URANEX

ABN 26 115 111 763

# ALLIGATOR RIVER PROJECT
# EL25165 – Swim Creek

# Annual Report for the Period
# 7th November 2006 to 6th November 2007.

Volume 1 of 1

| | |
|---|---|
| **Tenure Holder and Operator:** | **Uranex N.L.** |
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| **Compiled by:** | **P.F. Robinson, B. Lamb** |
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# SUMMARY

The Alligator River Project comprises Exploration Licence 25165 located in the Mary River region approximately 100 kilometres east-southeast of Darwin in the Northern Territory.

Uranex is targeting East Alligator River Uranium Field (EARUF) and/or South Alligator Rivers Uranium Field (SARUF) and/or Rum Jungle Uranium Field (RJUF) style uranium deposits. This is based on the recognition that the Lower Proterozoic stratigraphy of the area has some similarities that may equate with stratigraphy in these uranium fields

Most of the outcrop areas are mapped as the Wildman Siltstone (Ppw) of the Mt Partridge Group meta-sediments. The basal unit of the Mt Partridge Group, the Mundogie Sandstone (Ppm) outcrops on the eastern margin of the project and may be under cover in the north. The South Alligator Groups Koolpin Formation (Psk) is located in the far south of the tenement and may occur in synclinal areas under Cainozoic cover elsewhere.

The Whites Formation, which hosts the Rum Jungle uranium mineralisation, may be stratigraphically equivalent to part of the Wildman Siltstone (Ppw) within the tenement.

The Mundogie Sandstone (Ppm), which underlies the Wildman Siltstone, outcrops locally in the tenement. This is thought to be possibly equivalent to the magnetic Upper Cahill Formation of the EARUF further east. Hence the Lower Cahill host equivalent would be stratigraphically below it.

The Koolpin Formation outcropping in the south is the uranium host for the SARUF.

This first annual report describes activities conducted for the period 7th November 2006 to 6th November 2007. Exploration activities during the period have involved a detailed aeromagnetic and radiometric survey comprising 6561 line kilometres and it's processing and interpretation. This survey has produced both radiometric and aeromagnetic interpreted litho–structural targets for follow up by ground inspection and then drilling of those that may relate to uranium mineralisation.

Total project expenditure for the reporting period was $117,985.40.

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EL25165_2007_A_04_A78907m.tif
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# 1.0 INTRODUCTION

This annual report details all exploration work undertaken on Swim Creek Project Exploration Licence 26165 during the reporting period 7th November 2006 to 6th November 2007.

The licence located in the Mary River area, on the western margin of the Kakadu National Park within the Pine Creek Orogen approximately 100 kilometres east south east of Darwin in the Northern Territory (Figure 1).

Access is from Darwin on the Arnhem Highway approximately 130 kms to the south of the tenement, then north on the Point Stuart Road. Accommodation is available at the Mary River Point Stuart Lodge Just off the Point Stuart Road. Most of the tenement is on Annbarroo Station.

The tenement is situated on the Darwin (SD52-04), 1:250,000 map sheet.

The terrain in the area is mostly low hills. Vegetation cover is mostly tropical woodland.

# 2.0 TENURE

The Alligator River Project comprises one granted exploration licence and one application. It covers approximately 930 square kilometres and attracts a current expenditure covenant of $49,500.

***Table 1: Tenure Summary***

| Name | Licence | Granted | Expiry | No. Blocks | Area Km² | 2006-2007 Commitment |
|---|---|---|---|---|---|---|
| Swim Creek | EL25165 | 7-Nov-2006 | 6-Nov-2012 | 181 | 503.9 | $49,500 |

# 3.0 GEOLOGY

The Swim Creek Project is situated in the middle of the Pine Creek Orogen. The older Archean basement domes are situated about 80 kilometres to the east (Nanambu Complex) and similarly 80 kilometres to the west (Rum Jungle Complex).

Most of the outcrop areas are mapped as the Wildman Siltstone (Ppw) of the Mt Partridge Group meta-sediments (Figure2) The basal unit of the Mt Partridge Group, the Mundogie Sandstone (Ppm) outcrops on the eastern margin of the project and may be under cover in the north. The South Alligator Groups Koolpin Formation (Psk) is located in the far south of the tenement and may occur in synclinal areas under Cainozoic cover elsewhere.

There are isolated remnants of the Jurassic–Cretaceous flat lying sediments throughout the tenement.

