Combined Annual Report for the Period
14\textsuperscript{th} Feb 2008 – 13\textsuperscript{th} Feb 2009

EXPLORATION LICENCES 26006 & 26012

ARUNTA PROJECT

\textbf{Tenement Holders:} Arunta Uranium Pty Ltd ACN 127 112 323
(Subsidiary of Callabonna Uranium Ltd)

\textbf{Submitted by:} Callabonna Uranium Ltd

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28\textsuperscript{th} March 2009
EXECUTIVE SUMMARY

EL26006 and 26012 are located near Alice Springs and are held by Arunta Uranium Pty Ltd., a wholly-owned subsidiary of Callabonna Uranium Ltd (CUL). The tenements form part of CUL’s Arunta project. EL26006 is subject to a joint venture with NuPower Resources Ltd who is the operator. The joint venture is targeting sandstone-hosted uranium deposits amenable to mining by in-situ leach. Calcrete-hosted uranium is a secondary target. Work carried out on EL26006 during the reporting period included gravity measurements, an airborne EM survey and analysis of water from several existing water bores. Work on EL26012 has consisted of review of previous exploration results. The field program on EL26012 was delayed owing to adverse market conditions postponing CUL’s planned float.
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INTRODUCTION

Arunta Uranium Pty Ltd is a wholly owned subsidiary of Callabonna Uranium Ltd (CUL) and holds a 100% interest in Exploration Licences 26006 and 26012 ("the Arunta Project"). NuPower Resources Ltd is in joint venture with CUL over EL26006 and is the operator.

The joint-venture is targeting sandstone-hosted uranium deposits amenable to mining by in-situ leach similar to those in SW Kazakhstan.

A secondary target is calcrete-hosted uranium within recent channels and playa lake systems, similar to the Napperby deposit with an inferred resource of 3,350 tonnes contained U₃O₈.

TENURE

Exploration licence 26006 was granted on 14 February 2008 for a period of 6 years and 26012 were granted on 18 December 2007 for a period of six years (Table 1). The two tenements cover a total area of 383 sub-blocks and 1,173.9 square kilometres.

<table>
<thead>
<tr>
<th>Tenement</th>
<th>Name</th>
<th>Granted</th>
<th>Expiry</th>
<th>Sub-Blocks</th>
<th>Area Sq Kms</th>
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</thead>
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<tr>
<td>EL 26006</td>
<td>Mt Hay</td>
<td>14-Feb-08</td>
<td>13-Feb-14</td>
<td>257</td>
<td>797.3</td>
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<td>EL 26012</td>
<td>Undoolya</td>
<td>18-Dec-07</td>
<td>17-Dec-13</td>
<td>126</td>
<td>376.6</td>
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</table>

Table 1. Tenement Details

NATIVE TITLE

One Native Title Claim occurs within EL 26006 (Fig. 1, Table 2). No ground work has been carried out within this claim.
<table>
<thead>
<tr>
<th>Name</th>
<th>Federal Court Number</th>
<th>NNTT Number</th>
<th>Registration Date</th>
<th>Overlapping Arunta ELs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mt Everard</td>
<td>NTD36/05</td>
<td>DC05/12</td>
<td>20-Apr-06</td>
<td>EL 26006</td>
</tr>
</tbody>
</table>

Table 2. Native Title Claims over the Arunta Project

LOCATION & ENVIRONMENT

The Arunta Project is located to the north and northwest of Alice Springs in the MacDonnell Shire local government area. The tenements can be accessed via the Stuart Highways and Tanami Road. Other minor roads and unpaved tracks are also available for travel. The Alice Springs to Darwin Railway Line also travels by the project area providing good access to infrastructure. In the arid climate, average rainfall ranges from 8 mm a month during the dry season to 42 mm a month during the wet season but rainfall can vary quite significantly from year to year. The mean annual temperatures range from a summer maximum of 36°C to a winter minimum of 4°C, with a mean diurnal variation of about 13°C. The land is flat to gently undulating desert plains and low rocky foothills at the base of the McDonnell Ranges covered by acacia woodlands and grasslands. A majority of the land is covered by pastoral leases where the primary land use is cattle grazing.

EXPLORATION RATIONALE

EL26006 and 26012 were originally taken out in order to explore for calcrete-hosted uranium. Calcrete-hosted uranium deposits are near-surface concentrations within major drainage systems (including playa lakes) experiencing a contemporary semi-arid to arid climate. Fluvial sediments are cemented by secondary minerals including calcite, dolomite, and gypsum. Uranium typically occurs as carnotite which is deposited as a chemical precipitate late in the formation of the calcrete. In the Arunta region uranium-enriched granitoids are a potential source of uranium, although mafic rocks may be required to furnish vanadium. The Napperby deposit (inferred resource 3,350 tonnes U₃O₈) demonstrates that suitable ore-forming processes have operated in the region.

