FINAL SURRENDER REPORT FOR EL30006

DAVIS GAP

NGALIA REGIONAL PROJECT

PERIOD ENDING 9th April 2018

EL30006_2018_S.pdf

1:250K Map Sheet: Mount Doreen SF52-12
1:100K Map Sheet: Doreen 5153
Commodities: Uranium, Vanadium

Daniel Jordan & Wayne Taylor
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SUMMARY

EL30006, originally comprising 56 graticular blocks, and located south of the Bigrlyi uranium deposit, was granted on 9th April 2014 for a period of six years. The tenement was acquired to explore for Bigrlyi-style and Camel Flat-style uranium mineralisation hosted within Mt Eclipse Sandstone of the Ngalia Basin and palaeochannel style uranium within Cenozoic cover. Work included a review of historical exploration and the creation of merged regional geophysics imagery from open file and Energy Metals survey data to assist with anomaly targeting. In late 2016, a prospectivity review of EL30006 was undertaken. It was considered that areas of Mt Eclipse Sandstone were generally located too high up in the stratigraphy to be prospective for Bigrlyi-style uranium deposits. However, the results of the review indicated potential for Camel Flat-style deposits associated with the Yuendumu thrust fault system and palaeochannel-hosted uranium still remained. Surrender of 50 blocks of non-prospective ground was undertaken in March 2017 with two blocks amalgamated with another tenement and four blocks remaining. Following a review of previous drilling results, and a reconnaissance field trip in late 2017, the potential for discovery of a significant Camel Flat-style or palaeochannel-hosted uranium deposit was considered to be low and the tenement was surrendered in its entirety.

INTRODUCTION

The Ngalia Regional project comprises nine 100% EME owned exploration licences (total area over 3,400 km²) located in the Ngalia Basin and immediate surrounds, between 180 and 350 km northwest of Alice Springs in the Northern Territory (Figure 1). The tenements surround the Bigrlyi joint venture uranium project and include a number of satellite and regional uranium deposits such as the Camel Flat and Walbiri deposits (Figure 2).

![Figure 1: Location of the Bigrlyi and Ngalia Regional Projects (NT).](image)
Figure 2: Granted tenements within the Ngalia Regional project area (in blue) and tenement applications (outlined in red) as at March 2018. Labeled prospects and deposits are located along the northern margin of the Ngalia Basin with the prospective Mt Eclipse sandstone unit shown in dark green. The Ngalia Basin extent is shown in light green.

EL30006, originally comprising 56 graticular blocks, is located between 7 and 20 km south of the Bigrlyi uranium deposit and was granted on 9th April 2014 for a period of six years. The tenement was acquired to explore for Bigrlyi-style and Camel Flat-style uranium mineralisation hosted within Mt Eclipse Sandstone of the Ngalia Basin.

Figure 3: Location map showing the original extent of EL30006 (pre-March 2017) in relation to local infrastructure and topography.
Partial Relinquishment

In March 2017, following a review, Energy Metals elected to surrender 50 blocks of EL30006 deemed to be non-prospective and retain those parts of the tenement (6 blocks) that include intersections with the Yuendumu fault system (Figure 4). Refer to partial relinquishment report of Taylor & Jordan (2017).

Figure 4: EL30006 tenement map showing blocks relinquished in March 2017 and those retained (green hatch).

Figure 5: Tenement map showing amalgamated blocks of EL30006 with EL24533, the replacement title EL31636 and the remaining four blocks of EL30006.
Amalgamation

In June 2017 the two standalone north western blocks of EL30006 were amalgamated with EL24533 and a replacement title (EL31636) issued (Figure 5). After the amalgamation only the four blocks of EL30006 west of Cusack’s Bore remained (Figure 6).

Figure 6: Location map showing EL30006 final surrendered area (post-March 2017) and location of the Bigryli deposit. The area is traversed E-W by the main Mt Doreen Station access road through Cusack’s Bore.