URANEX

**Alligator River Project**

# EL25165 - Swim Creek

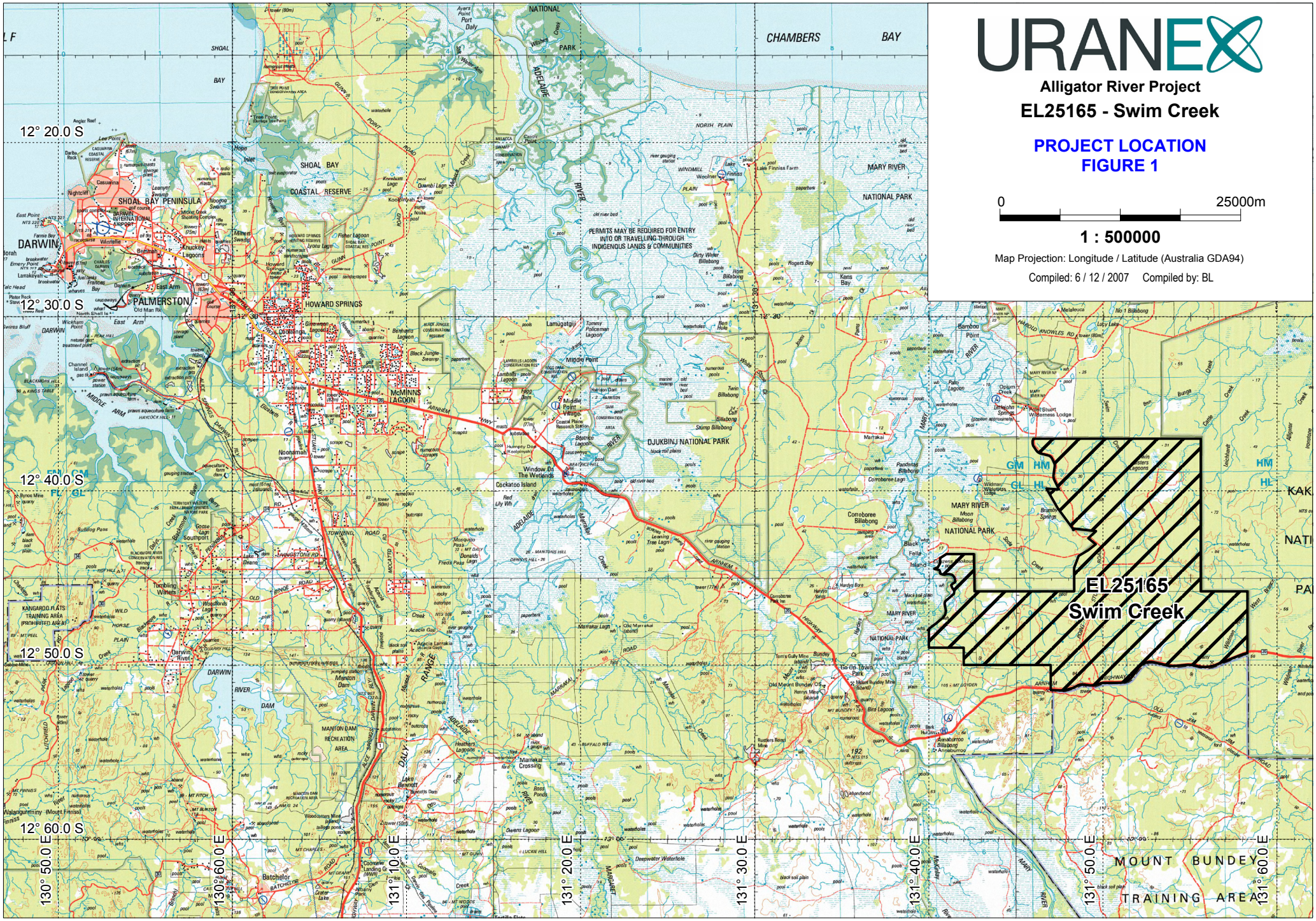
## PROJECT LOCATION
## FIGURE 1

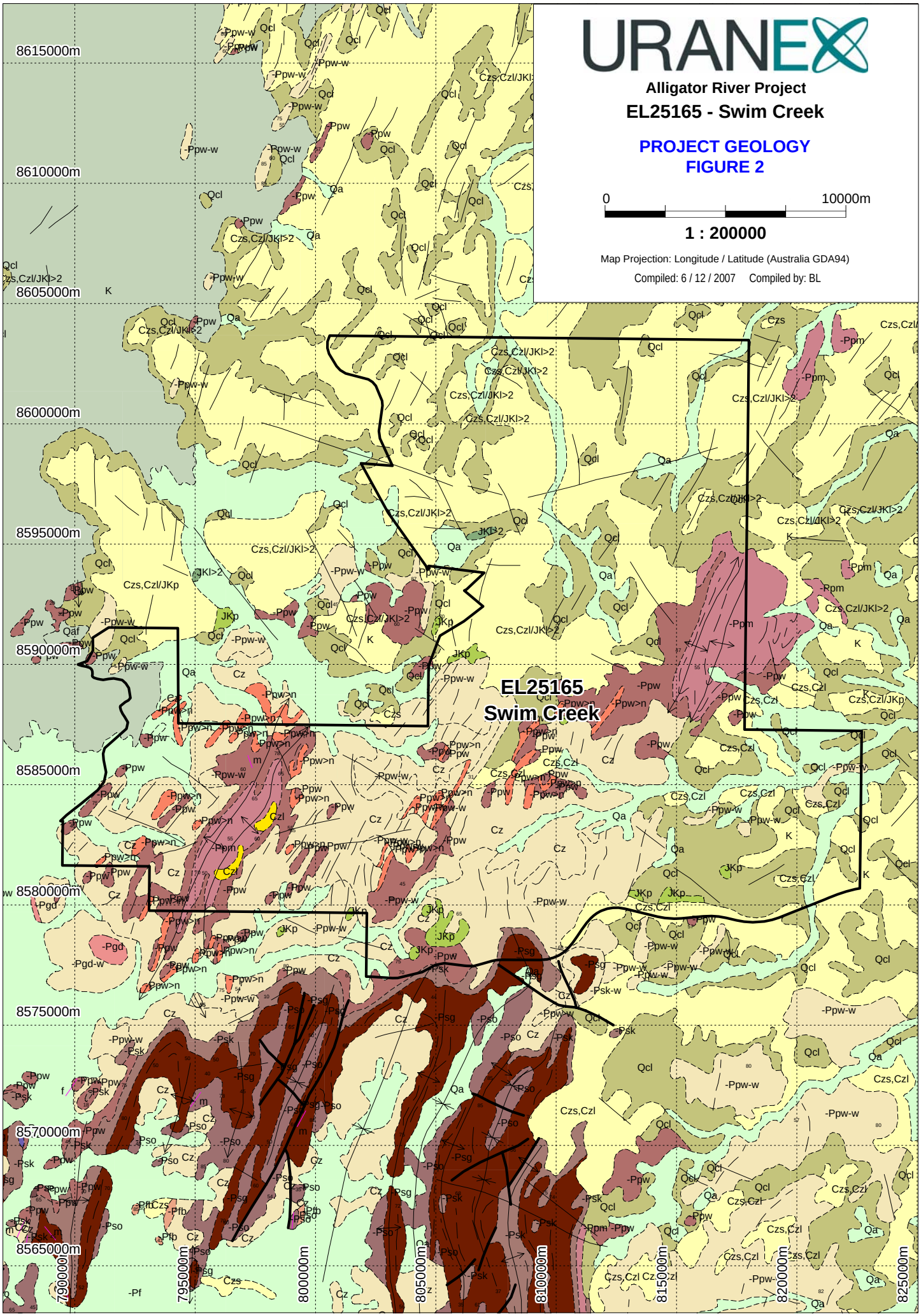
0 25000m

**1 : 500000**

Map Projection: Longitude / Latitude (Australia GDA94)

Compiled: 6 / 12 / 2007 Compiled by: BL




URANEX
Alligator River Project
EL25165 - Swim Creek
PROJECT GEOLOGY
FIGURE 2
0
10000m
1 : 200000
Map Projection: Longitude / Latitude (Australia GDA94)
Compiled: 6 / 12 / 2007 Compiled by: BL
EL25165
Swim Creek
8615000m
8610000m
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8600000m
8595000m
8590000m
8585000m
8580000m
8575000m
8570000m
8565000m
790000m
795000m
800000m
805000m
810000m
815000m
820000m
825000m

## 4.0 PREVIOUS EXPLORATION

The earliest investigations were conducted by Geopeko during the early 1970s following the acquisition of the BMR aeromagnetics and radiometrics. Their efforts were mainly towards uranium and to a lesser extent to base metals and later gold. Targets were eventually investigated by ground geophysics and geochemistry. These programs defined the "Quest" anomalies, which were the focus of their base metal exploration for 4 years.

Most of the other exploration was for gold and base metals. The main targets were for stratabound and stockwork gold mineralisation similar to Woodcutters and Rustlers Roost. The same ground was repeatedly taken up, past work assessed and added to by various techniques.

The main players were*:*

CRA 1979 to 1982,
Aquitaine 1980
Newmont Holdings 1987 to 1990,
Carpentaria Exploration 1990
Sons of Gwalia 1992
North Mining (Geopeko) 1994 to 1996 and Sirocco Resources – Rustlers Roost Mining 1998 to 2003.

They all targeted stratabound and anticlinal targets in the Wildman Siltstone and Koolpin Formation and to a lesser extent the Mundogie Sandstone. Contact and stockwork mineralisation was targeted around the post tectonic, high level, Mt Bundey Granite and the Mt Goyder Syenite. The Annbarroo anticlinal dome was also a focus.

Stream sediment sampling, soil sampling and drilling were employed at various scales. A number of prospects were located such as Donkey Hill and Anomaly 7 but no significant deposits were located in or near EL 21565.

## 5.0 TARGETING

The three main criteria for forming these deposits in the Pine Creek Orogen are:

1) Proximity to Archaean–Lower Proterozoic crystalline basement highs (<1800ma). These are the Nanambu Complex at EARUF, the Rum Jungle and Waterhouse Complexes of the RJUF and parts of the Litchfield Complex.

2) Favourable Lower Proterozoic host rock stratigraphy and lithofacies. At the EARUF, this is the Lower Cahill Formation. This starts at the base with massive dolomites and minor gneisses and schists. These underlie the major uranium deposits. The apparent equivalents at RJUF would be the Manton's Group Celia Dolomite and the Mount Partridge Group's Crater Formation and Coomalie Dolomite underlying the host Whites Formation.

3) Proximity of the current land surface profile to the base of existing or previously overlying Middle Proterozoic sedimentary cover rocks. This is the Kombolgie Formation at ARUF and the Depot Creek Sandstone at the RJUF and the Litchfield Complex. Critical to the exploration equation for the Swim Creek area is how far the current land surface is below the pre- Kombolgie regolith and whether there was a pre-sedimentary felsic volcanic episode equivalent to the Edith River Volcanics. The nearest Kombolgie Formation outcrop is in the Koongarra outlier some 100 kilometres to the east.

Uranex is targeting East Alligator River Uranium Field (EARUF) and/or South Alligator Rivers Uranium Field (SARUF) and/or Rum Jungle Uranium Field (RJUF) style uranium deposits.

This is based on the recognition that the Lower Proterozoic stratigraphy of the area has some similarities that may equate with stratigraphy in the EARUF, the SARUF or the RJUF described above.

The Whites Formation, which hosts the Rum Jungle uranium mineralisation, may be stratigraphically equivalent to part of the Wildman Siltstone (Ppw) within the tenement.

The Mundogie Sandstone (Ppm), which underlies the Wildman Siltstone, outcrops in the east and in the core of an anticline in the southwest of the tenement. This is thought to be possibly equivalent to the magnetic Upper Cahill Formation of the EARUF further east. This, being the most likely case, then the Lower Cahill host equivalent would be stratigraphically below it. And may also be present under cover to the north. The Lower Cahill Formation host lithologies consist of interbedded pyritic carbonaceous mica schists, chloritic calc-silicates, and chloritised felspathic quartzites.

At the SARUF the host is the Koolpin Formation (Psk) comprises ferruginous siltststone, pyritic carbonaceous shale and silicified dolomites and it outcrops just inside the southern boundary of the tenement.

# 6.0 CURRENT EXPLORATION ACTIVITIES

During the reporting period, exploration activities have included completion of a detailed airborne geophysical survey, the processing and interpretation of the results and defining targets for detailed ground follow up.

## 6.1 AIRBORNE GEOPHYSICS

UTS Geophysics were contracted to complete a detailed aeromagnetic and radiometric survey comprising 6561 line kilometres in late November 2006.

