	M Magnetic data R Radiometric data TC Total count data K Potassium counts U Uranium counts Th Thorium counts DT Digital terrain data
EEE	File name extension DAT Located digital data file DFN Located data definition file ERS Ermapper gridded data header file Ermapper data portion has no extension GRD Geosoft gridded data file

7 APPENDIX B - COORDINATE SYSTEM DETAILS

Locations for the survey data are provided in both geographical latitude and longitude and Universal Transverse Mercator metric projection coordinate systems.

WGS84

Coordinate Type
Semi Major Axis
Flattening

World Geodetic System 1984
Geographical
6378137m
1/298.257223563

MGA94

Coordinate type
Geodetic datum
Semi major axis
Flattening

Map Grid of Australia 1994
Universal Transverse Mercator Projection Grid
Geocentric Datum of Australia
6378137m
1/298.257222101

8 APPENDIX C - SURVEY BOUNDARY DETAILS

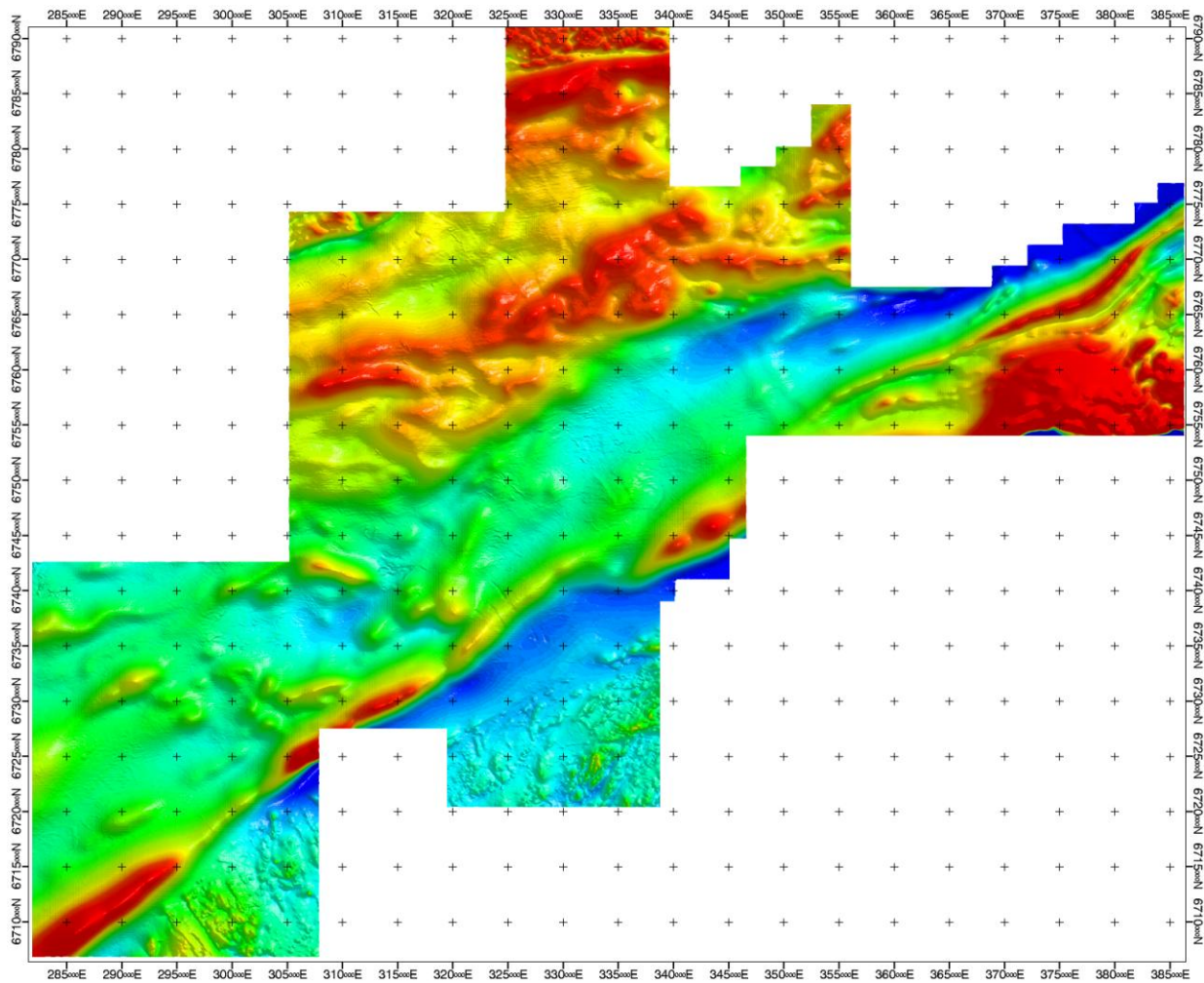
COORDINATES REPORT
Job: B055
Client: Quasar Resources PTY LTD
Grid Zone: 53