Recognition of extensive Tertiary Basins and their similarity with those hosting uranium deposits in South Australia (e.g. Beverley, Honeymoon, Four Mile) suggests prospectivity in the Arunta region for sandstone-hosted uranium. These deposits tend not to have a substantial surface radiometric response and exploration typically involves defining aquifer units using airborne EM with systematic drill-testing of potential host channels. Sampling of bore water can help to limit the area required to be drilled. This target style is the current focus of exploration within EL26006 undertaken by the NuPower/CUL joint venture.

EXPENDITURE

During the period a total of $112,545 was spent on this project, mainly on EL26006 but including $3,750 on EL26012. Under the Exploration Licence agreements Callabonna was required to spend a minimum of $44,000 on EL 26006 and a minimum of $26,000 on EL 26012. The expenditure commitment has been met for EL 26006, however due to extenuating circumstances (postponement of CUL’s planned float) Callabonna was unable to meet the minimum expenditure commitment for EL 26012.
Much of EL26006 is underlain by Cenozoic sediments of unknown thickness. EL26012, however, is underlain primarily by Proterozoic gneisses, amphibolite and lesser schist. A variety of gneisses have been mapped (Fig. 2) including augen or porphyroblastic textured and some contain garnet.

A high strain zone occurs to the immediate north of EL26012 (pale blue in figure 2 marked P). The magnetic image in figure 3 defines an ENE-WSW trending fault zone coincident with the mapped high strain zone. This image also suggests a major east-west trending boundary to the south of the tenement that is not reflected in the 250,000 scale mapping.

Potential for calcrete-hosted deposits is greatest in the southern portion of the tenement where Cenozoic sediments onlap the Proterozoic rocks.
CAINOZOIC GEOLOGY

The southern NT forms a “basin and range” province with Proterozoic and Palaeozoic rocks forming prominent ranges separated by broad valleys occupied by at least twenty Cainozoic sedimentary basins (Senior et al., 1995). Average sediment thickness ranges from about 180m to as much as 500m. The Mt Hay tenement covers portions of the Sixteen Mile and Burt Tertiary Basins (Fig. 4).

The stratigraphy of these basins is poorly known due to a lack of outcrop, intense weathering and paucity of drillholes. Drilling in the Sixteen Mile Basin indicated considerable thicknesses of probable Tertiary sediments including carbonaceous shales and clay with thin lignite seams (Hossfeld, 1954; Edworthy, 1967).

The Hale Basin was explored extensively for coal ( lignite) and sedimentary uranium during the late 1970’s and early 1980’s. This basin is considered to represent a generalised Tertiary stratigraphy for the southern Northern Territory. Senior et al. (1994) defined a two-fold stratigraphic subdivision that corresponds well with the observed pattern of Cainozoic sedimentation elsewhere in southern Australia. It comprises a restricted, fluvial palaeochannel dominated Palaeogene succession (Hale Formation) overlain by a more widespread, dominantly lacustrine Neogene succession (Waite Formation). An additional stratigraphic unit, the Napperby Formation (Higgins, 2009) has since been recognised as overlying the Waite Formation and represents the development of prograding alluvial fans shed from the ranges flanking the Cainozoic Basins.

There are strong similarities between the Tertiary basins of the Northern Territory and Eocene sediments in southern Australia that host significant uranium deposits (Higgins, 2009).
Figure 4: Tertiary Basins of the Alice Springs area
PAST EXPLORATION

AP2710 CRA
There is minimal overlap of this tenement with EL26006. The target was “sedimentary uranium” in Tertiary and Mesozoic rocks. Work carried out included analysis of groundwater and gamma-ray logging of open water bores as well as carborne scintillometer traverses. Stream sediment sampling of potential uranium source rocks revealed a maximum uranium value of 5 ppm. Two sampled bores fall within EL26006 and these returned uranium values of 7 and 18 ppb. The results were regarded as disappointing and did not justify further work.

AP2716 & 3384 & EL 440 CRA
AP2716 was granted to CRA in 1970 to search for Cu and Ni associated with ultramafic rocks. Helicopter supported stream sediment sampling was carried out, at a density of 1 per 6 km$^2$. Samples were assayed for Cu, Ni, Pb, Zn, Co, Cr, Mo, W and U. A maximum of 10 ppb U was returned with most samples at or below the detection limit of 1 ppb. Water bore sampling was also undertaken and a maximum of 2 ppb was returned.

Further work to “continue investigations into …. younger sediments …. for uranium” was proposed but apparently not carried out. The justification for this further work was not adequately explained, but the tenement was renewed as AP 3384.

