Annual Report for Period Ending 26 February, 2008

Exploration License 22440

Licensees: Grant Archer, Demetrios Kastrissios, David Langley

Area: Mount Evelyn Standard 1:250,000 sheet (SD53-5)
Ranford Hill Standard 1:100,000 sheet (5370)

Date: 22 June 2008

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Summary and Recommendations

A significant amount of effort and expenditure was put into the planning, superintendence, execution and preliminary interpretation of geophysical surveys over the period. A new airborne EM survey using the RepTEM system was carried during the period by external contractor GPX Geophysics at the cost of $39494 (ex-gst).
In addition, a new airborne magnetics and radiometrics survey was flown by external contractor UTS Geophysics over part of EL22440 at the cost of $5624 (ex-gst) making a grand total of $45118 (ex-gst) paid to external airborne contractors.

A six day field trip to locate tracks was successfully conduced during the period.

Significant effort was put into mineral exploration business planning activities related directly to EL22440.

Final results of current geophysical interpretation that is being carried out will lead to recommendations of a drilling program for the new year. A $100,000 budget has been allocated to a drilling program in the new year and is subject to clearances. Other exploration expenditure is expected to be a minimum of $30,000 and includes field work, interpretation by consultants and geochemical analysis.

Tenement Location

EL22440 is located within the western boundary of the Ranford Hill 1:100,000 map sheet in the Northern Territory. The EL consists of 12 graticule blocks and is located approximately 30km East-NorthEast of the township Pine Creek and 80km North-NorthEast of Katherine, both townships situated on the Stuart Highway. Figure 1 displays a map of the tenement location.

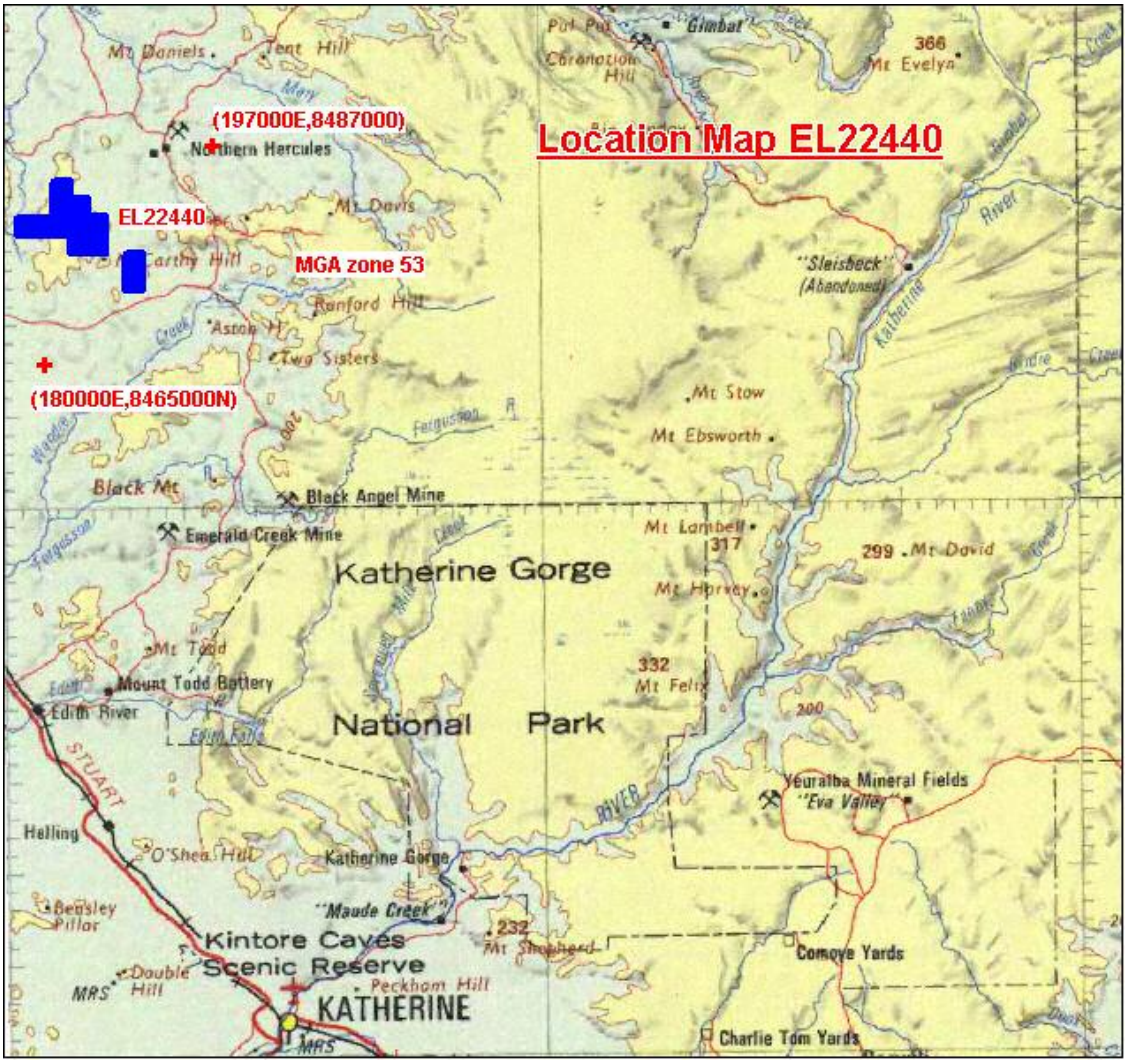


Figure 1 Location map of tenement EL22440

Commodity focus and Geology

Primary commodities being explored for are base metals, particularly lead/zinc/silver, iron ore and gold deposits. Numerous mineral deposit occurrences exist in the general wider region.

Mapped geology of the EL 22440 local area consists of the Mount Paltridge Group (Wildman siltstone and Mundogie sandstone) and the South Aligator Group (Mount Bonnie Formation, Gerowie Tuff and Koolpin Formation) and Zamu dolerite. The Allamber and McCarthys granite contacts occur in the western and southern regions of the tenement.

