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SUMMARY

During the 2011-12 reporting period Callabonna Uranium Limited collected a total of 117 MMI soil samples.

A review of Callabonna’s tenement holdings in the Northern Territory, led to a decision to focus the Company’s resources on other higher priority targets within the Northern Territory. As a result, a decision was made to relinquish the entire licence.

INTRODUCTION

Callabonna Uranium’s Mt Hay project is located approximately 50 kilometres northwest of Alice Springs, Northern Territory (NT). The project area is situated on the Anburla (5551) and Burt (5651) 100K scale map sheets and lies within the boundary of Hamilton Down Cattle Station. Good access is provided by the sealed Tanami Road directly from Alice Springs.

The lease is dominated by flat aeolian plains covered with dense scrub vegetation that is primarily utilized for low density cattle grazing.

The climate is usually dominated by arid conditions throughout most of the year with the majority of thunderstorms and rainfall restricted to the October-March monsoonal months. However, this previous year has seen extremely high rainfall for the region which severely impeded exploration progress.

Figure 1 Callabonna Uranium Arunta Project exploration leases, N.T.
TENURE

The exploration lease was granted on the 14th of February 2008 for a period of six years and initially consisted of 257 sub-blocks, covering an area of 797.3 km².

<table>
<thead>
<tr>
<th>Tenement</th>
<th>Name</th>
<th>Granted</th>
<th>Expiry</th>
<th>Sub Blocks</th>
<th>Area (km²)</th>
</tr>
</thead>
<tbody>
<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>
</tr>
</tbody>
</table>

Mandatory reduction enforced on the second and third anniversary has since reduced the lease to 71 sub blocks – as shown in Figure 2.

![Figure 2 Extent of Mt Hay exploration lease. The map displays the lease extent prior to and after the third year anniversary reduction.](image)

Towards the end of the fourth year of tenure a decision was made to completely relinquish the Mt Hay exploration lease (EL26006), so that the Company could focus its attention on other project areas within the Northern Territory. As a result the license was surrendered on 25th January 2012.
**NATIVE TITLE**

One Native title Claim occurs within EL 26006. No groundwork has been carried out in this claim area.

<table>
<thead>
<tr>
<th>Name</th>
<th>Federal Court Number</th>
<th>NNT 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>

**GEOLOGY**

**Geological Setting**

Callabonna Uranium's Mt Hay Project is located within Palaeoproterozoic Aileron Province of the Arunta Region. The geology is dominated variable grade metasediments with maximum ages exceeding ca.1820 Ma intruded by variable aged granites. Following initial sedimentation, a significant period of magmatism occurred during the period 1790-1770Ma known as the Yamba Event, this was followed by a series of sporadic igneous intrusions initiating with the ca. 1771±6Ma Jervois Granite through to 1552±14 Kanandra Granite (Scrimgeour, et al., 2001; Zhao, et al., 1995). In the eastern Arunta, granulite protoliths underwent high grade metamorphism accompanied by intense asymmetrical deformation during the 1730-1715 Ma Strangways Event (Claoue-Long, et al., 2008; Collins, et al., 1995). The ca.1590 Ma Chewings Orogeny overprints earlier tectonothermal events and generated variable domains of metamorphism throughout the Arunta and Aileron Province (to the north) (Claoue-Long, et al., 2008). Later events including the Teapot (ca. 1130Ma),
Larapinta (ca. 480-460Ma) and Alice Springs (450-300Ma) events generated localized migmatization, shear zones and faulting (Claoue-Long, et al., 2008).

Figure 4 Tertiary Basins of the Alice Springs area

Local 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 drill holes. 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).

HISTORICAL EXPLORATION ACTIVITY

The area has long been recognized as prospective for sedimentary uranium deposits. The current tenements have previously been explored for uranium by CRA in the early nineteen seventies. CRA’s approach was to use widely-spaced carborne-scintillometer traverses and the sampling of water bores for uranium, radon and gamma-rays. These tactics failed 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. There is a detailed summary of this work in the “2008-09 Annual Report”.

EXPLORATION ACTIVITY

The exploration license EL26006 was originally taken out 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 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 of 3350 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.

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.

The new gravity data helped to better delineating a major east-west trending structure that limits potential host-rocks to the south. Details of this gravity survey are contained in the “2008-09 Annual Report”.

7
Airborne Electromagnetic Survey

Callabonna Uranium entered a farm out agreement with Nupower Resources Limited during the first year of tenure (early 2009). The license formed part of their Aileron Project, which covered an extensive area prospective for secondary uranium in channels. As part of their first pass on the Aileron Project they completed a regional Airborne EM survey over the project area including EL 26006.

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. Full details of the survey are detailed in the “2008-09 Annual Report”.

Airborne time domain electromagnetic data was collected at 1km line spacing over the entirety of the lease. The results of this survey over EL 26006 delineated potential shallow sand filled channels which could be prospective for uranium mineralization. In the following reporting periods, this data was subsequently cleaned of artifacts and gridded for analysis.

Callabonna Uranium Ltd interpreted that

![Callabonna Uranium Ltd interpretation of the palaeochannels from the Tempest AEM imagery.](image1)

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. These samples are listed in the following table.