LOCAL GEOLOGY & MINERALISATION

The Ngalia Basin is a large 300 km by 70 km east-west elongate intracratonic basin covering an area of 15,000km². The basin contains sediments up to 6000m thick ranging in age from Neoproterozoic to Palaeozoic which are preserved in an elongate structure that is remnant of a much more extensive, polyphase intracratonic basin (Young et al. 1995).

Within the Ngalia Basin the Neoproterozoic Vaughan Springs Quartzite is the oldest unit and mostly forms ridges along the northern and southern basin margins and contains the Treuer Member, a less-resistant interbedded siltstone and sandstone. The Carboniferous Mount Eclipse Sandstone unconformably overlies the Vaughan Springs Quartzite in the northwest part of the basin and intervening Neoproterozoic and Palaeozoic units, present to the east in the Patmungala Syncline, are missing from the northwest. The Yuendumu thrust fault system, a low angle thrust fault zone, traverses the northern parts of the tenement area (Figure 7).
The Mount Eclipse Sandstone has a maximum thickness of more than 3,000m and hosts the majority of the sandstone-uranium mineralisation. It is a medium to coarse-grained feldspathic sandstone, commonly with carbonate cement. Conglomerate, arkose, calcareous sandstone and shale are present as lenses. The rocks are dominantly red (oxidised), although restricted zones of light to dark grey (reduced) sandstone are present mainly near the base of the unit.

EL30006 is situated approximately 10 km south of “Davis Gap” and is located along the Yuendumu thrust fault system of the Ngalia Basin in an area comprised scattered outcrop and subcrop of the Carboniferous Mt Eclipse Sandstone. There is an extensive cover of Quaternary to recent alluvial, colluvial and aeolian (regolith) deposits (Figure 4). The tenement is largely comprised of sand-plain country of subdued relief with some low sandstone hills located in the central area bound by elements of the Yuendumu thrust fault system; areas mapped as residual silty and sandy soils (Qr) generally correspond to Mt Eclipse Sandstone subcrop. There are no significant drainage systems except for a tributary of Gum Creek located approximately 4-5 km northeast of the tenement.
HISTORICAL EXPLORATION

The northern margin of the Ngalia Basin and the Arunta Inlier basement to the north, have been the focus of substantial regional exploration programs since the discovery of uranium mineralisation at the Rankins Reward prospect in 1970 (Ivanac & Spark, 1976). Exploration for various commodities, including diamonds, gold, base metals as well as uranium, has been undertaken in both the Ngalia Basin sedimentary rock terrain and the adjacent Aileron Province granite and metamorphic terrain.

Prior to the 1970s the only geological mapping undertaken in the region was in 1967 to compile the first edition of the MOUNT DOREEN 1:250,000 Sheet (SF52-12).

Uranium exploration in the Ngalia Basin commenced in 1971 by Central Pacific Minerals NL (CPM) on behalf of various joint venture partners. Sandstone-hosted uranium was initially discovered at the Walbiri and Dingo’s Rest South prospects in 1971 followed by Bigrlyi in 1973 (Ivanac & Spark, 1976; Figure 2).

At Bigrlyi, radiometric surveying, mapping and trenching identified uranium mineralisation at a series of anomalies, now known as Anomalies 1 to 15, which comprise the Bigrlyi Project. The anomalies occur over 11.5 km of strike length, and are hosted by the Carboniferous Mt Eclipse Sandstone south of prominent strike ridges formed by the Proterozoic Vaughan Springs Quartzite. Mineralisation occurs as steeply dipping lenses near or at the boundaries of reduced and oxidised zones within Mt Eclipse Sandstone. From 1974 to 1981, drilling programs resulted in definition of a uranium resource of 2,770 tonnes $\text{U}_3\text{O}_8$ at a grade of 3,420 ppm $\text{U}_3\text{O}_8$ for 1,000 ppm cut-off.

