EL 28213 Lake Surprise

First Annual Report
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Operator: Afmeco Mining and Exploration Pty Ltd
Licensee: Afmeco Mining and Exploration Pty Ltd

Authors: K. MacDonald

AFMEX Report 2012/16

Verified by: Authorised by:

RACHAEL WILSON

JOE POTTER
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<td><strong>Tenement Manager/Agent</strong></td>
<td>M &amp; M Walter Consulting</td>
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<tr>
<td><strong>Postal address</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Kelsey MacDonald - Geologist</td>
</tr>
<tr>
<td></td>
<td>68 Greenhill Road</td>
</tr>
<tr>
<td></td>
<td>Wayville, SA 5034</td>
</tr>
<tr>
<td><strong>Fax</strong></td>
<td>(618) 8377 7903</td>
</tr>
<tr>
<td><strong>Phone</strong></td>
<td>(618) 8292 9300</td>
</tr>
<tr>
<td><strong>Email for further technical details</strong></td>
<td><a href="mailto:rachael.wilson@areva.com">rachael.wilson@areva.com</a></td>
</tr>
<tr>
<td><strong>Email for expenditure</strong></td>
<td><a href="mailto:rachael.wilson@areva.com">rachael.wilson@areva.com</a></td>
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Abstract

AFMECO Mining & Exploration Pty Ltd (AFMEX) is exploring for sandstone-hosted, roll front-type uranium mineralisation within the Wiso and Georgina Basins. EL28213 (Lake Surprise) forms the ‘Davenport Project’ with Exploration Licenses EL28211, EL28212 and EL28214. EL28213 was granted on 17th March 2011 for a period of six years. Historically, the Wiso and Georgina Basins have been explored for petroleum and have not been explored for uranium. AFMEX believes the regional geological setting of the southern Wiso and the north-western Georgina Basins satisfies many of the characteristics required for sandstone-hosted uranium which are reflected by the Bigrlyi and Pamela-Angela deposits. During the reporting year, activities consisted of a reconnaissance mission to ground-truth the conceptual exploration model, and desktop studies including modelling, historical reviews and report writing.

Copyright Statement

I, Kelsey MacDonald, claim ownership of copyright for the entirety of this report. I authorise the Minister to publish information in which the copyright subsists under Regulation 10 or 125 of the Copyright Act 1968. I authorise the department to copy and distribute the report and associated data (Regulation 126(3)(a)).
1 LOCATION, TITLE HISTORY AND ACCESS

Historic exploration within the Wiso and Georgina Basins has primarily focussed on petroleum systems despite the fundamentals for sandstone-hosted uranium mineralisation being present. Due to the basin remaining under-explored, the potential for future uranium discoveries is prospective.

1.1 EL28213

Lake Surprise (EL28213) forms the ‘Davenport Project’ with EL28211, EL28212 and EL28214 (Figure 1). Lake Surprise covers an area of 253 km² (88 blocks) and is located approximately 40km northwest of Whycliffe Well. EL28213 was granted on 17th March 2011 for a period of six years with a minimum expenditure commitment of $20,000 within the first year of tenure.

The tenement is located entirely on Aboriginal Freehold Land and a ‘Permit to Enter and Remain on Aboriginal Land’ was obtained from the Central Land Council prior to entering onto EL28213. Access to the tenement is limited to minor and poorly maintained pastoralist tracks which causes access to be quite difficult.
2 GEOLOGICAL CONTEXT AND EXPLORATION RATIONALE

2.1 Geological Setting

The project area is located on the south-eastern margin of the Wiso Basin where it meets the northern edge of the Arunta Region (specifically the Aileron Province), the south-western edge of the Davenport Inlier, and the north-western margin of the Proterozoic Georgina Basin (the Dulcie Syncline) (Figure 2). The Wiso Basin is a Neoproterozoic to Palaeozoic intracratonic sag basin which comprises an east south-east trending, structurally-controlled trough (Lander) containing up to 3km of sediments. Elsewhere, sediment thickness does not generally exceed 300m. The Davenport Province is a mildly deformed and metamorphosed, Paleo- to Mesoproterozoic succession of siliciclastic metasedimentary and volcanic rocks. These unconformably overlie the Tennant Creek Inlier, a volcanioclastics and flysch sedimentary rock sequence which was intruded by granites and deformed by the Tennant Event at ~1850 Ma.
Sedimentation commenced in the early Middle Cambrian with deposition of marine carbonates and overlying shallow marine to intertidal siliciclastics. During the Late Cambrian uplift erosion occurred, possibly as part of the Delamerian Orogeny. This was followed by deposition of shallow marine to fluvial siliciclastics during the Late Cambrian to Early Ordovician with shallow marine carbonates and siliciclastics following later in the Ordovician after which deposition ceased. In the Devonian, the Arunta Block to the south was uplifted during a phase of the Alice Springs Orogeny leading to deposition of Devonian to Early Carboniferous fluvial siliciclastics along the southern margin of the basin. The most significant faulting is along the southern margin of the Lander Trough. A series of parallel, ESE trending faults with an overall displacement of over 2,000m places sediments of the Wiso Basin against the crystalline rocks of the Arunta Block.