The survey was flown using the MGA94 coordinate system (a Universal Transverse Mercator projection) derived from the Geocentric Datum of Australia.

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

***Table 2: Airborne Survey Data Acquisition Specifications***

| NAME | LINE SPACING | LINE DIRECTION | TIE LINE SPACING | TIE LINE DIRECTION | SENSOR HEIGHT | TOTAL LINE KMS |
|---|---|---|---|---|---|---|
| Swim Creek | 100m | 090-270 | 1000m | 000-180 | 40m | 6561 |

***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

***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

***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

***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.

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.

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

***Radiometric Data Processing***
Statistical noise reduction of the 256 channel data was performed using the Maximum Noise Fraction (MNF) method described by Dickson and Taylor (1998).

Channels 30-250 only are noise-cleaned, 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 noise-cleaned 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.

Height attenuation corrections based on the STP radar altimeter were then performed to remove any altitude variation effects from the data.

The corrected count rate data was then converted to ground concentrations for potassium, uranium and thorium.

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

The processed magnetic data was presented as - Total Magnetic Intensity (TMI), Reduced to Pole (RTP) and Reduced to Pole First Vertical Derivative (RTR1VD) images.

The processed radiometric data was presented as – Total Count (TC), Potassium (K), Thorium (Th), Uranium (U) and Ternary (K, Th, U) images.

A Digital Terrane (DT) image was also produced.

### 6.2 INTERPRETATION OF AIRBORNE GEOPHYSICS

The geophysics was further processed by Southern Geo Sciences (SGS) and Dr Geoff Dickson. They produced an array of images that allowed a far better interpretation of the results.

New magnetic images included – Reduced to Pole (RTP) (Figure 3), First Vertical Derivative of the RTP (1VD, RTP) (Figure 4) Gradient, TMI 1VD, and Total Magnetic Intensity (TMI images all with various shade directions.

New radiometric images included K, U, TH, K:Th, U:Th, Ternary images all with various shade directions. The U: Th ratio image (Figure 5) is very useful in reducing the effect of uranium and thorium rich laterites and granites and emphasising uranium dominant sources.

The Uranium Indicator by Dr Dickson that uses U x U:Th image (Figure 6) emphasises the uranium component even further.

The Ternary image (Figure7) combines and displays the uranium window (blue), the thorium window (green) and the potassium window (red)

The spot uranium indicator anomalies on Figure 6 are mostly over shallow cover over the Wildman Siltstone. The largest anomaly in the southwest is over young alluvium over the Wildman Siltstone.

The magnetic images show two blind east-northeast striking dolerites in the west. Two parallel linear northeast striking structures can be seen in the top central area. The shorter south-eastern one seems to terminate against a northeast feature and the termination is associated with a significant elliptical magnetic anomaly.

URANEX

**Alligator River Project**

## EL25165 - Swim Creek

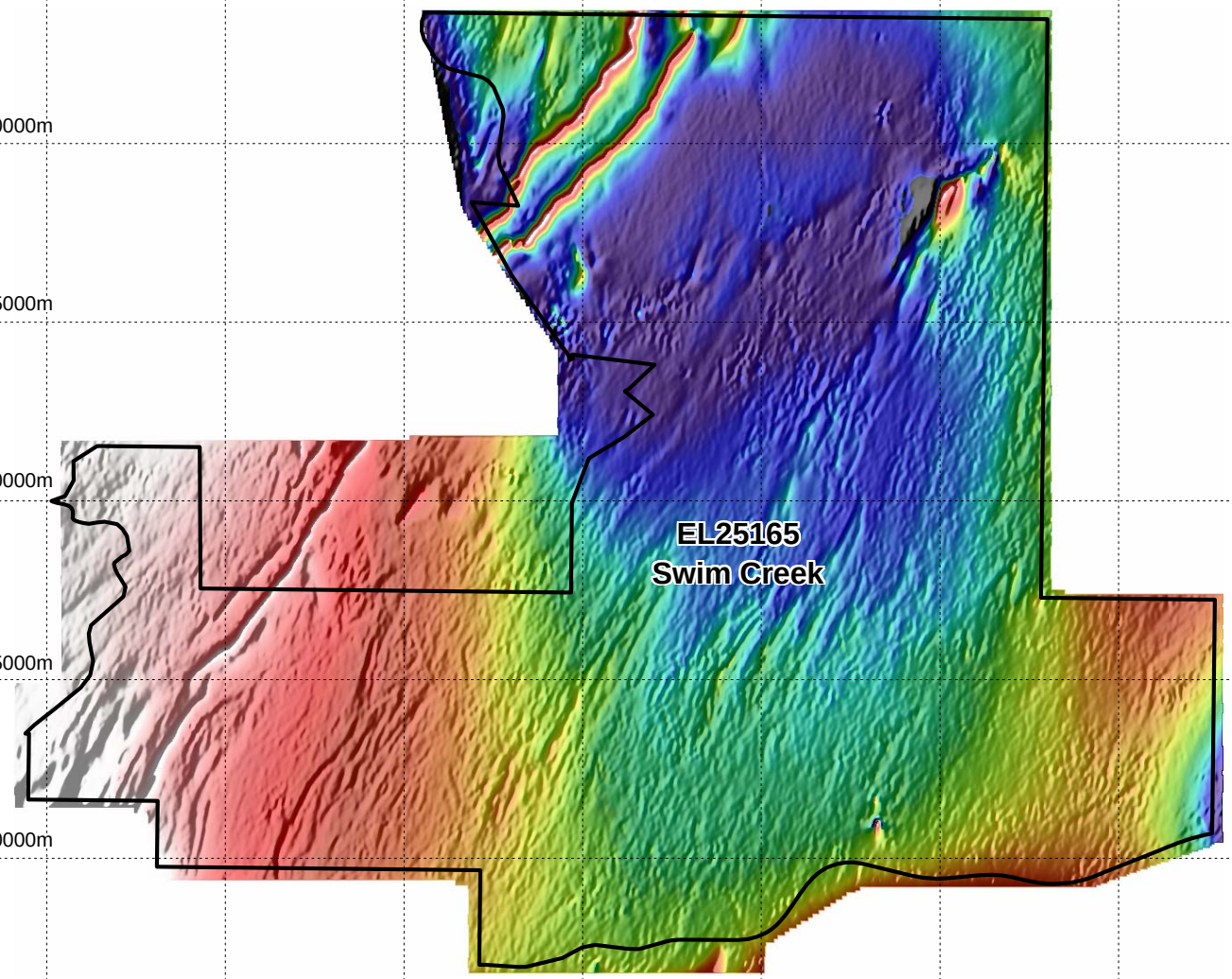
### RTP MAGNETICS, EAST SHADE
### FIGURE 3

0 — 10000m

**1 : 200000**

Map Projection: Longitude / Latitude (Australia GDA94)

Compiled: 6 / 12 / 2007  Compiled by: BL

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805000m
810000m
815000m
820000m
825000m