In the late 1970s Afmeco Pty Ltd and AGIP Nucleare explored the Ngalia Basin for uranium at the Dingo’s Rest and Camel Flat prospects respectively. At Camel Flat prospect, located immediately east of EL30006, AGIP undertook mapping, ground radiometric surveying and reconnaissance drilling. Mineralisation was found to occur within overturned basal beds of the Mt Eclipse Sandstone, near the contact with the Mt Doreen Formation and Yuendumu thrust fault. By 1979, a 3 km long mineralised zone had been drill tested, returning best intersections of 2.8m @ 2,841 ppm $\text{U}_3\text{O}_8$ from 167.5m (CF55P) and 0.8m @ 1,186 ppm $\text{U}_3\text{O}_8$ from 124.7m (CF58P).

In 1997, Rio Tinto carried out an airborne radiometric and magnetic survey that covered the northern flank of the Ngalia Basin and part of the Arunta Inlier, to the north, including the Bigrlyi Project and the Dingo’s Rest Prospects (Davies, 1998, 1999). Fifteen new anomalies were identified and six were followed up by ground investigations.

In the period 2001-2003 Gutnick Resources NL undertook a program of regional stream sediment and rock chip sampling over ELs 10241 and 22703 which covered parts of EL30006. The exploration, which targeted the Ngalia and Amadeus Basins, was known as the ‘Rand Project’ and focussed on discovery of Au deposits based on a new genetic model for Witwatersrand-style gold deposits. No significant results were obtained over the area of EL30006.

Energy Metals assumed management of the Bigrlyi Project in May 2005 following the purchase of a 53.3% interest in the Bigrlyi joint venture; the other partners being
Paladin Energy Ltd and Southern Cross Exploration. Drilling programs in the period 2006-2011 resulted in a substantial upgrade of resources. By 2011 the Bigrlyi resource estimate totalled 21.1 million pounds (9,570 tonnes) of U₃O₈ and 19.7 Mlb (8,900 tonnes) of V₂O₅ at a cut-off grade of 500ppm U₃O₈. Exploration work at Energy Metals 100% owned Ngalia Regional Project tenements EL24453, 24463, 24533, 24451 and 24807 commenced in 2006.

In 2008, EME completed 5 vertical RC holes at the Camel Flat prospect located east of EL30006. Some historic high-grade intercepts were confirmed, including 2.5m @ 2,564 ppm eU₃O₈ (CF0803). Following further drilling programs in the period 2010-2012 a maiden resource estimate for the Camel Flat Deposit was announced in 2014. The inferred JORC resource is 292 tonnes U₃O₈ with an average grade of 1,384ppm using a cut-off grade of 100ppm.

Cauldron Energy Ltd subsidiary Eclipse Metals Ltd are holders of EL24808, a tenement adjacent to EL30006 and part of their Eclipse Project. EL24808 was acquired in 2006 to explore for Bigrlyi-style uranium deposits. Cauldron completed an airborne radiometric and magnetic survey in 2007 and a TEMPEST airborne EM survey in 2011 which covered peripheral areas of EL30006 due to a partial surrender of EL24808 (Rust, 2009). Further details of Cauldron’s exploration program are not publically available.

Royal Resources Ltd held tenure in the area of EL30006 from 2010 to 2013 as part of their Yatjalu Project spanning ELs 27633, 28700 and 27634 (Faris & Lawrence, 2013). Royal Resources exploration efforts were focused on the uranium prospectivity of both the Mount Eclipse Sandstone and potential buried Cenozoic palaeochannel systems. A gravity survey identified a possible palaeochannel system on EL27633 (southern part of EL30006) and this was followed by field reconnaissance, surface geochemical sampling and a rotary mud drilling program. In addition, an RC drilling traverse was conducted across the interpreted Yuendumu thrust fault to test for Camel Flat-style mineralisation. However results of the geochemical sampling and drilling programs were not encouraging and the tenements were surrendered (Faris & Lawrence, 2013).
EXPLORATION BY ENERGY METALS ON EL30006 - 9th APRIL 2014 TO 9th APRIL 2018

EL30006 (56 graticular blocks located south of the Bigrlyi resource area) was granted on 9th April 2014 for a period of six years. The tenement was acquired to explore for Bigrlyi-style and Camel Flat-style uranium mineralisation within Mt Eclipse Sandstone and palaeochannel uranium within Cenozoic cover.

