# ANNUAL TECHNICAL REPORT

## EL 26924 – YEURALBA

### PERIOD ENDING 7 DECEMBER 2011

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<th><strong>Title holder</strong></th>
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<td>Annual Technical report for EL 26924 – Period ending 7/12/2011</td>
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<td><strong>Company Reference No:</strong></td>
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<td><strong>Target Commodity or Commodities</strong></td>
<td>Uranium and Base Metals</td>
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</tbody>
</table>
CONTENTS

EXECUTIVE SUMMARY

1. LOCATION, TOPOGRAPHY AND ACCESS

2. PREVIOUS EXPLORATION

3. GEOLOGY

4. GA AEM AIRBORNE SURVEY

5. 2010 - GA AIRBORNE GEOPHYSICS

6. EXPLORATION POTENTIAL

7. REFERENCES

ATTACHMENTS

1. GA AEM SYNTHETIC PROFILES – GA AEM FLIGHT LINES
2. GA MAGMAP V5 2010 – GA AEM FLIGHT LINES
3. GA RADMAP 2010 – URANIUM eU RADIOACTIVITY – GA AEM FLIGHT LINES
4. GA RADMAP 2010 – TC RADIOACTIVITY – GA AEM FLIGHT LINES
5. GOOGLE EARTH IMAGE – GA AEM FLIGHT LINES
6. NTGS GEOLOGY – GA AEM FLIGHT LINES
7. 90M SRTM DEM – GA AEM FLIGHT LINES
EXECUTIVE SUMMARY

A review has been completed on the exploration potential of this tenement. Utilising images (attached) from the GA Airborne geophysics, it is apparent that there is an almost universally low total count radiometric response over the Mamadawerre Sandstone. In addition, there is a strong anomalism on the southern side of the unconformity with the underlying Tollis Formation, possibly associated with uranium mineralisation.

The eU radiometric image is similar and shows general coincidence of anomalies with total count radioactivity.

The significant conductors present on both flight lines warrant the consideration of infill EM lines at about 500m (or less) spacing. This work would provide a reasonably satisfactory 3D model from which viable drill targets could be assessed.

Gold, PGM, uranium and base metal mineralisation similar to Coronation Hill style in acid volcanics of the Tollis Formation and perhaps also similar to those mined deposits (Carpentaria) in the adjacent Maude Creek Goldfield could be explored for by detailed geochemical stream sediment and soil sampling.
1. LOCATION, TOPOGRAPHY AND ACCESS

EL 26924 of 18 sub-blocks was first granted to Softwood Plantations Pty Ltd on 11 October 2007. Preparatory to the ASX listing Outback Metals Limited (OUM) made an outright purchase of Softwood Plantations.

The EL is located about 290km south east of Darwin and immediately to the east of the Maude Creek Goldfield. The country is mainly very rugged hill country with prominent SE trends and deeply incised tablelands and lies immediately to the south of the Katherine Gorge National Park (Nitmiluk) and to the east of the Park Access Road, where numerous eastward-heading 4WD tracks were observed in 2011.

2. PREVIOUS EXPLORATION

The following mineral exploration using modern techniques has been undertaken previously.

- Pancontinental Mining in j/v with Buka Minerals and Western Nuclear, 1972-75 on EL 145 for uranium, carried out an airborne radiometric survey but mainly focussed on the known ABC Uranium Prospect NW of Katherine (Cox, 1975).
- Hunter Resources, 1987-88 on EL 4824 for gold and base metals. A regional geochemical stream sediment program (39 samples assayed for gold, arsenic, copper, lead, zinc) was carried out with no results of particular interest within EL 26924 (Nicholson, 1988).
- Jettner and Trescale, 1988-91 on EL 6141 for gold and base metals. Geochemical soil and stream sediment sampling was carried out but there are no results of significance within EL 26924 (Jettner, 1991).
- Jettner and Trescale for RM Biddlecombe, 1988-93 on EL 6198 for gold and base metals by soil geochemical sampling and trenching mainly in the Maude Creek Goldfield outside of the EL (Jettner, 1992).

There are no mineral occurrences as listed in the MODAT database within the boundaries of the EL.

3. GEOLOGY

EL 26924 contains the complex geology of four major overlapping sedimentary basins overlain by Palaeogene sediments (Cainozoic sands and ferricrete).