URANEX

Alligator River Project

## EL25165 - Swim Creek

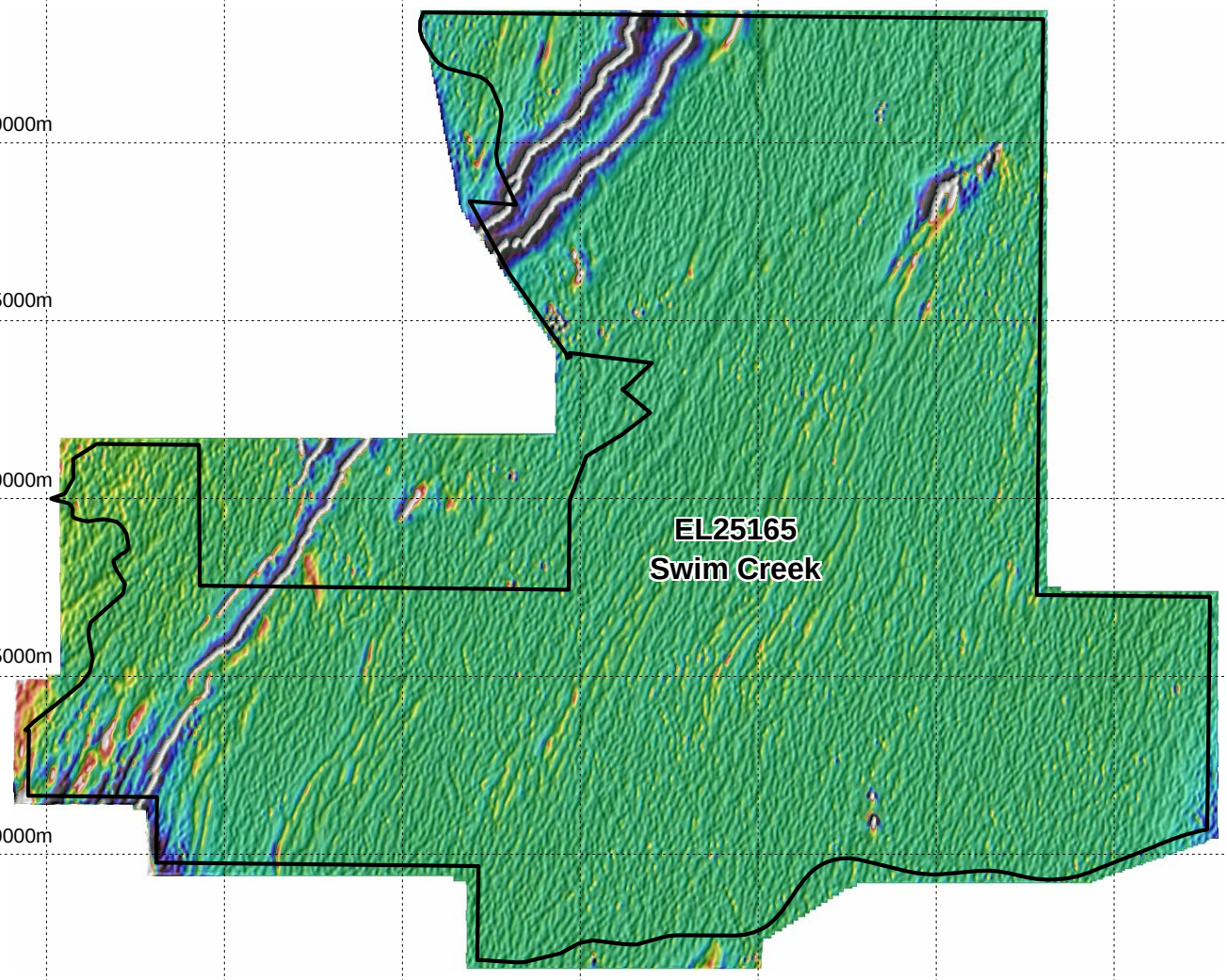
### RTP 1VD MAGNETICS, EAST SHADE
### FIGURE 4

0 — 10000m

**1 : 200000**

Map Projection: Longitude / Latitude (Australia GDA94)

Compiled: 6 / 12 / 2007  Compiled by: BL

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URANEX

**Alligator River Project**

## EL25165 - Swim Creek

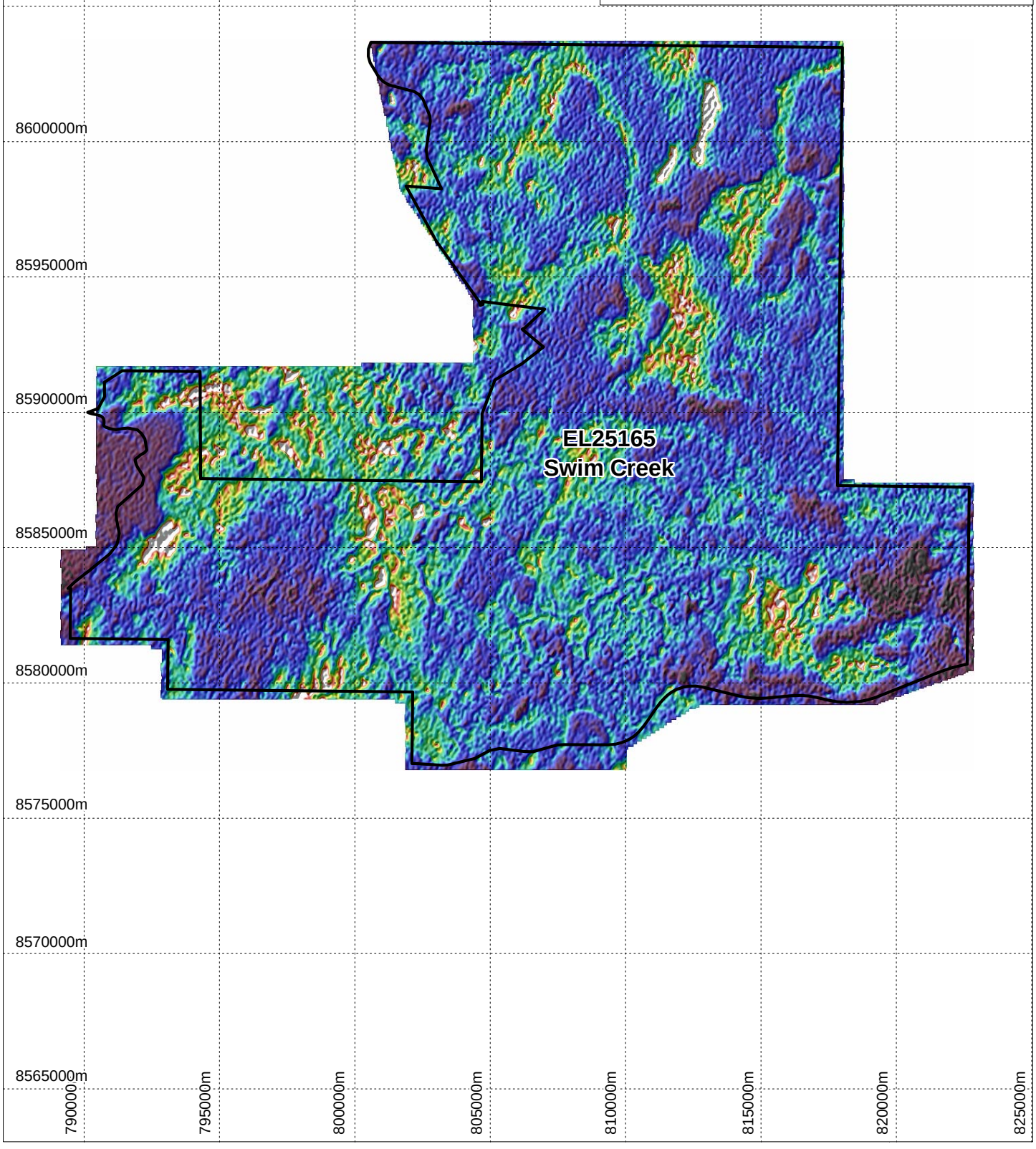
**U:TH, EAST SHADE**
**FIGURE 5**

0 — 10000m

**1 : 200000**

Map Projection: Longitude / Latitude (Australia GDA94)