Work done under AP 3384 included more drainage geochemistry (of basement rocks), seismic traverses at the edge of the Burt Plain Basin, carborne radiometric traversing, water analysis and gamma logging of water bores and a few auger drillholes. Water samples were analysed for uranium, sulphate, fluorine, TDS, pH and eH and radon. The results (maximum uranium 12 ppb, uniformly low gamma count) were considered to be insufficiently anomalous to warrant further investigation.

AP2889 CRA
AP2889 was granted to CRA in 1971 to search for Cu and Ni associated with ultramafic rocks. Helicopter supported stream sediment sampling was carried out, at a density of 1 per 6 km$^2$. This gave “no indication of the existence of economic concentrations of Cu, Ni or other base-metals”.

Stream sediment samples were also analysed for uranium and these covered most of EL26012. A maximum of 6 ppm U was found. Work done on EL26006 was confined to sparse carborne scintillometer surveys and analysis of water from several bores. Water samples were analysed for uranium, sulphate, fluorine, TDS, pH and eH and radon. A maximum of 6 ppb U and 2490x10^{-12} curies/l was found in EL26006. This work gave no indication of the existence of economic concentrations of uranium, but it was thought that the “average uranium content [not given] of the Precambrian upland could make it a suitable source for … deposits in younger rocks”.

EL518 CRA
The target for this tenement was sedimentary uranium. Work carried out included geological mapping, gamma logging of open water bores and water sampling. The latter revealed a maximum of 37 ppb (in Bulldust bore to the south of the current tenement) which was not regarded as significant. Downhole gamma results were low, variations reflecting “changes in lithology”. The tenement was relinquished post haste.

EL3100 CRA
The target for this licence was specific: a postulated graben near Hamilton Downs. Two drillholes were completed (to 98m) and gamma logged, but results were not encouraging, with oxidized clays persisting to 93m and only background gamma radiation. One hole was collared within EL26006 (RD82HD82).
EL6693 WHITE RANGE GOLD NL

There is minimal overlap of this tenement with EL26006. No work appears to have been carried out in the current tenement.

EL2618 WHITE INDUSTRIES Ltd

This tenement was granted in 1981 and lapsed the following year. The target was kimberlitic diamonds. A photogeological interpretation was completed by Hunting Geology & Geophysics who identified a number of targets that were not followed up. No field work appears to have been done. The photogeological interpretation is of little relevance to the current program.

EL2641 & 3599 WHITE INDUSTRIES Ltd & BHP

The target was also kimberlitic diamonds. Stream sediment samples were collected, examined for indicator minerals and analysed for a suite of elements including As, Ce, La, Ba, Nb, Zr, Cu, Pb, Zn, Co, Ni and Cr but excluding uranium. No indicator minerals or anomalous metals were found and BHP withdrew from the joint venture.

EL8126 ROEBUCK RESOURCES EL9565 & 9566 CRA/RTE

There is minimal overlap of this tenement with EL26006. It targeted the “Burt Plain magnetic anomaly” and several photogeological circular structures. A JV with CRAE was concluded in the second year of tenure and an airborne magnetic and radiometric survey completed, which included ELs 9565 & 9566. The high resolution airborne survey (1996) covered a significant portion of EL26006 (but none of EL26012). CRAE’s (later Rio Tinto Exploration) target was igneous intrusive hosted Ni-Cu-PGE. A GEOTEM survey was later completed (1997) for 3,900 line km.

A significant outcome from the GEOTEM survey was the identification of “moderately conductive dendritic palaeochannels …. draining to the north from basement highs”. Two basement conductors were followed up with ground EM (SIROTEM) and drilling. Five drillholes were completed within EL26006 and downhole conductivity and susceptibility logs carried out. No sulphide mineralisation was found, although the program was successful in outlining a highly deformed layered igneous complex. The deformation overprint coupled with lack of outcrop made it “difficult to recognize vectors to ore” in prospective parts of the complex and the tenements were relinquished.

ELs 10264, 10279 & 10280 JOHNSON’S WELL MINING

These Els were “situated well away from … current area of exploration”. The target was apparently Witwatersrand style gold. Databases were set up “to collate data received from exploration activities”, but it seems these databases never received data from the three listed ELs.

EL10359 TANAMI GOLD

Exploration by Tanami Gold consisted of “extensive” soil and rock sampling over the Whistleduck Gabbro. Soil samples were analysed for Au, Ag, Bi, Cu, Pb, Zn, Pt & Pd. No anomalous results were returned. One hundred and ten rock samples were analysed for Au, As, Bi, Cd, Co, Cu, Mo, Ni, Pb, Sb, W and Zn. No significant results were returned. The target model of shear-zone hosted quartz vein hosted gold analogous to the Winnecke Goldfields was abandoned and the tenement relinquished.