A detailed account of local geology by Melville (1995) is given in appendix 1 of this report.

Results of Work Completed

A significant amount of effort and expenditure was put into the planning, superintendence, execution and preliminary interpretation of geophysical surveys over the period. In addition a six day field trip to locate tracks was conduced and significant effort was put into mineral exploration business planning activities related directly to EL22440.

A new airborne EM survey using the RepTEM system was carried during the period by external contractor GPX Geophysics. The helicopter borne survey consisted of 190km of data covering most of the license at a cost of $39494 (ex-gst). Magnetics and radar data were also collected during the survey. With the permission of tenement EL24539 holders, two lines of data were also collected on property EL24539, which abuts EL22440 to the north. This represented only a small part of the total survey actually flown for EL22440. Appendix 2 contains the GPX Geophysics logistics report.

In addition, a new airborne magnetics and radiometrics survey was flown by external contractor UTS Geophysics over part of EL22440. These data also resulted in digital terrain model data. This survey was actually flown also in conjunction with a survey flown for tenement EL24539, with permission of tenement EL24539 holders. This resulted in a total of 138 line km of new data in the northern part of tenement EL22440.

The cost of this survey was $5624 (ex-gst). This made a grand total of $45118 (ex-gst) paid to external airborne contractors.

The digital versions of new airborne survey data will be submitted to the NTGS within 6 months of availability of these data, and this is imminent.

The newly available airborne data are still currently under synthesis with consultants within the group, and conclusions for submissions still need to be finalized before any results are able to be reported. These activities include geophysical data and image processing, data interpretation and modeling. It is reported at this stage however, that significant enough conductivity contrasts have been observed in the new EM data to assist in interpretation. Appendices 2 and 3 show example conductivity depth sections. Final results of this data synthesis will lead to recommendations for a drilling program to be carried out during the new period. A budget of $100,000 has been allocated for drilling, subject to the necessary clearances.
It is expected that follow up geochemical and geophysical survey work recommendations will result from analysis.

A field trip was conducted at the end of September 2007. The purpose of this trip was to located tracks within the license and this was a successful exercise.

Numerous hours was spent towards mineral exploration business planning activities related directly to EL22440. Results were tangible and will greatly assist in advancing exploration with a focus on a drilling program during the new year.

Significant expenditure of $135000 is planned for the new year, which includes a $100000 budget for drilling.

Expenditure 4th Year annual report

	Cost (ex-gst)
Airborne EM survey	39494
Aeromagnetics and radiometrics	5624
Field work	2520
Literature search	900
Database compilation	1100
Computer Modeling	2400
Reprocessing of data	2500
General Research	1400
Report compilation	1000
Administration	1100
Total ex-gst	$58,038

Planned Expenditure and proposed program for Year 5

The expectation is to focus on a drilling program during year 5, subject to the necessary clearances required. The drilling program will be driven by results of geophysical analysis currently underway.

In addition it is expected that field work, geochemical analysis and geophysical and geological consultant work will be carried out during the period. Field work will include attendance at drill sites, geological mapping and sample collection. Geochemical work will include laboratory analysis of drill rock samples and follow up surface reconnaissance. Consultant work will include the services of geophysicist Grant Archer and geologist Rodney Boucher, in interpretation.

Planned expenditure:

	Cost (EX-GST)
Drilling (subject to clearances)	100000
Geochemical Analysis	5000
Field work	10000
Consultants work	15000 (minimum)
	Total $130,000

Appendix 1

Reference: Melville, P.M. (1995) "Final Report for Exploration License 7054 McCarthys Area, Northern Territory 07.12.90 – 06.12.94", pages 8-9, Report for Northern Territory Department of Mines and Energy, CR19950197.

EL22440 local geology. Extracts taken from Melville.

"**Mundogie Sandstone**

The Mundogie Sandstone consists of coarse grained fe quartz sandstones and pebble conglomerate. It forms a prominent topographic high feature with rugged and deeply incised streams draining from it. On the contact with the Wildman Siltstone a strongly ferruginous, brecciated, gossanous and quartz veined horizon is occasionally developed. Secondary ferruginization is ubiquitous in these instances often forming the framework within the sandstones and breccias. This horizon is conformable and can be mapped over a considerable strike length. It is interpreted to be a décollement structure. A relic boxwork texture is observed at times and contributes to the strong ferruginous alteration. Quartz veining in this horizon is multiphased and stockworked in appearance and also often affected by later tectonic brecciation."

"Wildman Siltstone

This unit predominantly comprises siltstones and carbonaceous phyllite and forms areas of relatively gentle undulating relief. A strong cleavage is developed in these rocks and exposed bedrock is typically stained by iron oxide. The McCarthy's Mine is hosted by the Wildman Siltstone. A distinctive haematite rich horizon can be traced within the unit over most of the licence area. It is interpreted to be a lateral equivalent of the iron ore deposits at Frances Creek and is locally termed, Frances Creek beds."

"Koolpin Formation

The Koolpin Formation forms the topographic high ridge lines. On the limbs of the Spider Anticline these ridges are flat topped and have cliff like drop offs along the edges. Silicification as a result of weathering phenomena has strongly altered these rocks although the original texture and nature can still be discerned. The Koolpin predominantly comprise carbonaceous mudstone but has chert, ironstone and phyllite interbeds. A commonly exposed ironstone interbed is characterised by the presence of sugary and nodular cherty bands which resemble the 15 ironstone horizon as known within the Middle Koolpin Formation in the Mt Bonnie and Burrundie Dome regions. The nodular chert ironstone horizon often forms the steep drops along the edges of the ridge. Strong secondary silicification in conjunction with ferruginization within this bed make it particularly resistant to erosion. Ferruginization within the Koolpin Formation is a common feature. Boxwork textures as disseminations and within fractures is often observed throughout but is particularly concentrated along cherty and ironstone horizons."

"Gerowie Tuff

The Gerowie Tuff comprises light brown siliceous siltstones, argillites and albitic cherts These rocks, along with the Mt Bonnie Formation, form a series of relatively low undulating hills that are well incised by a perennial drainage system. Very thin skeletal soils develop over the Gerowie Tuff and rock types are difficult to discern through the effects of weathering on similarly textured and coloured lithologies.