Compiled: 6 / 12 / 2007  Compiled by: BL



URANEX

**Alligator River Project**

## EL25165 - Swim Creek

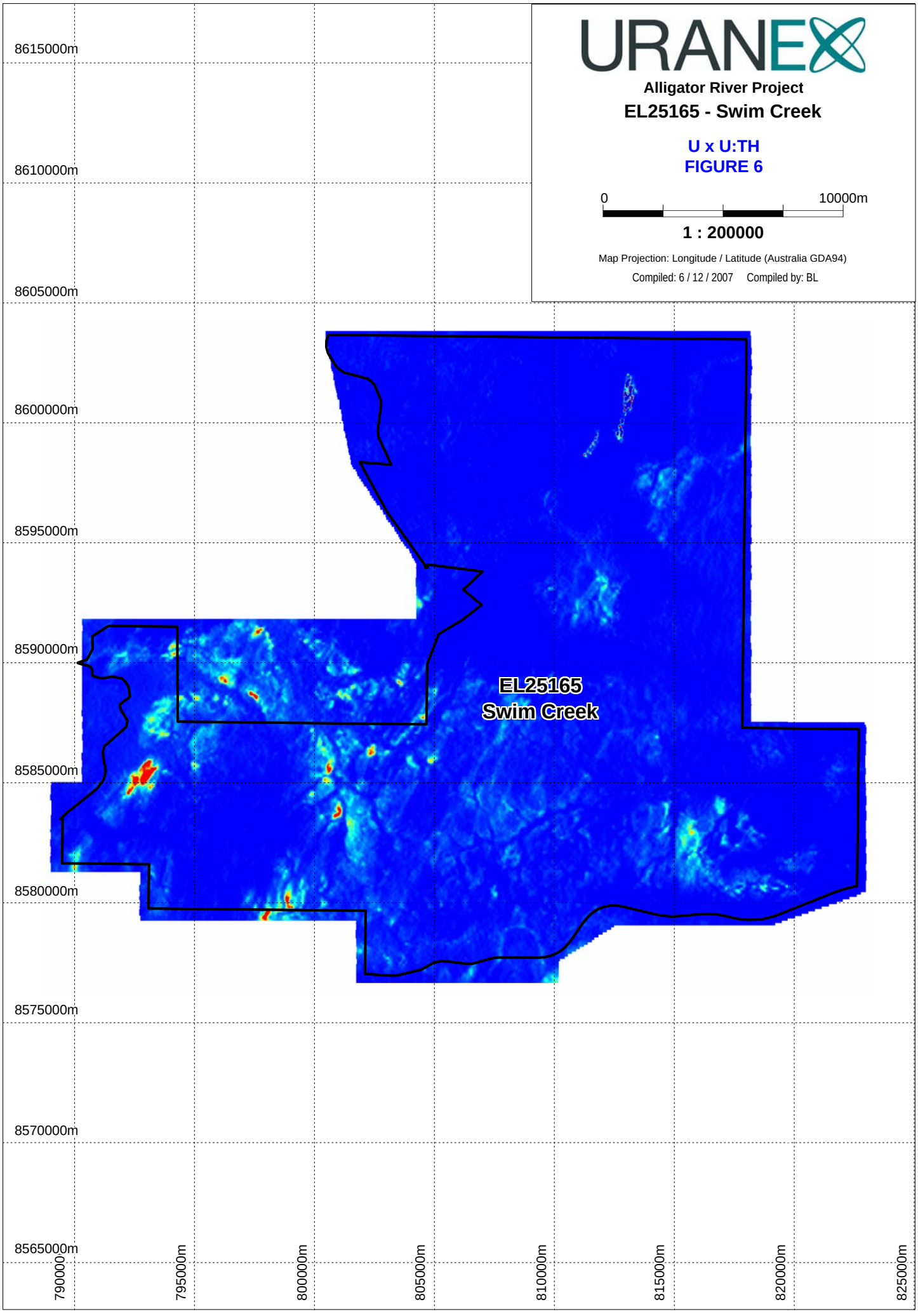
**U x U:TH**
**FIGURE 6**

0 — 10000m

**1 : 200000**

Map Projection: Longitude / Latitude (Australia GDA94)

Compiled: 6 / 12 / 2007  Compiled by: BL



URANEX

**Alligator River Project**

## EL25165 - Swim Creek

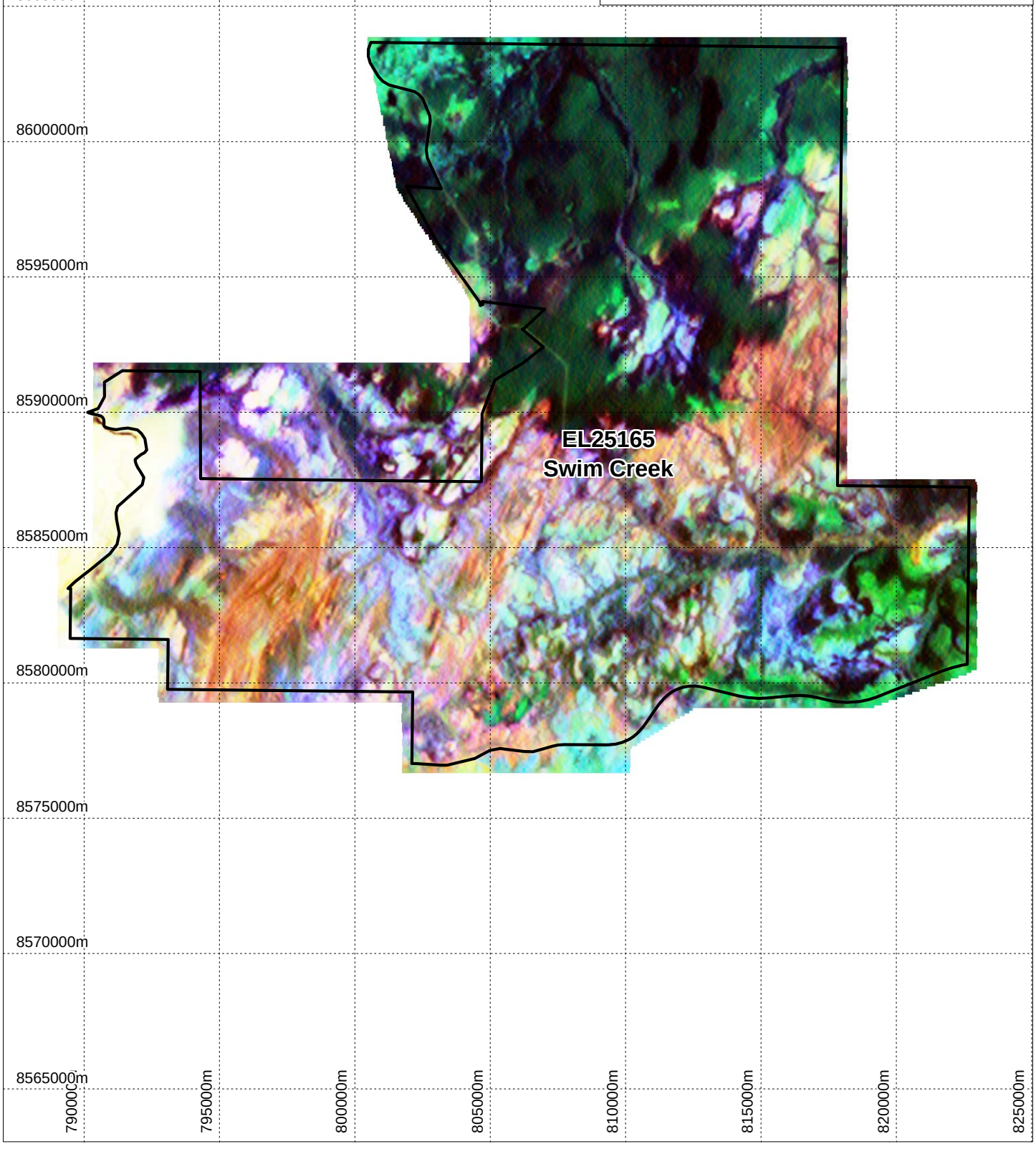
### TERNARY RADIOMETRICS
### FIGURE 7

0 — 10000m

**1 : 200000**

Map Projection: Longitude / Latitude (Australia GDA94)

Compiled: 6 / 12 / 2007  Compiled by: BL



### 6.3 INITIAL GROUND TRAVERSES

A reconnaissance trip was made in October to check access, geology and potentially some uranium radiometric anomalies.

Away from the formed roads access was not possible. Most branch roads from the Point Stuart Road were padlocked. Outcrop along the Point Stuart Road is scarce.

## 7.0 EXPENDITURE

A breakdown of expenditure is contained in Table 3. Expenditure for EL25165 for the period 7th November 2006 to 6th November 2007 is $117,985.40.

***Table 3: Expenditure 2006 to 2007***

| Activity | Amount |
|---|---|
| | |
| Geological /geophysical consultants | $11,543.00 |
| Geophysical Survey | $84,021.00 |
| Tenement Maintenance Costs | $4,370.00 |
| Data Entry, Drafting & Printing | $1,793.00 |
| Travel & Accomodation | $869.00 |
| Admin costs (15%) | $15,389.40 |
| | |
| **REPORT TOTAL** | **$117,985.40** |
| | |
| Previous Expenditure | $0.00 |
| **LICENCE TOTAL** | **$117,985.40** |

## 8.0 CONCLUSIONS AND RECOMMENDATIONS

Results from the aeromagnetic and radiometric survey and stratigraphic analysis have provided some targets to follow up of the Swim Creek Project area for uranium exploration. Exploration for the next report period will include ground inspection of anomalies and drilling of the generated targets and for stratigraphy.

### 8.1 PROPOSED EXPLORATION

The first exploration stage will be a reconnaissance to examine geology and inspect and explain the various uranium radiometric anomalies located by the airborne survey. This will need to be helicopter assisted with prior notice given to the land occupiers.

This will be followed by RAB drilling traverses of radiometric anomalies that may be indicating a uranium mineralisation source.

RAB traverses should also be completed on existing access to investigate the bedrock in areas of no outcrop where suitable host stratigraphy and lithologies such as the Lower Cahill Formation equivalents, Whites Formation equivalents and the Koolpin Formation may be expected.

A proposed Expenditure for this is attached as Table 4.

If targets remain after the initial reconnaissance and drilling is justified, the expected expenditure would be in the vicinity of $110,000 as detailed below in Table 4.

