EL 28211 Nelson Bore

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Table of Contents

Table of Contents................................................................. ii
List of Figures.................................................................................. ii
Title Page......................................................................................... iii
Abstract ............................................................................................. iv
Copyright Statement ........................................................................ iv

1 Location, Title History and Access ......................................................... 2
   1.1 EL28211....................................................................................... 2

2 Geological Context and Exploration Rationale ........................................... 3
   2.1 Geological Setting.......................................................................... 3
   2.2 Exploration Rationale ................................................................. 4
   2.3 Historical Exploration................................................................. 5

Work Completed During Reporting Year ..................................................... 6

3 Conclusions and Recommendations............................................................ 9

References............................................................................................. 10

List of Figures

1 EL28211 Location Map 1: 500,000
2 Geological Map of Davenport Project
3 Reconnaissance Mission Map
4 Drainage and Depth to Proterozoic Basement Map
### Title Page

<table>
<thead>
<tr>
<th><strong>Titleholder</strong></th>
<th>AFMECO Mining &amp; Exploration Pty Ltd</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Operator</strong></td>
<td>AFMECO Mining &amp; Exploration Pty Ltd</td>
</tr>
<tr>
<td><strong>Tenement Manager/Agent</strong></td>
<td>M &amp; M Walter Consulting</td>
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<td><strong>Titles/Tenements</strong></td>
<td>EL 28211 Nelson Bore</td>
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<tr>
<td><strong>Mine/Project Name</strong></td>
<td>Davenport Project</td>
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<td>EL28211 Annual report for the period 17/03/2011 to 16/03/2012</td>
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<td><strong>Date of report</strong></td>
<td>11th May 2012</td>
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<td><strong>Datum/Zone</strong></td>
<td>GDA94/Zone 53</td>
</tr>
<tr>
<td><strong>250 000K mapsheet</strong></td>
<td>Barrow Creek</td>
</tr>
<tr>
<td><strong>100 000K mapsheet</strong></td>
<td>Taylor, Murray Downs, Wauchope</td>
</tr>
</tbody>
</table>
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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. EL28211 (Nelson Bore) forms the Davenport Project with Exploration Licenses 28212, 28213 and 28214. EL28211 was granted on the 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

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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 EL28211

Nelson Bore (EL28211) forms the ‘Davenport Project’ with EL28212, EL28213 and EL28214 (Figure 1). Nelson Bore covers an area of 699 km² (229 blocks) and is located approximately 35km south of Wycliffe Well. EL28211 was granted on 17th March 2011 for a period of six years with a minimum expenditure commitment of $40,000 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 EL28211. Access to the tenement is via the Stuart Highway, with several major (unsealed) and well-maintained tracks traversing the license area.
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 volcaniclastics and flysch sedimentary rock sequence which was intruded by granites and deformed by the Tennant Event at ~1850 Ma.
Figure 2: Sketch map of the area of interest, showing major geological components and the location of the Davenport tenements (EL 28211 – 28214).

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 fluviatile 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 EL28211 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% $P_2O_5$, 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 (Figure 3) to the Davenport tenement package was undertaken from September 12th to September 16th, 2011. 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.

Figure 4: Calculated drainage orientation and depth to Proterozoic basement (from Oz SeeBase) for the region of interest.
Drainage and catchment potential were investigated within the Davenport Ranges and tenement boundaries (Figure 4). Drainage from the radiometric high and northwards in the Ranges appears to be toward the north-east and away from EL28211. A basement ridge underneath Nelson Bore implies that the targeted host rock sequence (Devonian Dulcie Sandstone) is either absent or present as a thin layer only. There is no apparent drainage system traversing the tenement. Therefore, the drainage and catchment configuration is considered unfavourable for the formation of sandstone-hosted uranium deposits within the tenement boundaries of EL28211.

The centrally located tenement EL28211 is adjacent to the Stuart Highway with good access via several major unsealed and well-maintained tracks traversing the area. The tenement appears to be heavily vegetated with spinifex, low scrub and small trees limiting visibility and hindering vehicle/foot access. Local burned areas were easily accessible.
3 CONCLUSIONS AND RECOMMENDATIONS

The southern Davenport tenement EL 28211 is located proximal to potential source rocks of the Davenport Inlier. Ground-truthing confirmed the limited exposure of potential source rocks, and low radiometric anomalies corresponding to low cps and ppm measurements for uranium via SPPγ and hand-held XRF. Drainage and catchment potential in the area will require further assessment for the formation of sandstone-hosted uranium deposits.

Activities for the next 12 months will include reassessing the potential of Nelson Bore 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 review. This preliminary work will be used to generate targets for further exploration.
REFERENCES


Afmeceo Project Generation Progress Report 2012 (Internal Report)