EL22615 BHP-BILLITON & MITHRIL RESOURCES

The target of this 2002 JV was Ni but apparently neither party was particularly enthused by the possibilities. Mithril withdrew in November 2002. BHP “reviewed” the project and relinquished the tenement in December 2003, having completed no work of substance.
SUMMARY

The area has long been recognised as prospective for “sedimentary” (aka sandstone-hosted or roll-front or tabular) uranium deposits. The current tenements have previously been explored for uranium by CRA in the early nineteen seventies. CRA’s tactical approach was to use widely spaced carborne scintillometer traverses and uranium/radon/gamma ray investigation of water bores. These tactics failed (unsurprisingly) to identify any anomalous uranium or radioactivity. The wide-spacing of the sampling is not ideal given the relatively small size of the target and likelihood of limited surface response. Furthermore, thin veneer of alluvial cover is likely to mask even a shallowly-buried radioactive source. A CRAE GEOTEM survey covering EL26006 revealed conductive drainages that have been better defined by the TEMPEST survey flown by the joint venture.
GRAVITY SURVEY

Forty-four gravity readings were completed on EL26006. These formed part of the Central Arunta Gravity Survey (CAGS) a joint initiative of the Northern Territory Geological Survey (“Bringing Forward Discovery initiative”) and Geoscience Australia. Sample spacing for the CAGS was a nominal 4 x 4km, but the joint venture funded collection of additional sample points to reduce the spacing in the area of interest to 2 x 2km (Fig. 5). The helicopter-supported survey employed a Scintrex CG-5 digital automated gravity meter that has all the features of the low noise industry standard CG-3M microgravity unit, but is smaller and lighter and has improved noise rejection. By constantly monitoring tilt sensors electronically, the CG-5 automatically compensates for errors in gravity meter tilt. Two Leica GPS1200 geodetic grade receivers were employed to provide spatial information. One receiver was used as a post-processed kinematic (PPK) rover in the helicopter. The second receiver was used as a base station for logging static data on the control station. A GPS/Glonass antenna was mounted on the tail-boom of the helicopter, with the receiver mounted on a custom mount inside the rear cabin of the helicopter. Navigation between gravity stations was facilitated by Garmin 296 GPS receivers operating in autonomous mode.

For more details the reader is referred to Mathews and Jecks (2008).

The new gravity data were successful in better delineating a major east-west trending structure that limits potential host-rocks to the south (Fig. 5).

![Figure 5: Image showing new gravity data superimposed on regional NT government data. The prominent gravity gradient corresponding to the southern extent of Proterozoic metamorphic rocks is accurately mapped.](image)

ANALYSIS OF WATER FROM BORES

Ten samples of bore water were collected within EL26006 and analysed for a suite of elements. Several measurements (e.g. pH, eH) were made onsite. Full analyses are presented as Appendix 1.
Table 1: Locations of bore water samples.

<table>
<thead>
<tr>
<th>SampleID</th>
<th>Name</th>
<th>E</th>
<th>N</th>
<th>Sample Depth (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>10032</td>
<td>Centenary Bore</td>
<td>340305</td>
<td>7414951</td>
<td>pumped</td>
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<tr>
<td>10033</td>
<td>Sandscreen Bore</td>
<td>337226</td>
<td>7409391</td>
<td>pumped</td>
</tr>
<tr>
<td>10034</td>
<td>Ironwood Hamilton</td>
<td>345467</td>
<td>7408069</td>
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<tr>
<td>10219</td>
<td>Cadney Bore</td>
<td>349055</td>
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</tbody>
</table>

Figure 6: Uranium content of bore water samples.

There are insufficient samples to define with confidence an anomaly threshold, nevertheless the 44 ppm uranium encountered in the Hamilton Downs bore is considered anomalous. Uranium values seem to decline to the north.

AIRBORNE EM SURVEY

Fugro Airborne Surveys Pty. Ltd. undertook an airborne TEMPEST electromagnetic and magnetic survey over EL26006 between the 1st of August 2008 and the 1st of October 2008. The survey was flown using a Shorts Skyvan SC-3-200 aircraft and was based out of Tennant Creek and Alice Springs. Temporary offices were set up at the Bluestone Motor Inn, Tennant Creek and the Elkira Best Western Motel, Alice Springs, where all survey operations were run and the post-flight data verification was performed. Full details of the survey and its specifications can be found in Appendix 2. Flight lines are shown in figure 7 and early and late time response in figures 8 and 9 respectively.

At the time of writing, processing and interpretation of these data had not been completed. Accordingly, further details will be provided in next years’ annual report.
Figure 7: TEMPEST flight lines.

Figure 8: Image of early time response. Note dendritic channel system clearly visible to north, draining to NW.
Figure 9: Image of late time response. Dendritic channel system better defined.
REFERENCES