Mt Bonnie Formation

The Mt Bonnie Formation superficially, at least, resemble the Gerowie Tuff in it's occurrence and nature. Siliceous siltstones, slates, argillites, cherts, and greywackes are observed. Areas of well incised but low relief are formed and thin skeletal soils are commonly developed."

“Burrell Creek Formation

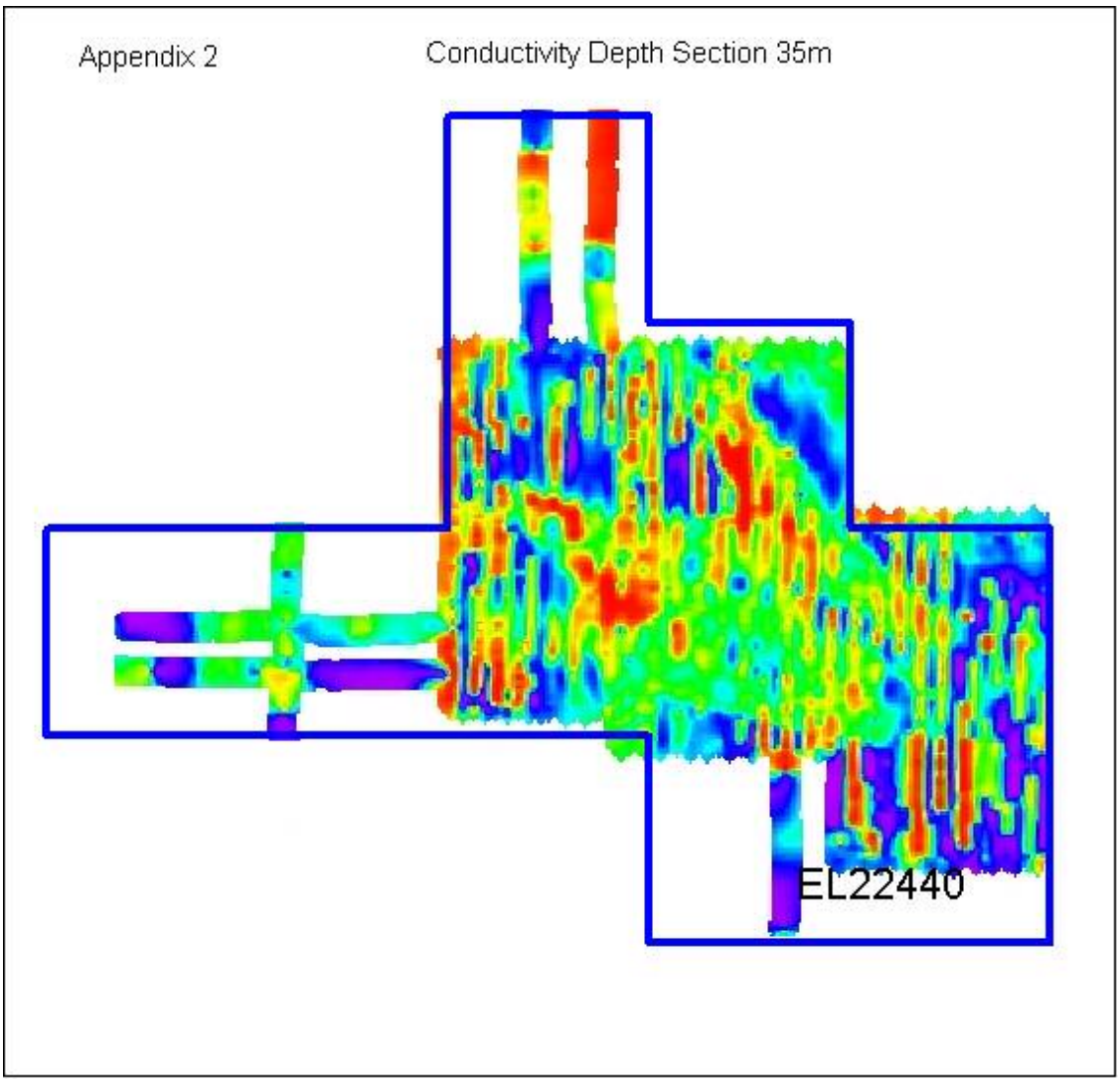
The Burrell Creek Formation is typified by feispathic greywacke, slates and siltstones.”