***Table 4: Proposed Expenditure 2007 to 2008***

| **Activity** | **Amount** |
|---|---|
| | |
| Geological Staff/Contractors | $20,000 |
| Logistics (Helicopter) | $10,000 |
| Drilling Expenses | $50,000 |
| Survey, Site Preparation | $4,000 |
| Analytical Costs | $10,000 |
| Heritage Costs | $3,000 |
| Travel & Accommodation | $10,000 |
| Administration | $3,000 |
| | |
| **TOTAL** | **$110,000** |

# APPENDIX 1- UTS GEOPHYSICAL LOGISTICS REPORT

**Logistics Report**

for a

# DETAILED AIRBORNE MAGNETIC, RADIOMETRIC AND DIGITAL TERRAIN SURVEY

for the

# BYNOE AREAS, LOVE CREEK AND SWIM CREEK PROJECTS

carried out on behalf of

## URANEX NL

by

UTS GEOPHYSICS

(UTS Job #A789)

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# 1 GENERAL SURVEY INFORMATION

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

Uranex NL
Level 2, 28-42 Ventnor Avenue
West Perth WA 6005

Acquisition for this survey commenced on the 28th August 2006 and was completed on the 21st November 2006. The base location used for operating the aircraft and performing in-field quality control was Darwin, Northern Territory, Australia.

# 2 SURVEY SPECIFICATIONS

The areas surveyed were near Darwin 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 52 with a central meridian of 129 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 |
|---|---|---|---|---|---|---|
| Bynoe area 1 | 200m | 090-270 | 2000m | 000-180 | 40m | 2,064 |
| Bynoe Area 2 (Infill to area 1) | 200m (offset by 100m) | 090-270 | 2,000m (offset by 1000m) | 000-180 | 40m | 838 |
| Bynoe Area 3 | 200m | 090-270 | 2000m | 000-180 | 40m | 247 |
| Bynoe Area 4 | 200m | 090-270 | 2000m | 000-180 | 40m | 264 |
| Love Creek area 5 | 100m | 090-270 | 1000m | 000-180 | 40m | 5,188 |
| Swim Creek area 6 | 100m | 090-270 | 1000m | 000-180 | 40m | 6,561 |
| **TOTAL** | | | | | | **15,162** |

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-CYU. 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)<br>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.

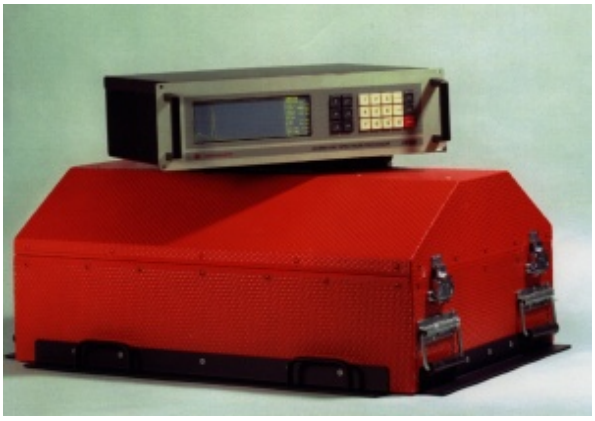
### 3.12 Radiometric Data Acquisition

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

| | |
|---|---|
| Uranex NL | Peter Robinson |
| UTS Geophysics Perth Office | Nino Tufilli<br>David Abbott<br>Barrett Cameron |

# 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 Maximum Noise Fraction (MNF) method described by Dickson and Taylor (1998). This method constructs a noise covariance model from the survey data, which is then decorrelated and re-scaled so that the model has unit variance and no channel-to-channel correlation.

A principal component transformation of the noise-whitened data is performed, and the number of components to be saved is determined by ranking the eigenvectors by signal-to-noise ratio. The signal-rich components are retained, and the spectral data reconstructed without the noise fraction.

Channels 30-250 only are noise-cleaned, 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 noise-cleaned 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 corrected count rate data was then converted to ground concentrations for potassium, uranium and thorium (sensitivity coefficients are supplied in Appendix E).

Final micro-levelling techniques were then selectively applied to the tie line levelled data to remove minor residual variations in profile intensities. Located and gridded data were generated from the final processed radiometric data.

### *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:**

**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: A789**

# 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: A7890101
Client: Uranex NL
Job: Bynoe
Coordinates MGA94 Grid Zone: 52
Include Point: 653750.0 0.00

Surround

| | |
|---|---|
| 653500.000 | 8599300.000 |
| 661800.000 | 8599300.000 |
| 661800.000 | 8587805.000 |
| 671900.000 | 8587805.000 |
| 671900.000 | 8577000.000 |
| 669900.000 | 8577000.000 |
| 669900.000 | 8575000.000 |
| 656400.000 | 8575000.000 |
| 656400.000 | 8577000.000 |
| 653500.000 | 8577000.000 |

COORDINATES REPORT

Job ID code: A7890201
Client: Uranex NL
Job: Bynoe
Coordinates MGA94 Grid Zone: 52
Include Point: 653750.0 0.00

Surround

| | |
|---|---|
| 666300.000 | 8587805.000 |
| 666300.000 | 8594500.000 |
| 667400.000 | 8594500.000 |
| 667400.000 | 8595500.000 |
| 671900.000 | 8595500.000 |
| 671900.000 | 8587805.000 |

COORDINATES REPORT

Job ID code: A7890301
Client: Uranex NL
Job: Bynoe-
Coordinates MGA94 Grid Zone: 52
Include Point: 654750.0 100.00

Surround

| | |
|---|---|
| 662600.000 | 8587800.000 |
| 666300.000 | 8587800.000 |
| 666300.000 | 8594500.000 |
| 667400.000 | 8594500.000 |
| 667400.000 | 8595500.000 |
| 671900.000 | 8595500.000 |
| 671900.000 | 8577000.000 |
| 669900.000 | 8577000.000 |
| 669900.000 | 8575000.000 |
| 664400.000 | 8575000.000 |
| 664400.000 | 8580700.000 |
| 662600.000 | 8580700.000 |

COORDINATES REPORT

Job ID code: A7890401
Client: Uranex NL
Job: Bynoe
Coordinates MGA94 Grid Zone: 52
Include Point: 0.0 0.00

Surround

| | |
|---|---|
| 681100.000 | 8558600.000 |
| 678700.000 | 8558600.000 |
| 678700.000 | 8567800.000 |
| 686000.000 | 8567800.000 |
| 686000.000 | 8564800.000 |
| 682100.000 | 8564800.000 |
| 682100.000 | 8560100.000 |
| 681100.000 | 8560100.000 |

COORDINATES REPORT

Job ID code: A7890501
Client: Uranex NL
Job: Bynoe
Cordinates MGA94 Grid Zone: 52
Include Point: 687900.0 0.00

Surround

| | |
|---|---|
| 687895.000 | 8576900.000 |
| 690000.000 | 8576900.000 |
| 690000.000 | 8575100.000 |
| 693905.000 | 8575100.000 |
| 693905.000 | 8567800.000 |
| 690400.000 | 8567800.000 |
| 690400.000 | 8568300.000 |
| 688400.000 | 8568300.000 |
| 688400.000 | 8571500.000 |
| 687895.000 | 8571500.000 |

COORDINATES REPORT

Job ID code: A7890601
Client: Uranex NL
Job: Love Creek
Coordinates MGA94 Grid Zone: 52
Include Point: 0.0 0.00

Surround

| | |
|---|---|
| 815000.000 | 8614200.000 |
| 815000.000 | 8634600.000 |
| 814900.000 | 8635600.000 |
| 814100.000 | 8636800.000 |
| 814100.000 | 8644700.000 |
| 817700.000 | 8644700.000 |
| 817700.000 | 8641900.000 |
| 821100.000 | 8640300.000 |
| 835600.000 | 8637400.000 |
| 838800.000 | 8633900.000 |
| 838800.000 | 8631800.000 |
| 828600.000 | 8618800.000 |
| 818000.000 | 8615200.000 |
| 818000.000 | 8614200.000 |