### 2.2 Exploration Rationale

Historically, the Wiso and Georgina Basins have been explored for petroleum and have not been explored for uranium. AFMEX believes the regional geological setting of the southern Wiso and the north-western Georgina Basins satisfies many of the characteristics required for sandstone-hosted uranium deposits. The Upper Devonian Lake Surprise Sandstone is considered to be particularly prospective with the mineralisation style analogous to the Bigrlyi and Pamela-Angela deposits. The margin of the southern Georgina Basin, which underlies the Wiso Basin to the south east, is considered equally prospective for sandstone-hosted uranium mineralisation. Radiogenic basement rocks of the Aileron Province and the Tennant Creek Inlier may have provided a source of coarse detritus and leachable uranium for recycling into the younger basins. Organic-rich horizons within permeable sandstone capable of trapping mobile uranium are likely to be preset within the upper, Devonian to Carboniferous portion of the basin succession. Where these horizons occur at shallow depths and within close proximity of the basin margin, the potential for roll front-style and/or structurally-controlled, sedimentary-hosted Bigrlyi-style mineralisation in Mt Eclipse Sandstone equivalents is considered significant.
The tenements forming the Davenport Project along the southern margin of the Wiso Basin and the north-western margin of the Georgina Basin were selected based on the following criteria:

- Radiogenic basement rocks of the Aileron Province providing a suitable source of coarse detritus and leachable uranium for recycling into younger basins;
- An up to 3000m thick forland-style shallow marine to fluvial Palaeozoic sedimentary succession in the Wiso and Georgina Basins;
- Both basins contain carbonaceous-bearing rock sequences at several stratigraphic levels;
- Hydrocarbons lower in the stratigraphy may have access to intrabasinal fluids and may be available as mobile reductants;
- Presence of up to 300m thick, porous aquifer sandstone packages;
- Presence of unconformities and structures within the basins to provide the lateral and vertical variations in permeability required to focus fluid flow and fluid mixing;
- Steep structurally-reactivated basin margins to provide hydraulic gradient.

### 2.3 Historical Exploration

A brief review of recent/current activities on tenements surrounding EL28213 revealed that the vast majority of these are focused on exploration for phosphates (e.g., Rum Jungle Resources JV with Oyasa Exploration Ltd; Territory Phosphate Ltd; NuPower Resources Ltd) which are inferred to occur within favourable units of the Ordovician Chabalowe Formation. This conceptual notion is largely based on assays from a NTGS drill hole at Wycliffe Well that returned 3m of 2.2% P₂O₅, and anomalous concentrations of Se, As, Ni, Co, Mo, Cu.
WORK COMPLETED DURING REPORTING YEAR

Work during the reporting year has consisted of a reconnaissance mission, government and in-house technical reviews and reporting.

A reconnaissance mission to the Davenport tenement package was undertaken from September 12th to September 16th, 2011 (Figure 3). The primary aims of this mission were to;

- Ground-truth the conceptual exploration model in terms of suitable uranium sources, adequate transport and efficient traps;
- Consider the veracity of the original targeting model;
- Gain a better understanding of on-site conditions;
- Assess logistical requirements and consider access tracks; and
- Initiate dialog with relevant landholders.
Various airborne radiometric anomalies were examined within the Davenport Ranges to assess the source rock potential of Paleoproterozoic volcanics. On-ground assessment of the dacitic-rhyolitic volcanic basement sequences confirmed the airborne radiometric data; low levels of U on the radiometrics corresponded to low levels of U detection with the SSP $\gamma$ (generally <40 cps). The highest readings achieved in this area were ~150-200 cps which corresponded to 120ppm U using an Omega handheld XFR.

EL28213 is located away from the Stuart Highway with access via limited pastoralist tracks; a well-maintained network of railway and gas pipeline tracks appear to traverse the interior. Due to time constraints and inadequate 4WD equipment, it was impossible to investigate the Lake Surprise tenement. The tenement appears to be heavily vegetated with spinifex, low scrub and small trees limiting visibility and hindering vehicle/foot access.

Outcrop is extremely sparse within EL28213. Limited outcrop of Lake Surprise Sandstone was accessible between EL28213 and EL28214; this appeared as extremely weathered, ferruginised-bleached, cross-bedded quartz arenite with low uranium counts (<40 CPS). The weathered nature of the sediments prevented a more detailed assessment.
3 CONCLUSIONS AND RECOMMENDATIONS

The northern-most Davenport tenement EL 28213 contains sparse exposure of Lake Surprise Sandstone. Based on the nature of the outcrop, the Lake Surprise Sandstone was confirmed to be a suitable host rock for sandstone-hosted uranium. Drainage and source rocks considerations are considered favourable for the formation of sandstone-hosted uranium deposits and the presence of weak airborne radiometric anomalies is promising.

Activities for the next 12 months will include reassessing the potential of Lake Surprise to host sandstone-hosted uranium deposits, and initiating land access discussions. Negotiations with the Karlantijpa South, Alywarra, Mungkarta and Warrabri Aboriginal Land Trusts will be undertaken and may possibly include Heritage Clearance surveys. Exploration activities will involve acquiring remote sensing imagery of the project area, reconnaissance mapping and geological reviews. This preliminary work will be used to generate targets for further exploration.
REFERENCES


Afmeco Project Generation Progress Report 2012 (Internal Report)