“Zamu Dolerite

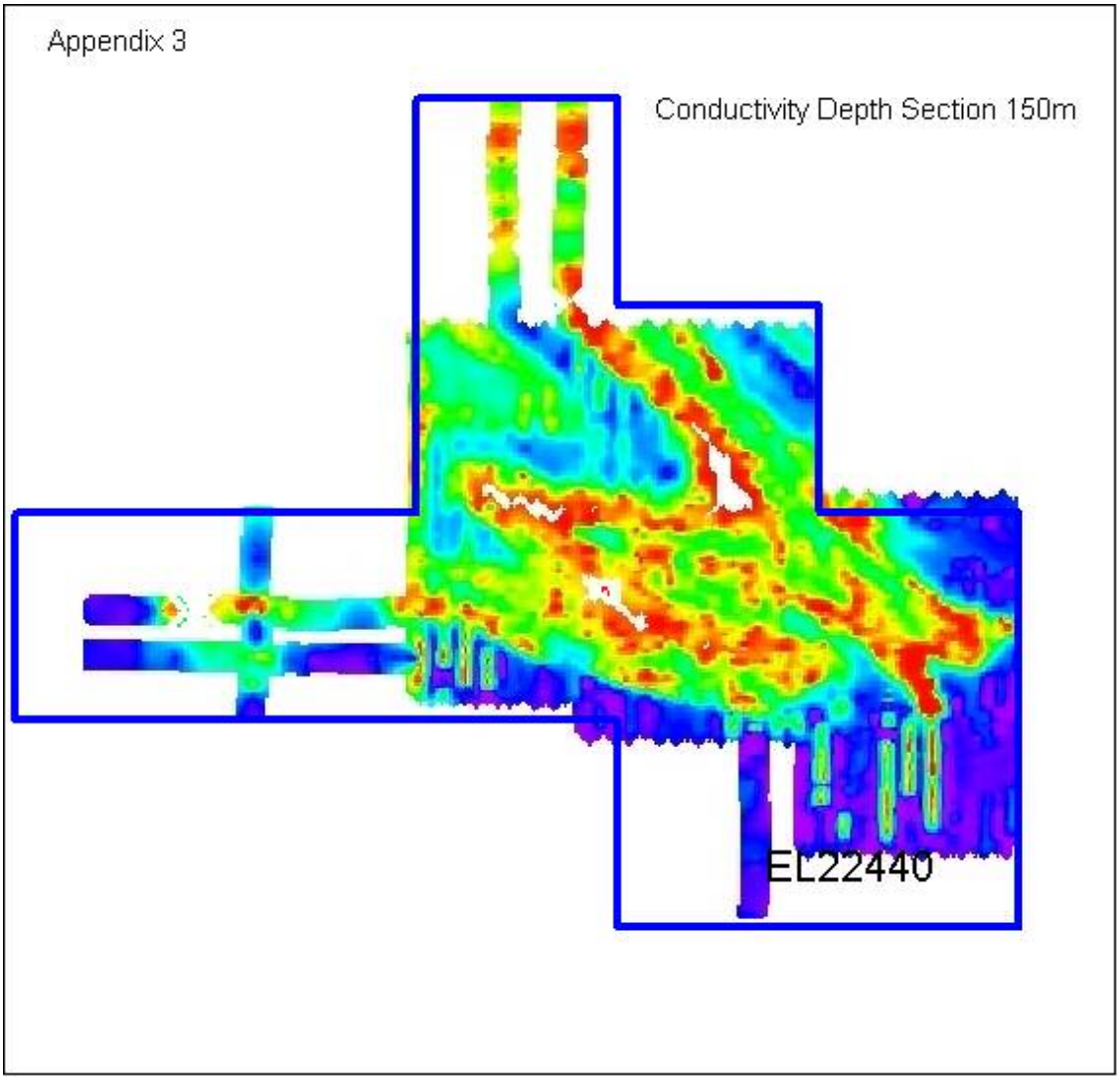
This dolerite occurs as a medium to course grained sill in the Koolpin Formation. It can occur as a distinctive series of resistant outcrop and rubble or become preferentially weathered and be obscured under soil and regolith cover. Distinctive dark red clay rich soils are developed over the dolerites in these instances.”

Appendix 2

Conductivity Depth Section 35m



Appendix 3



RepTEM Airborne Geophysical Survey

Pine Creek, Northern Territory.

November 2007

Survey Operations and Logistics Report

For

GEORGE FRAZIS

Survey Flown by:

GPX Airborne

JOB NUMBER 2323

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GPX Airborne
RepTEM (MkI) Survey

SURVEY SUMMARY

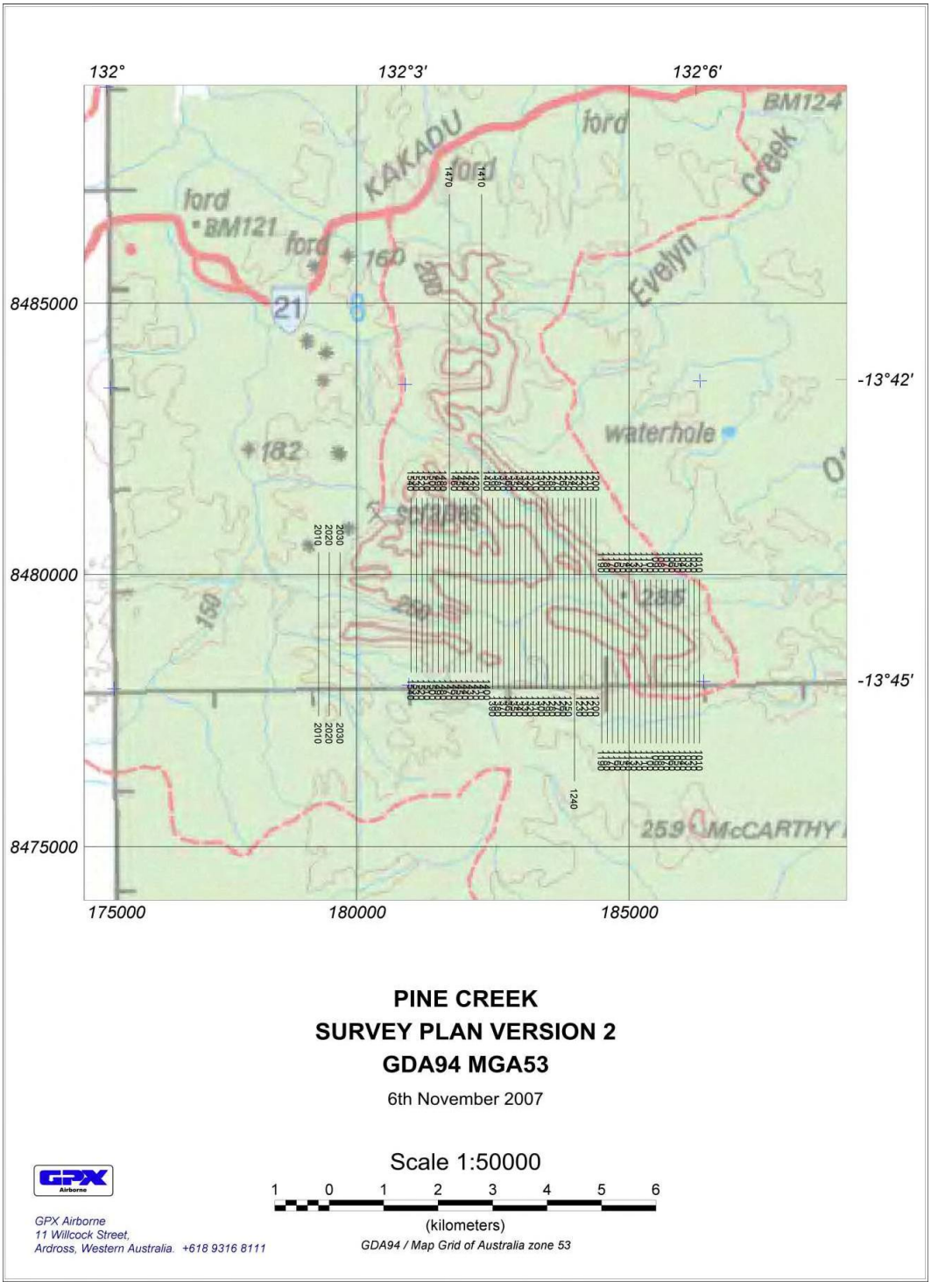
Client:	GEORGE FRAZIS
Job Number:	2323
Survey Area:	Pine Creek, Northern Territory
Data Processing Base:	Base of Operations and processing base was Pine Creek Hotel, with the aircraft flown out of Francis Creek Mine.
Mobilisation	11th November 2007
Production	12th November 2007
Demobilisation	13th November 2007
Line km surveyed:	197.226 km
Survey Crew:	Ben Trevenen (Crew Leader) Kent Andrews Rowan Schneider Nick Scott (Pilot)