**Dunmarra Basin**

There is extensive cover of Cretaceous rocks over both the SE and SW parts of the EL. Kruse et al (1994) and Ferenczi et al, (2005) describe these as up to 40 m thick, forming tablelands and numerous mesas capping Pine Creek Orogen, Wiso and McArthur Basin rocks. Bedding in the Cretaceous strata is generally horizontal to subhorizontal. Cretaceous sedimentary rocks have generally remained tectonically stable following lithification and have a well-developed laterite profile in most places.
Wiso and Daly Basins
There are two basal units of the basin occurring on EL 26924 being the Kalkaringi Volcanics (formerly Antrim Plateau Volcanics) and the Jindare Formation as described by Kruse et al 1994:

Jindare Formation
Dark purple-brown sandstones overlying and often interbedded with the Kalkaringi Volcanics are referred to as the Jindare Formation. The Formation usually crops out as low hills or sinuous ridges, commonly more thickly vegetated than adjacent volcanic derived terrain. Individual outcrops are typically tabular benches of dark brown, dark purple or red-brown, fine-to coarse-grained quartzofeldspathic sandstone, often with characteristic low- or less commonly high-angle cross-beds in sets up to 1 m thick. Rarely, these sandstones may weather via orange-brown to almost white. Conglomerates of angular, rounded and tabular pebbles occur locally.

Kalkaringi Volcanics
The formation is exposed along the margin of the Daly Basin as bouldery outcrops or as scattered cobble and boulder rubble on sparsely vegetated, cracked black soils. Dark grey-green to purple-brown tholeiitic basalt and dolerite are the principal rock types.

McArthur Basin
The basal unit of the Kombolgie Subgroup, the Mamadawerre Sandstone, outcrops in the northern part of the EL. Further to the north it is overlain by the Nungbargarri Volcanics, also elevated to formation rank from its former member status. Ferenczi and Sweet (2005) describe the Mamadawerre Sandstone as comprising medium to coarse, quartz-rich sandstone, subordinate granule and pebbly sandstone, and minor siltstone and conglomerate. It is the most widely exposed formation of the Kombolgie Subgroup, forming extensive outcrops in the Arnhem Land Plateau. Thickness estimates of the Mamadawerre Sandstone on the main Arnhem Land Plateau vary up to more than 1000m but on EL 26924 it is less than 100m.

Pine Creek Orogen (PCO)
The Palaeoproterozoic Tollis Formation as identified by Needham et al in 1986 is a member of the Finniss River Group. It is typified by thin to thick beds of alternating greywacke and (meta)mudstone, tuff and minor conglomerate, altered mafic to intermediate volcanic rocks and banded ironstone. Poorly sorted, coarse- to fine-grained, and less common gritty or pebbly (<1 em), volcanolithic greywacke is the dominant rock type, forming massive, commonly graded beds up to 1 m thick.

In the far NW part of the EL basaltic lavas, tuff and sills of the Dorothy Volcanic Member form a 200m-thick unit sporadically exposed southeast of Maud Creek. Kruse et al describe the basalt as strongly altered, with secondary quartz and sericite and some primary pyroxene and plagioclase phenocrysts.

The Burrell Creek Formation, also of the Finniss River Group, does not crop out in the EL but is suspected to underlie the Tollis Formation here. Kruse et al describe it as consisting of interbedded mudstone and greywacke and significantly it is lacking in volcanolithic rocks seen elsewhere in the PCO.

Intrusives
Massive medium-grained, dark grey quartz dolerite dykes of the Maud Dolerite intrude the Tollis Formation in the far NW part of the EL near Maud Creek, where it forms irregular bodies
up to 200m across (Needham et al, 1986). Gold and copper mineralisation in quartz-filled shear zones is known within the dolerite at Maud Creek and at the Carpentaria prospect WNW and NW of the EL respectively.

4. GA AEM AIRBORNE SURVEY

The 2009 GA AEM survey was funded under the Australian Government’s Onshore Energy Security Program, and was managed and interpreted by Geoscience Australia’s Airborne Electromagnetic Acquisition and Interpretation Project. This Kombolgie survey, in the Pine Creek Orogen region, covered sections of the Cobourg Peninsula, Junction Bay, Alligator River, Milingimbi, Mount Evelyn, Katherine, and Urapunga 1:250 000 map sheets. It covered a total of 8,800 line km and an area of 32,000 km². The data were acquired under contract by Geotech Airborne Pty. Ltd. using its VTEM TM helicopter-borne electromagnetic system. These data were inverted using a layered earth inversion algorithm being the GA-LEI layered-earth inversion software developed at Geoscience Australia. The main products which have been utilised on EL 26924 are geo-referenced images of pseudo-sections of conductivity.

EL 26924 has partial VTEM coverage provided by two E-W flight lines spaced about 5 km apart:

**Line 12550**

This line is in the northern part of the EL and traverses mainly Tollis Formation but a short 1.15km tongue of the Mamadawerre Sandstone (formerly Lower Kombolgie Formation) is included. From near surface to about 75m depth there is an undulating zone of weak to moderate conductivity which is interpreted as the depth of weathering and groundwater in the Tollis Formation. The zone passes under the Mamadawerre Sandstone and probably approximates the unconformity with the Tollis Formation.

Below this there is a 200m thick undulating zone of moderate to strong conductivity, the cause of which is not clear, but it might be a concealed intrusion of the Maude Creek Dolerite at the Tollis Formation/Burrell Creek Formation contact. The zones of strong conductivity might be caused by accumulations of base metal sulphides with gold mineralisation. However at about 500m and more depth they are marginal deep drill targets.