# COORDINATES REPORT

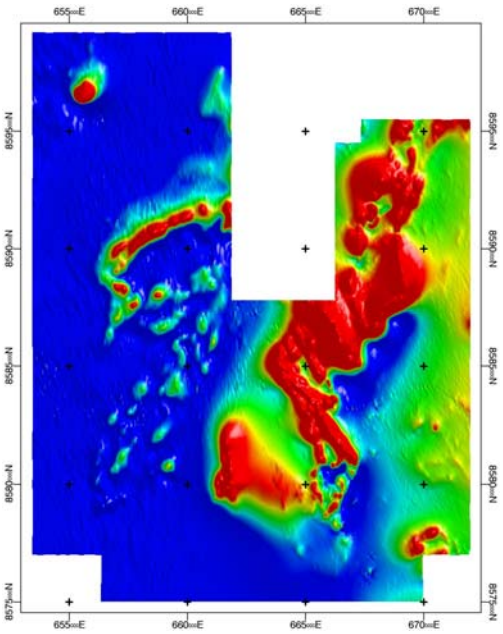
Job ID code: A7890701
Client: Uranex NL
Job: Swim Creek
Coordinates MGA94 Grid Zone: 52
Include Point: 0.0 0.00

Surround

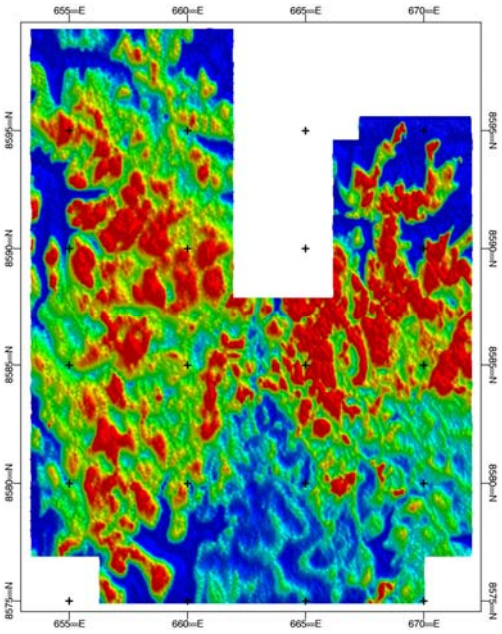
| | |
|---|---|
| 800600.000 | 8603700.000 |
| 818000.000 | 8603700.000 |
| 818000.000 | 8587400.000 |
| 822800.000 | 8587400.000 |
| 822800.000 | 8580600.000 |
| 818800.000 | 8579200.000 |
| 812400.000 | 8579200.000 |
| 810000.000 | 8577700.000 |
| 810000.000 | 8576800.000 |
| 801900.000 | 8576800.000 |
| 801900.000 | 8579400.000 |
| 792900.000 | 8579400.000 |
| 792900.000 | 8581400.000 |
| 789200.000 | 8581400.000 |
| 789200.000 | 8584900.000 |
| 790500.000 | 8584900.000 |
| 790500.000 | 8591700.000 |
| 804400.000 | 8591700.000 |
| 804400.000 | 8594300.000 |
| 801700.000 | 8598300.000 |
| 800900.000 | 8602200.000 |