In November 2007, GPX Airborne was contracted by George Frazis to perform a RepTEM survey over the Pine Creek survey area in the Northern Territory. The job was flown on the 12th of November 2007.

The base of operations and processing was located at the Pine Creek Hotel. The aircraft operated out of Francis Creek Mine

Survey Area Maps

Overview



RepTEM System Specifications

Transmitter

Waveform –	25% duty cycle square wave
Pulse on Time -	5 ms (inclusive of 1ms cosine ramp on)
Pulse off Time -	15 ms
Pulse Current -	320 Amps
Switch on Ramp -	1 ms
Switch off Ramp -	55 µs
Tx Loop Area -	~350 m^2
Tx NIA –	112,000
Tx Frequency-	25 Hz

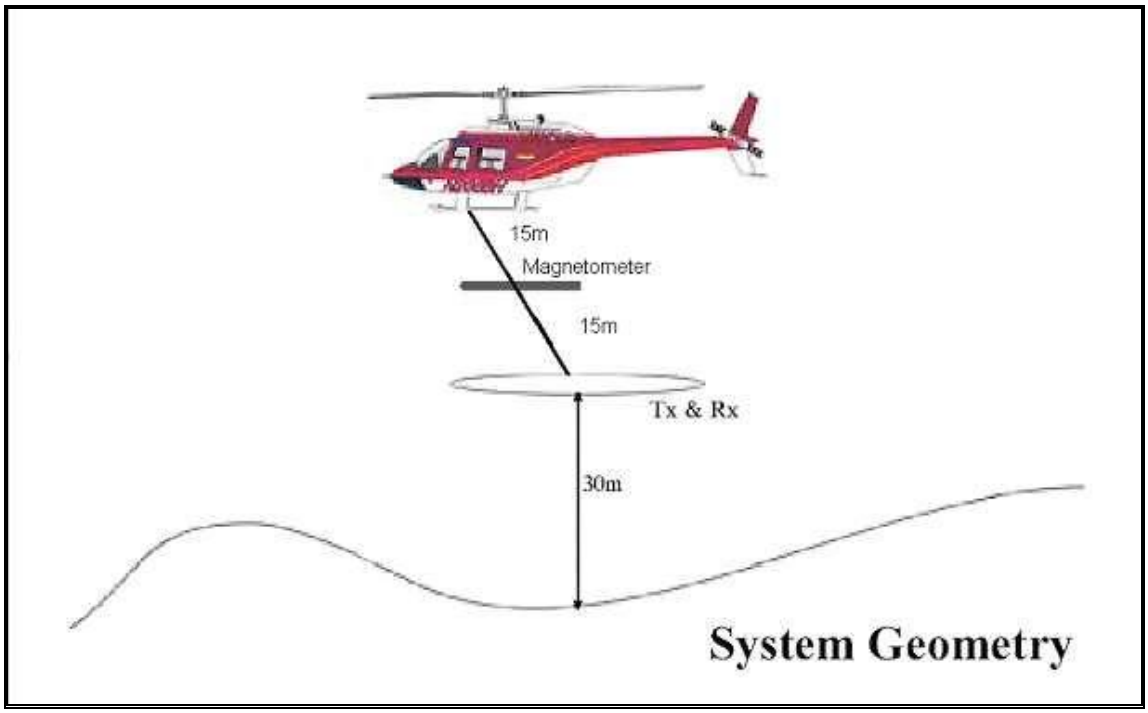
Receiver

A-D Circuitry -	24 bit
Sample Time -	0 - 12 ms
Sampling -	121 Linear channels
Windowed Data -	21 channels

Receiver Coil

Effective NA -	10,000 Square Metres
Bandwidth –	45,000 Hz

Geometry.



Transmitter loop is towed 35 m below helicopter- Receiver coil is located at centre of Tx loop.

Transmitter / Receiver at nominal 35 m terrain clearance.

Helicopter survey speed is between 45 and 55 knots.

Along line sample interval is between 9 and 11 metres

EM Data Channel Specifications

NB: Time 0 is at the start of the switch off ramp

21 Channel Sampling Scheme (55Us ramp)				
Channel	**Begin Time**	**End Time**	**Centre Time**	**Width in Time**
1	55	80	67.500	25.00
2	80	105	92.500	25.00
3	105	130	117.500	25.00
4	130	155	142.500	25.00
5	155	255	205.000	100.00
6	255	355	305.000	100.00
7	355	456.25	405.625	101.25
8	456.25	557.50	506.875	101.25
9	557.50	760.00	658.750	202.50
10	760.00	1063.75	911.875	303.75
11	1063.75	1468.75	1266.250	405.00
12	1468.75	1975.00	1721.875	506.25
13	1975.00	2582.50	2278.750	607.50
14	2582.50	3291.25	2936.875	708.75
15	3291.25	4101.25	3696.250	810.00
16	4010.25	5012.50	4556.875	911.25
17	5012.50	6025.00	5518.750	1012.50
18	6025.00	7138.75	6581.875	1113.75
19	7138.75	8353.75	7746.250	1215.00
20	8353.75	9670.00	9011.875	1316.25
21	9670.00	11391.25	10530.626	1721.25

RepTEM Airborne Geophysical System

Magnetic Data Specifications

The helicopter was equipped with a bird-mounted Geometrics G 822A Cesium vapor, optically pumped magnetometer continuously sampling at 1200 Hz.