**Line 12560**

This line is located at the far southern part of the EL and similarly has a near surface zone of conductors that are much stronger than on Line 12550 probably indicating an increase in groundwater salinity. Below and merging with this zone are many inverted “U” and “V” shaped zones of moderate to very strong conductors which are strongly folded and faulted. The cause of these is not clear but they could be sulphide rich horizons +/- gold, possibly in the Burrell Creek Formation or iron stones or BIFs at the base of the Tollis Formation. Some of these are at a sufficiently shallow depth to warrant drill testing.

5. GA AIRBORNE GEOPHYSICS

The EL is covered by the Mary River 2000 airborne survey carried out by Kevron Geophysics for GA and NTGS. Flight lines were E-W at 400m spacing. These data have been recently re-processed by NTGS and GA and integrated into levelled National datasets as described below.
**GA 2010 Magnetics**
The TMI image shown was cut from the GA 5th edition full-colour Magnetic Anomaly Map of Australia at 1:5 million scale, and accompanying composite dataset with cell resolution of 3 seconds of arc, have been compiled. GA estimated that 27 million line-kilometres of survey data was acquired to produce this new edition, which is eight million line-kilometres more than for the previous edition released in 2004. New independent airborne total-field magnetic data acquired in 2007 during the AWAGS have been used to increase the accuracy of intermediate wavelengths of the continental-scale merge of the grids.

The TMI image shows that EL is located within a moderately disturbed magnetic zone transected by two prominent ENE trending magnetic linears that may be concealed mafic dykes coeval with the Maude Creek Dolerite sill.

Within the NE corridor formed by the above mentioned linears there are three SE trending linear magnetic dipoles. Although these may well be mafic intrusions, perhaps older than the Maud Creek Dolerite, into the Tollis Formation, it is suspected that they are probably magnetic responses from magnetite rich material in the overlying Kalkaringi Volcanics.

**GA 2010 Radiometrics**
The TC and eU images were cut from the new 2010 GA radioelement map of Australia, the Radiometric Map of Australia, which was compiled showing the distribution of airborne measured potassium (percent K), uranium (ppm equivalent U) and thorium (ppm equivalent Th) over 80 percent of the Australian continent at 100 metre resolution (Minty et. al., 2009). The map was calibrated with the AWAGS to adjust all the public-domain radiometric surveys in Australia to the International Atomic Energy Agency's (IAEA) Global Radioelement Datum. The new datum provides a baseline for all current and future airborne gamma-ray spectrometric surveys in Australia.

In the appraisal of the images it was noted that there is an almost universally low total count radiometric response over the Mamadawerre Sandstone. However immediately on the southern side of the unconformity with the underling Tollis Formation there is a moderately strong anomalism and some anomalism may be caused by unconformity related uranium mineralisation. Further to the south of the unconformity there are SE trending ridges of anomalies which appear to cut across both topographic and geological trends. At this stage it is suspected that some of these anomalies may be related to the erosion and NE retreat of the Mamadawerre Sandstone unconformity but the fact that they continue and persist into outcrop of Kalkaringi Volcanics is somewhat puzzling.

The eU radiometric image is similar and shows general coincidence of anomalies with total count radioactivity. However there is some uranium anomalism within the Kombolgie Formation but the cause is not understood.

**Recommendations**
The significant conductors present on both flight lines warrant the consideration of infill EM lines at about 500m or less spacing. This work would provide a reasonably satisfactory 3D model from which viable drill targets could be assessed.
EXPLORATION POTENTIAL

Apart from the drill targets highlighted by the GA AEM survey, the writer is of the opinion that the EL has potential for:

- **Unconformity related uranium mineralisation in the Tollis Formation** which should be explored with a detailed 25m flight line spaced airborne survey such as used by Thomson Aviation with their Airtractor.

- **Gold, PGM, uranium and base metal mineralisation similar to Coronation Hill style in acid volcanics** of the Tollis Formation and perhaps also similar to those mined deposits (Carpentaria) in the adjacent Maude Creek Goldfield, which could be explored for using detailed geochemical stream sediment and soil sampling.

- **Gold, base metal and perhaps uranium mineralisation associated with the ENE trending concealed mafic intrusions** similar to Westmoreland style mineralisation which could be explored for with a detailed airborne radiometric survey.

- **Potential iron ore in ferricretes and possible CIDs overlying or associated with the basal Cretaceous rocks** which should be initially reconnoitred by VHR remote sensing.

- **Potential sandstone hosted roll front uranium mineralisation in the fluviatile Cretaceous rocks** which should be explored for by a detailed 25m flight line spaced airborne survey such as used by Thomson Aviation with their Airtractor.

REFERENCES


Jetner AW 1991 - Final report Maud Creek exploration licence for Trescabe. OFCR 1991-0035


Nicholson PM 1988 - Initial exploration EL 4824 Maranboy area, NT. Hunter Resources OFCR 1988-0242