Surround	
324700.000	6791000.000
339700.000	6791000.000
339700.000	6776600.000
346000.000	6776600.000
346000.000	6778400.000
349200.000	6778400.000
349200.000	6780200.000
352400.000	6780200.000
352400.000	6784000.000
356100.000	6784000.000
356100.000	6767500.000
368800.000	6767500.000
368800.000	6769400.000
372000.000	6769400.000
372000.000	6771300.000
375200.000	6771300.000
375200.000	6773200.000
381700.000	6773200.000
381700.000	6775100.000
383800.000	6775100.000
383800.000	6776900.000
386300.000	6776900.000
386300.000	6754100.000
346600.000	6754100.000
346600.000	6744800.000
345100.000	6744800.000
345100.000	6741100.000
340200.000	6741100.000
340200.000	6739100.000
338800.000	6739100.000
338800.000	6720500.000
319400.000	6720500.000
319400.000	6727600.000
307900.000	6727600.000
307900.000	6706900.000
281800.000	6706900.000
281800.000	6742600.000
305100.000	6742600.000
305100.000	6774300.000
324700.000	6774300.000
324700.000	6791000.000

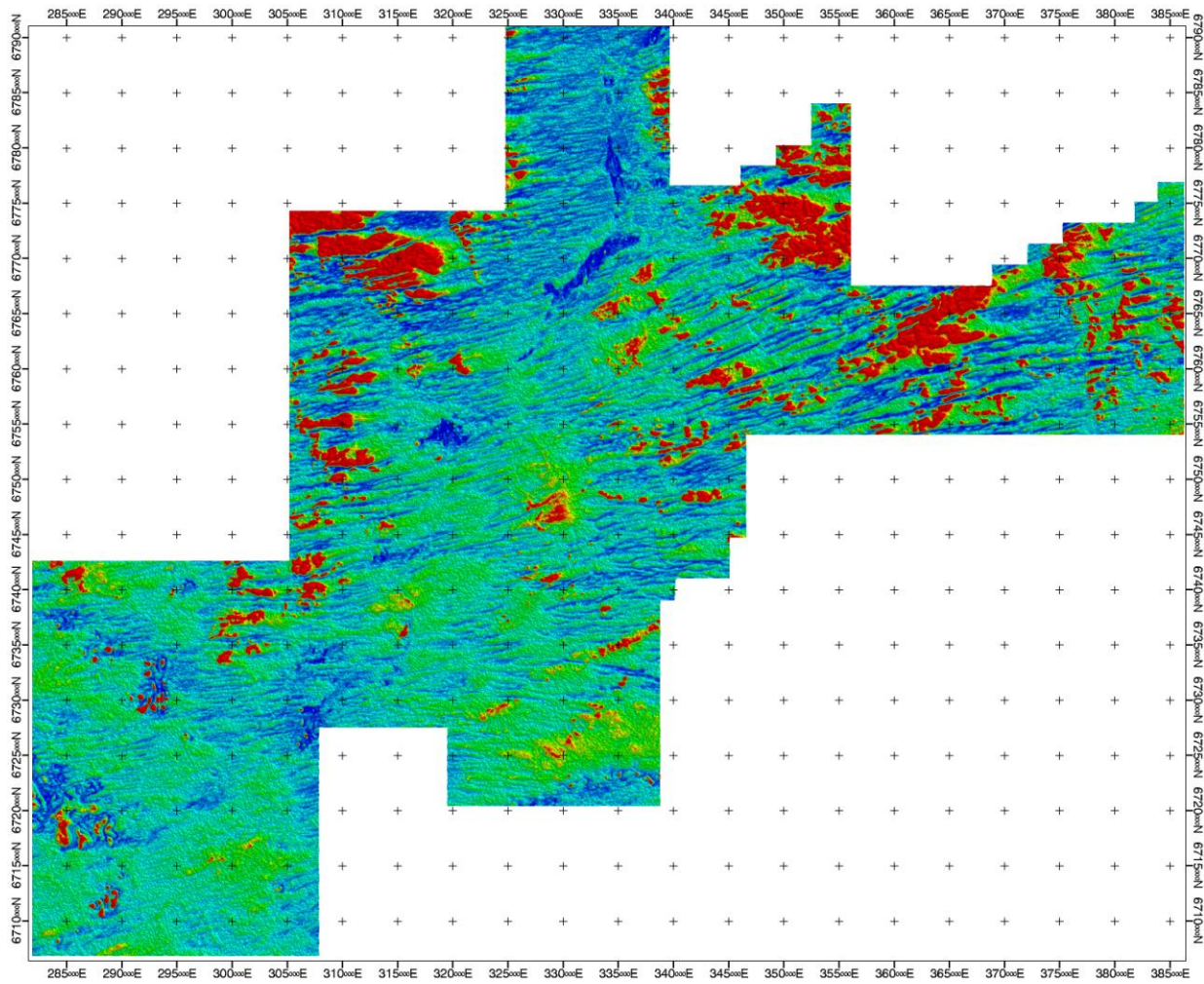