The instrument has a sensitivity of 0.001nT, with a sensor noise level of less than 0.1nT.

The magnetic readings are resampled to 50Hz with each sample containing an array of 24 readings. Adjacent readings are summed to minimise bias from the EM transmissions to produce the 25Hz magnetic array data. The mid time array positions are averaged to create the magnetic response.

The time-synchronized ground magnetic field data was digitally recorded at a 5.0 sec interval with a Geometrics G856 magnetometer to an accuracy of 0.1nT.

Base Station Location: 807712mE, 8472911mN at 197 metres.

DATA PROCESSING SUMMARY

The following processes were carried out at the field processing office:

- Spline removal of birdswing
- Negative decays paired and reversed
- Filtering and correction of laser altimeter
- Data is splined to a uniform sample spacing
- Butterworth filter applied to each channel
- Preliminary gridding and data verification

Final EM Processing

Software used for processing at the GPX Perth office:

- Geosoft
- EmaxAIR by Fullagar Geophysics
- ChrisDBF

System response obtained from high level flights is removed from the data. CDIs are generated using EmaxAIR, and depth slice data is interpolated from the Emax output using in-house software. Final plots are created in Geosoft .MAP format, and include CDIs that are masked to the first and last depth solution at each station.

Magnetic Data processing.

The aircrafts magnetic data is corrected for diurnal and the mean diurnal value added back to the channel. Parallax is applied, followed by the IGRF correction, the mean

IGRF value being added back to data. Where required tie line and a micro-level will be applied to the final magnetic channel.

Area Name	Diurnal Value	IGRF Value
Pine Creek	47080.89 nT	47033.95 nT

Digital Elevation Model

The laser altimeter data was subtracted from the GPS height to give a digital elevation model which represents height above the WGS84 spheroid. This data was then mean levelled with the SRTM (Satellite Radar Topography Mission, NASA) to remove any levelling.

Final DVD Contents

\images

GeoTiff format images of all depth slices, minimum, maximum and last conductivity, digital elevation and magnetic data.

\grids

Conductivity depth slices with name convention of dnnn.grd where nnn is the depth of the conductivity slice, grids are in Geosoft GRD format. ERMapper format grids have also been provided, with a ERM_Dnnn.ers naming convention.

Final Magnetic grid:	ERM_Magnetics.ers
Final Digital Terrain:	ERM_DEM.ers (WGS84 spheroid)

grids\cdi_grids

Geosoft format files of the CDI grids.

\located_data

TEM.LDT

Line:	Line number
Fiducial:	Fiducial number as displayed on the CDI sections.
East:	Easting (GDA94 MGA53)(metres)
North:	Northing (GDA94 MGA53)(metres)
Heli_Z:	GPS altitude of helicopter (metres)
TX_Laser:	Height of the laser altimeter on the hoist (metres)
DEMF:	Levelled Digital Elevation Model, WGS84 (metres)
Current:	Transmitter current (amps)
Ch[*]:	EM response, channels 1-21 (uV)
Mag:	Interpolated magnetic channel.

CDI.LDT

Line: Line number
East: Easting (GDA94 MGA53)(metres)
North: Northing (GDA94 MGA53)(metres)
Distance: Distance along line (metres)
Depth: Depth below surface (metres)
Conductivity: Conductivitiy (mS/m)
RL: GPS depth (WGS84)(metres)

DEPTHSLICE.LDT

Line: Line number
East: Easting (GDA94 MGA53)(metres)
North: Northing (GDA94 MGA53)(metres)
Distance: Distance along line (metres)
RL: GPS depth (WGS84)(metres)
[35-150]: Conductivity at specified depth (mS/m)

COND_SUMMARY.LDT

Line: Line number
East: Easting (GDA94 MGA53)(metres)
North: Northing (GDA94 MGA53)(metres)
Firstcond: First recorded conductivity in a decay (mS/m)
Maxcond: Maximum recorded conductivity in a decay (mS/m)
Lastcond: Last recorded conductivity in a decay (mS/m)
Mincond: Minimum recorded conductivity in a decay (mS/m)

MAGNETICS.LDT (25Hz data)

Line: Line Number
SPM: Seconds past midnight.
East: Easting (GDA94 MGA53)(metres)
North: Northing (GDA94 MGA53)(metres)
Rawmag: Raw magnetics channel
Diurnal: Diurnal data
PreMag: Diurnal corrected.

IGRF: Calculated IGRF value for each point.

MagF : Final magnetics channel

GPS_Z: GPS altitude of helicopter (metres)

Clearance: Ground clearance of the Magnetic Sensor.

Each data type is also accompanied with a similar Geosoft database.