# APPENDIX D - PROJECT DATA OVERVIEW

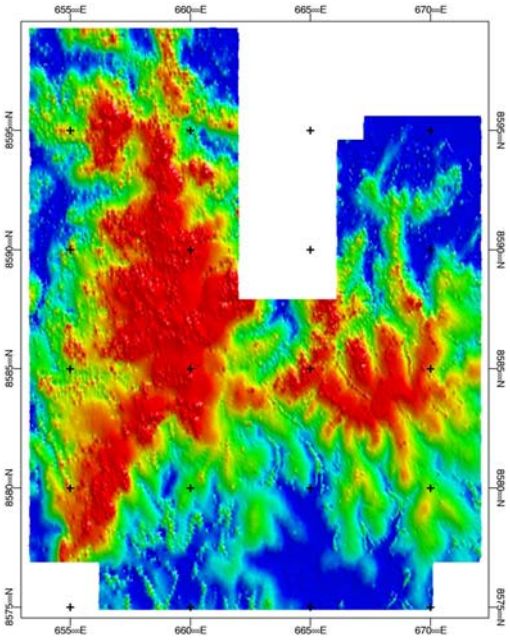
Bynoe Area 01 and Infill Project




Total Magnetic Intensity

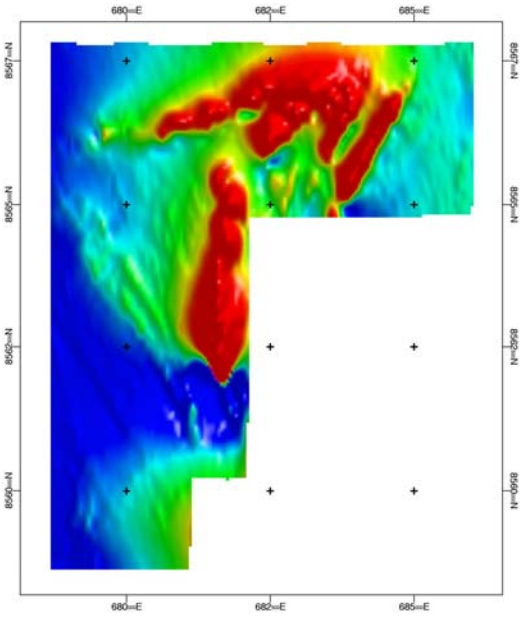



Radiometric Total Count

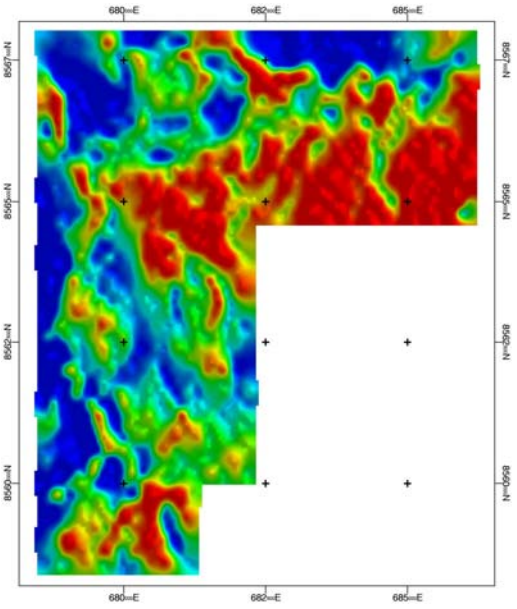



Digital Terrain Model

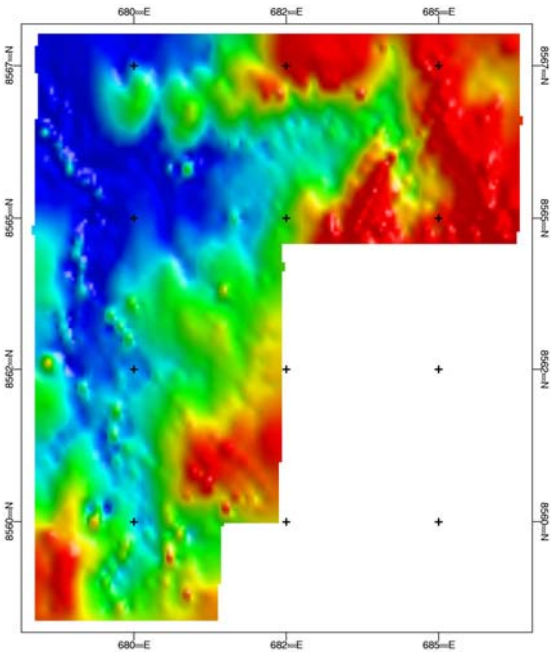
# Bynoe Area 03 Project




Total Magnetic Intensity

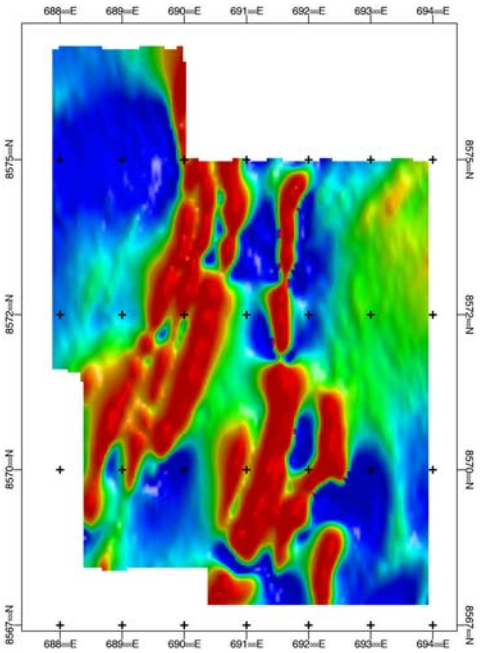



Radiometric Total Count

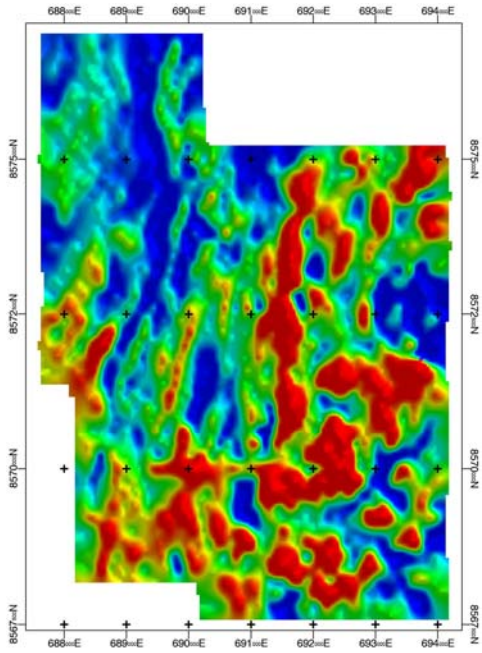



Digital Terrain Model

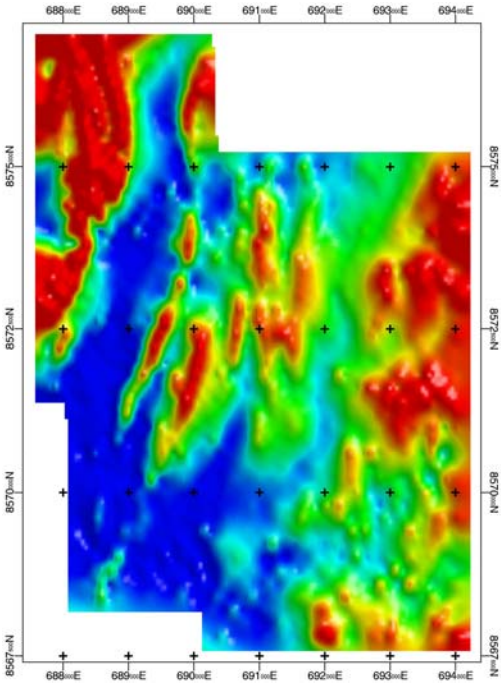
# Bynoe Area 04 Project




Total Magnetic Intensity

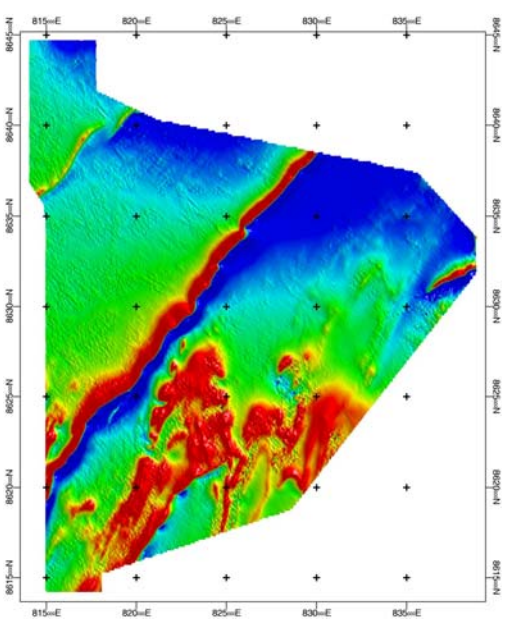



Radiometric Total Count

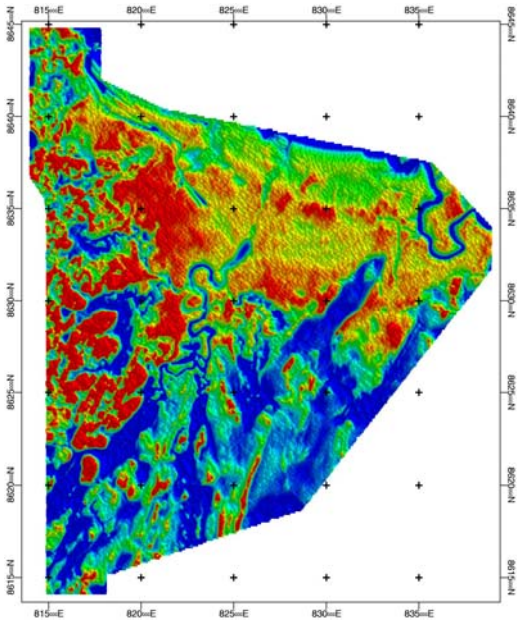



Digital Terrain Model

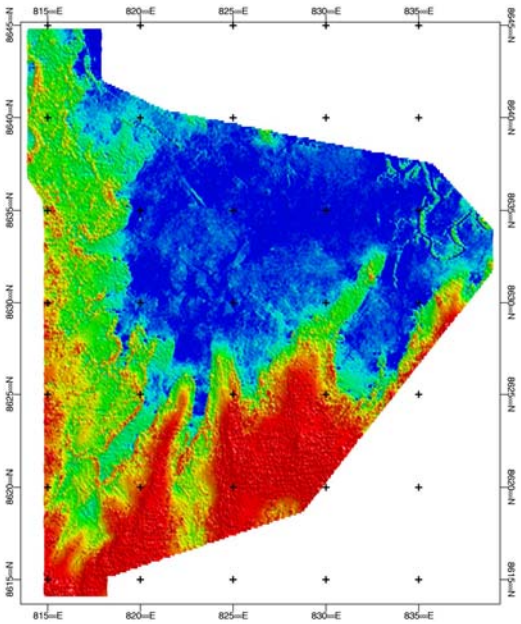
# Love Creek Area 05 Project




Total Magnetic Intensity

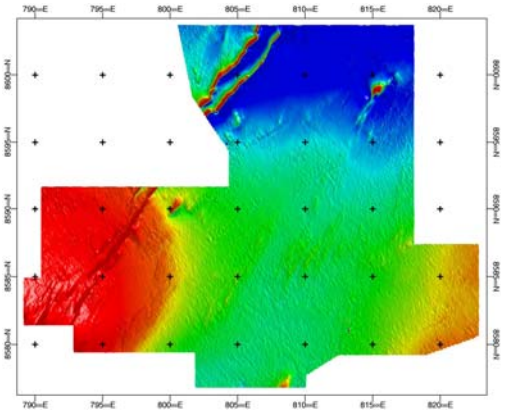



Radiometric Total Count

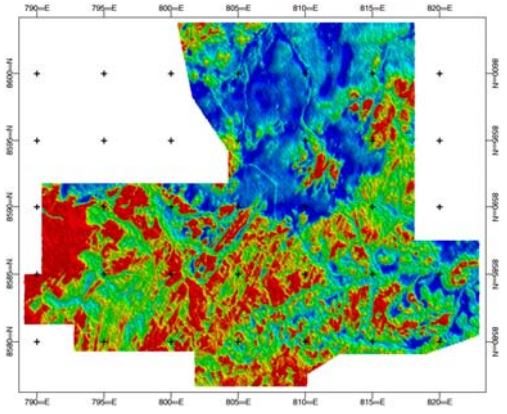



Digital Terrain Model

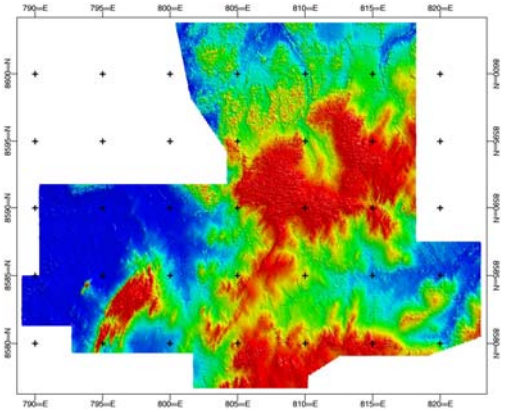
# Swim Creek Area 06 Project




Total Magnetic Intensity




Radiometric Total Count




Digital Terrain Model

# APPENDIX E – ACQUISITION AND PROCESSING PARAMETERS

## Magnetic Processing Parameters

**Bynoe Area 01 and infill**

IGRF date - 2006.66
IGRF mean value - 46673.63 nT
Magnetic inclination - -40.42 deg
Magnetic declination - 3.51 deg
Diurnal base value - 46220.00 nT

**Bynoe Area 03,04, 05,06**

IGRF date - 2006.73
IGRF mean value - 46778.29 nT
Magnetic inclination - -40.72 deg
Magnetic declination - 3.56 deg
Diurnal base value - 46225.00 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: | 41.2 cps/dose rate |
| Potassium: | 164.5 cps/%k |
| Uranium: | 17.4 cps/ppm |
| Thorium: | 8.3 cps/ppm |

**Final Reduction -** All data reduced to STP height datum 40m