9 APPENDIX D - PROJECT DATA OVERVIEW

Tallaringa Project

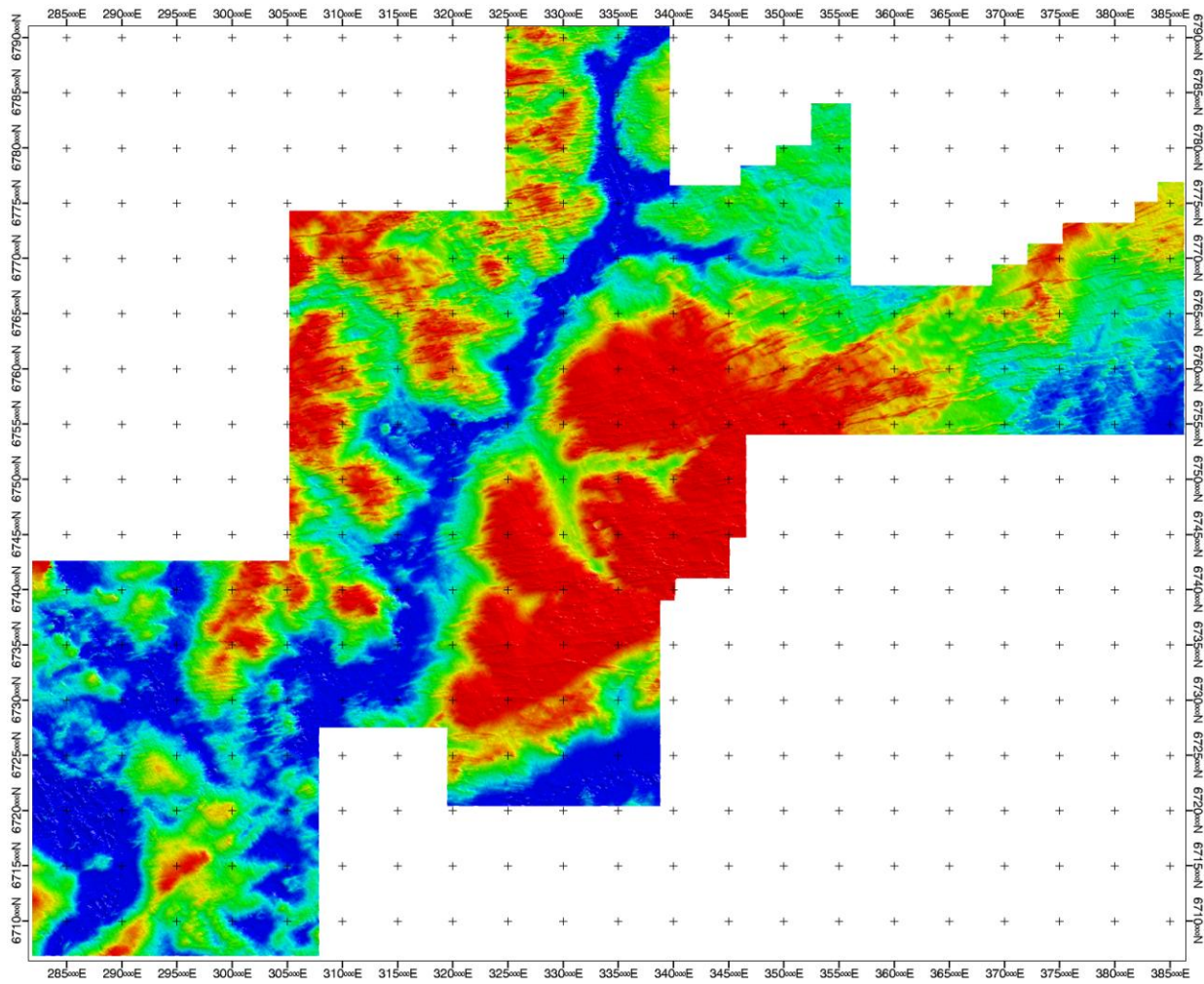
Total Magnetic Intensity



Radiometric Total Count



Digital Terrain Model



10 APPENDIX E – PROCESSING PARAMETERS

Magnetic Processing Parameters

IGRF Date:	IGRF 2008.96
Average Declination:	5.44 degrees
Average Inclination:	-62.49 degrees
Average Field strength:	57000.00 nT
Average diurnal:	55900.00 nT

Radiometric Processing Parameters

Height Attenuation Coefficients

Total Count:	-0.0074
Potassium:	-0.0094
Uranium:	-0.0084
Thorium:	-0.0074

Cosmic Correction Coefficients

Total Count:	0.8662
Potassium:	0.0466
Uranium:	0.0462
Thorium:	0.0486

Aircraft Background Coefficients

Total Count:	33.69
Potassium:	9.27
Uranium:	0.59
Thorium:	0.05

Sensitivity Coefficients

Total Count:	39.70 cps/dose rate
Potassium:	163.65 cps/%k
Uranium:	14.65 cps/ppm
Thorium:	7.86cps/ppm

Radiometric Stripping Coefficients

Alpha:	0.227
Beta:	0.378
Gamma:	0.708
a:	0.0682

Final Reduction - All data reduced to STP height datum 50m