\sections

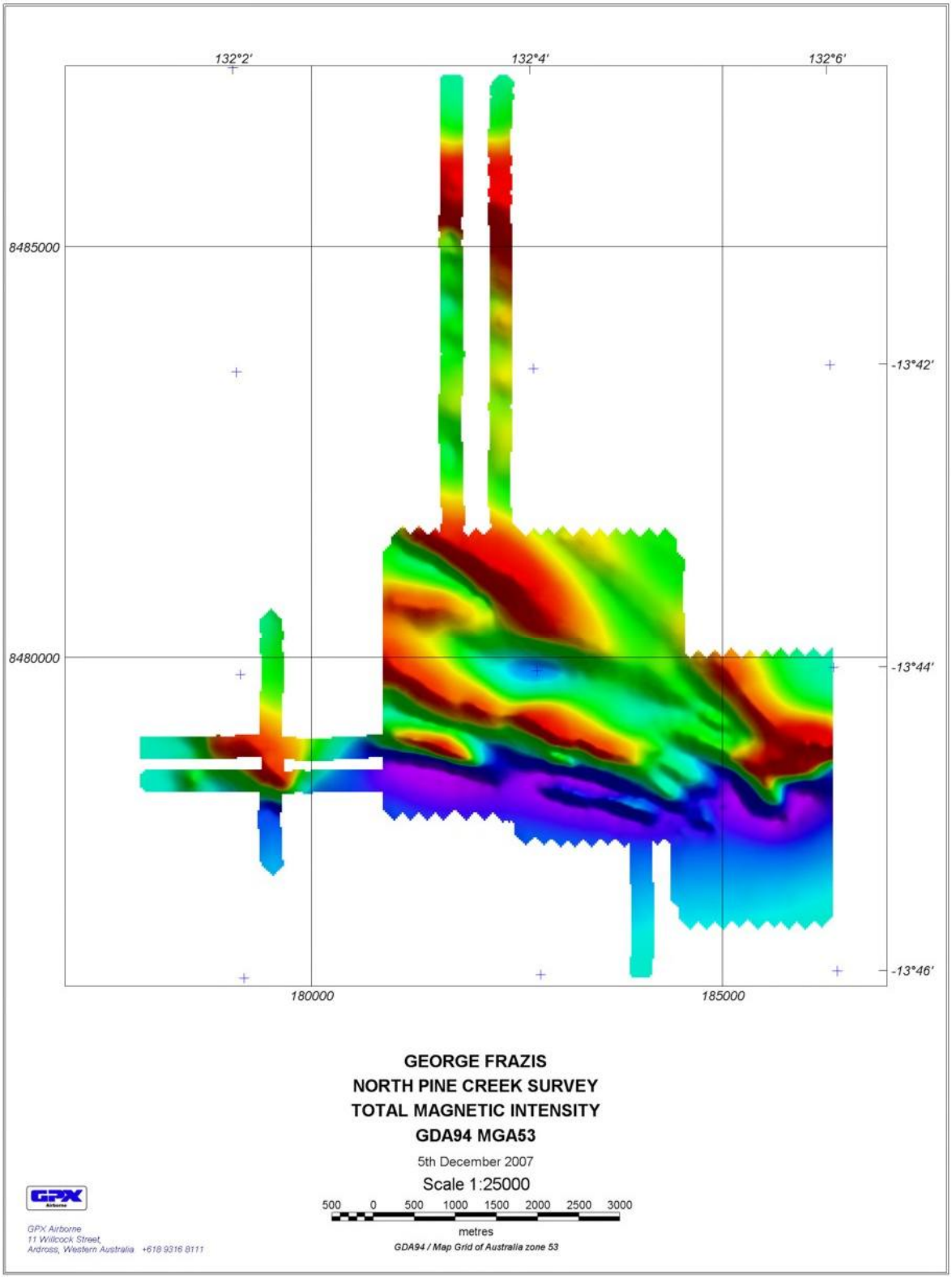
Linear & logarithmic profiles, and conductivity depth images for each line. In Geosoft .MAP format (viewable with the free interface at http://www.geosoft.com).

\sections\Images

Linear & logarithmic profiles, and conductivity depth images for each line. In PNG (Portable Network Graphics) format.

IMAGES

Total Magnetic Intensity



CONTRACTOR INFORMATION

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Locked Bag 3, Applecross,
Western Australia. 6153
Telephone: (08) 9316 8111
Fax: (08) 9316 8033
Web: www.gpx.com.au

Logistics Report

for a

DETAILED AIRBORNE MAGNETIC, RADIOMETRIC AND DIGITAL TERRAIN SURVEY

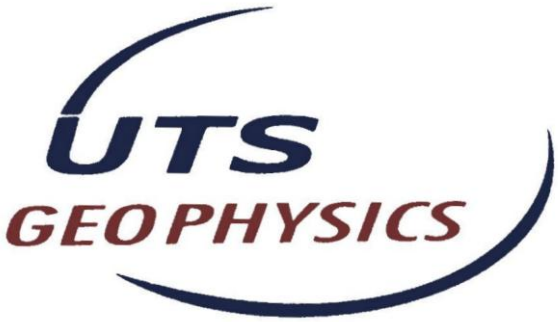
for the

PINE CREEK PROJECT

carried out on behalf of

GEORGE FRAZIS

by



(UTS Job #A938)

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1 GENERAL SURVEY INFORMATION

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

George Frazis
PO Box 36762, Winnellie
Darwin NT 0821

Acquisition for this survey commenced on the 07th January 2008 and was completed on the 10th January 2008. The base location used for operating the aircraft and performing in-field quality control was Katherine, Northern Territory.

2 SURVEY SPECIFICATIONS

The area surveyed was approximately 85km southeast of Katherine in the Northern Territory, 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
Pine Creek	50m	000-180	500m	090-270	40m	552
TOTAL						**552**

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

- FU24 – 954 fixed wing survey aircraft.
- UTS proprietory flight planning and survey navigation system.
- UTS proprietory high speed digital data acquisition system.
- Novatel 3951R, 12 channel precision navigation GPS.
- OMNILITE 132 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.
- Scintrex Cesium Vapour CS-2 total field magnetometer.
- Fluxgate three component vector magnetometer.
- RMS Aeromagnetic Automatic Digital Compensator (AADC II).
- Diurnal monitoring magnetometer (Scintrex Envimag).

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-HVP. 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 3951R
- 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 — King KRA- 405 twin antenna altimeter
- Accuracy — 0.3 metres
- Resolution — 0.1 metres
- Range — 0 - 500 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 proprietory 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 Scintrex Cesium Vapour CS-2 Magnetometer. This precision sensor has the following specifications:

- Model Scintrex Cesium Vapour CS-2 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 Develco Fluxgate Magnetometer. This precision sensor has the following specifications:

- Model Develco 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
- Resolution 0.1 nT
- Sample interval 5 seconds (0.2 Hz)
- Operating range 20,000nT to 90,000nT
- Temperature -20^{o}C to +50^{o}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

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Grant Archer

UTS Geophysics Perth Office

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David Abbott
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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 reflown 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. As a result of the physical separation of the sensors, a small residual offset still exists between instrument timings.