<table>
<thead>
<tr>
<th>Sample ID</th>
<th>Name</th>
<th>Easting</th>
<th>Northing</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>
</tr>
<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>
<td>Pumped</td>
</tr>
<tr>
<td>10219</td>
<td>Cadney Bore</td>
<td>349055</td>
<td>7400965</td>
<td>Pumped</td>
</tr>
</tbody>
</table>
Sample locations and Uranium levels are shown in Figure 6.

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. Full analyses are presented in the “2008-09 Annual Report, Appendix 1”.

The results of the water geochemistry sampling indicate progressive reduction in uranium abundance deeper into the basin possibly indicating the stripping and subsequent precipitation of uranium minerals from transported fluids.

<table>
<thead>
<tr>
<th></th>
<th>Location</th>
<th>X</th>
<th>Y</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>10644</td>
<td>Centenary Bore</td>
<td>340158</td>
<td>7414774</td>
<td>22.5</td>
</tr>
<tr>
<td>10030</td>
<td>Hamilton Bore</td>
<td>331088</td>
<td>7403813</td>
<td>Pumped</td>
</tr>
<tr>
<td>10031</td>
<td>Hamilton Control</td>
<td>331088</td>
<td>7403813</td>
<td>Pumped</td>
</tr>
<tr>
<td>10081</td>
<td>Spellpaddock Bore</td>
<td>323177</td>
<td>7404313</td>
<td>Pumped</td>
</tr>
<tr>
<td>10502</td>
<td>Hamilton Control</td>
<td>330955</td>
<td>7403640</td>
<td>Diesel pump</td>
</tr>
<tr>
<td>10774</td>
<td>Hamilton Downs Station</td>
<td>331252</td>
<td>7398196</td>
<td>Solar pump</td>
</tr>
<tr>
<td>NUP502</td>
<td>Hamilton control</td>
<td>330955</td>
<td>7403640</td>
<td>Diesel pump</td>
</tr>
</tbody>
</table>

Figure 6 Geotem airborne EM results for Mt Hay lease with water geochemistry results plotted over satellite imagery.
Field Reconnaissance
During the second year of the license (2009-10), the Callabonna Geologists completed a reconnaissance field trip to the Arunta tenements to view the surface geology. A hand held spectrometer was utilised for quick field assaying of outcrops but no rock chip samples were taken in EL 26006 for further analysis.

Office Studies
Nupower, as part of their earn-in-arrangement had proposed a program of drilling fences of holes across these channels to test for uranium mineralization. This program was not completed.

At the end of the 2010-11 reporting period, Nupower advised Callabonna Uranium Ltd that they were withdrawing from the JV without completing the advised work program on the project. The Company therefore find ourselves as operator and owner of this lease with the previous operator having not completed the proposed program we agreed on and having not afforded us time to complete the program ourselves.

However following the interpretation of palaeochannels from the Tempest AEM images, Callabonna Uranium Ltd planned to explore these channels for uranium mineralisation which is conceptualized in Figure 7.

Figure 7: Concept model for channel-hosted uranium mineralisation.
**MMI Survey**

During the 2011-2012 reporting year a MMI survey was carried out over the license area to test for vertically transported metal ions originating in the interpreted palaeochannels (Figure 8). A total of 117 soil samples were collected along the interpreted drainage channels.

![Figure 8 MMI survey sample location plan](image)

Samples were collected at a constant depth (10-25cm) below the organic-inorganic soil interface. All samples weighed 200g. The samples were sent to SGS in Newburn, Western Australia, and were analysed using Mobile Metal Ion (MMI) geochemistry. Samples were analysed for Mo, As, Se, Cu, U and V.

MMI is used to extract the mobile form of ions residing in near surface soils. MMI solutions contain strong ligands, which detach and hold in solution the metal ions that were loosely bound to soil particles by weak atomic forces. The extraction does not dissolve the bound forms of the metal ions. Thus, the metal ions in the MMI solutions are the chemically active or “mobile” component of the sample.

There is no sample preparation or drying. The analysis is done on a 50g sample and the extracted solution is analysed via ICP-MS instruments, that can provide determinations in the part per billion range. These values are then normalized against a background reading which represents the mean value for the 1st quartile of the data array. This normalized value is considered the response ratio for each sample and plotted in Figure 9 as units of RR (response ratio).
The data from the MMI survey can be found in Appendix 1. Figure 8 shows the MMI survey gridded for Uranium. The results of this survey indicated that there were very few anomalies across the region with highest response ratios reaching less than 4 times background. As such the company does not consider that the tenement has the potential for uranium mineralisation within the palaeochannels interpreted from the EM images.

CONCLUSIONS

Exploration across the surrendered license consisted of a gravity survey, an airborne electromagnetic survey, water geochemistry sampling from stock bores over the Mt Hay Lease and an MMI survey. Geochemical assaying indicates elevated uranium and minor vanadium within aquifers interpreted as tertiary channels from the 2009 airborne AEM survey conducted over the lease.

BIBLIOGRAPHY