To compensate for this residual parallax error, an adjustment was made to the instrument clocks. The magnetic and radar altimeter data was adjusted by 0.600 seconds, and the radiometric data was adjusted by 1.375 seconds for each flight.

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 10 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. Limits were applied to the radiometric channels in selected areas only during the micro-levelling process are shown in the table below.

5.4 Digital Terrain Model Data Processing

The radar altimeter data was subtracted from the GPS altimeter data. The separation distance between the GPS antenna and the radar altimeter of 1.4 metres was subtracted from the 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:

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UTS Geophysics
P.O. Box 126
BELMONT WA 6984

Quoting reference number: A938

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	F10.2	RAW MAGNETIC INTENSITY	nT
15	F10.2	DIURNAL CORRECTION	nT
16	F10.2	IGRF CORRECTION	nT
17	F10.2	DRN AND IGRF CORRECTED TMI	nT
18	F10.2	FINAL TOTAL MAGNETIC INTENSITY	nT

RADIOMETRIC 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	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 - ALLLLB, where:

A	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

LDT	Located digital data file
FMT	Located data format definition file
ERS	Ermapper gridded data header file
	Ermapper data portion has no extension
GRD	Geosoft gridded data file

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	World Geodetic System 1984
Coordinate Type	Geographical
Semi Major Axis	6378137m
Flattening	1/298.257223563

MGA94	Map Grid of Australia 1994
Coordinate type	Universal Transverse Mercator Projection Grid
Geodetic datum	Geocentric Datum of Australia
Semi major axis	6378137m
Flattening	1/298.257222101

APPENDIX C - SURVEY BOUNDARY DETAILS

COORDINATES REPORT

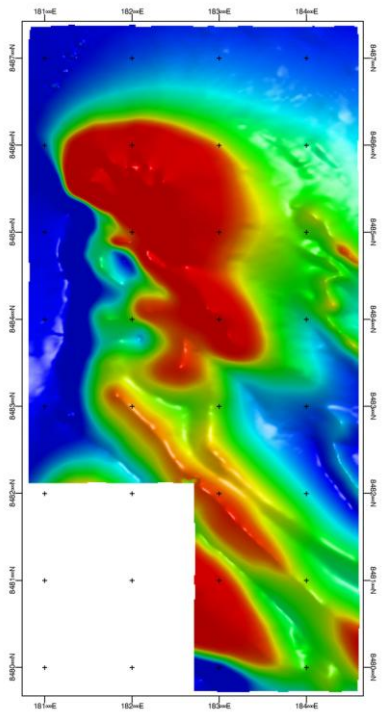
Job ID code: A9380101
Client: Grant Archer
Job: Pine Creek
Grid Zone: 53
Include Point: 0.0 0.00

Surround

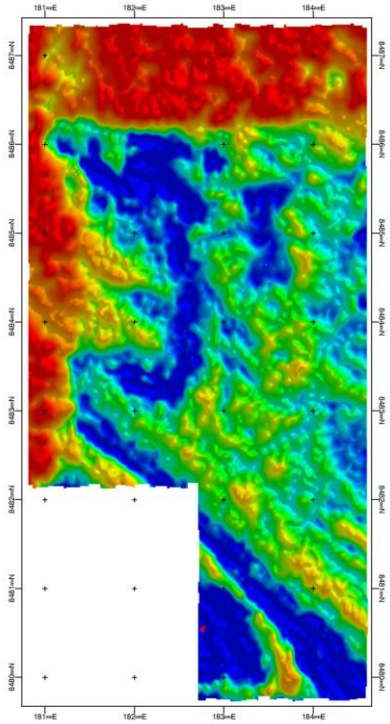
180800.000	8487300.000
184600.000	8487300.000
184600.000	8479800.000
182700.000	8479800.000
182700.000	8482200.000
180800.000	8482200.000
180800.000	8487300.000

APPENDIX D - PROJECT DATA OVERVIEW

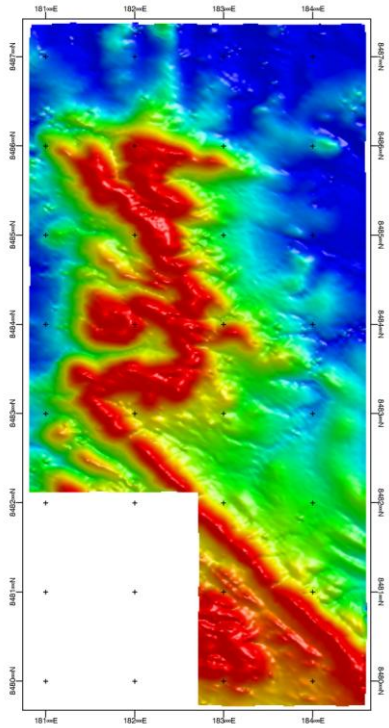
Pine Creek Project



Total Magnetic Intensity



Radiometric Total Count



Digital Terrain Model

APPENDIX E – ACQUISITION AND PROCESSING PARAMETERS

Magnetic Processing Parameters

Model	:	IGRF 2008.03
Average Declination	:	-3.86 degrees
Average Inclination	:	-41.68 degrees
Average Field strength	:	47077.65 nT
Average diurnal	:	46202.00 nT

Radiometric Processing Parameters

Height Attenuation Coefficients

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

Aircraft Background Coefficients

Total Count:	62.96
Potassium:	8.34
Uranium:	2.57
Thorium:	1.11

Cosmic Correction Coefficients

Total Count:	1.051
Potassium:	0.047
Uranium:	0.046
Thorium:	0.055

Sensitivity Coefficients

Total Count:	42.8cps/dose rate
Potassium:	186.0 cps/%k
Uranium:	16.1cps/ppm
Thorium:	8.5 cps/ppm

Final Reduction - All data reduced to STP height datum 30m