Geological Interpretation

In early 2017 a geological review of EL30006 was undertaken. The previous exploration results of Royal Resources were reinterpreted, in particular an alternative model for the buried palaeochannel on the southern part of EL30006 was proposed based on Royal’s gravity data. In the new model a northward flowing palaeo-drainage system, rather than a southward flowing system, is suggested as shown in Figure 8; if this model is correct Royal Resources did not adequately drill-test the structure as their rotary-mud drilling was conducted in the inferred channel headwaters at the southern end of the channel. Royal’s drilling lithology description, i.e. “white bleached (oxidised) fine to coarse pebbly poorly sorted feldspathic sands and grits” suggest only deeply weathered Mt Eclipse sandstone was intercepted rather than any significant channel sediments. A northward flowing channel would further suggest that the source region for the channel was confined to units of the Mt Eclipse Sandstone located high in the stratigraphy, which are unlikely to contain suitable primary uranium sources. However, suitable uranium sources could be present along the Yuendumu thrust fault system and, if so, possible channels such as the one marked ‘S’ in Figure 8 are considered prospective.

Figure 8: Map showing an alternative interpretation of the palaeochannel on the southern part of EL30006 (based on gravity data from Royal Resources). Channel branch labeled ‘S’ considered prospective for mineralisation. Royal resources drill holes shown in green.
Royal Resources also drill tested for Camel Flat-style mineralisation over the inferred Yuendumu thrust fault without result (see N-S drill hole traverse shown in Figure 8; Faris & Lawrence, 2013). Because the fault system is complex and the displacements and orientations of the various fault branches are not well understood, Energy Metals considered Royal’s drill traverse may not have been a sufficient test.

In the northern part of EL30006, the possibility of Bigrlyi-style mineralisation was downgraded due to the Mt Eclipse Sandstone subcrop in these areas being located too high in the stratigraphy within oxidised units.

Geophysics

Other exploration activities on EL30006 were directed at regional geophysical data acquisition. This data was incorporated and stitched into regional data sets to produce new regional merged imagery across the Ngalia Basin and surrounding basement rocks of the Arunta block (Aileron Province). Imagery was produced from radiometric, magnetic and DEM data (refer Kerr & Liu, 2015). The main focus on EL30006 was to confirm the presence of the Yuendumu Thrust Zone and trace the Yuendumu Thrust Fault system; this zone is considered prospective for uranium mineralisation within basal Mount Eclipse Sandstone by analogy with the Camel Flat deposit to the east.

DEM imagery in Figure 9 shows the prominent hill country associated with Mt Eclipse Sandstone outcrop in the vicinity of the Yuendumu thrust fault system. The remainder of the tenement is of subdued relief.

Magnetic imagery shown in Figure 10 highlights the Yuendumu thrust fault system.

Ternary radiometric K-Th-U RGB imagery is shown in Figure 11. The radiometric response is subdued and no significant U anomalies are present in the relinquished area.

Figure 12 shows $U^2/Th$ ratio imagery over the surrender area. The $U^2/Th$ ratio is useful for discriminating potential uranium deposits from other K-Th-U radiogenic rocks that may be dominated by Th. No significant $U^2/Th$ anomalies are present in the relinquished area.
Figure 9: DEM imagery (N sun) with geological units from the Mt Doreen map sheet outlined. Prominent hill country is associated with outcrop of Mt Eclipse Sandstone.
Figure 10: Magnetic imagery (tmi_rtp_TDR_gsc) highlighting the Yuendumu thrust fault system.
Figure 11: Merged ternary radiometric K-Th-U RGB imagery showing surrender area. The radiometric response is subdued and no significant U anomalies are present in the relinquished area.
Figure 12: Merged survey radiometric $U^\alpha$/Th (NE sun) ratio imagery showing surrender area. No significant U anomalies are present in the relinquished area.
Geological Reconnaissance

In September 2017 a number of potential target and/or anomaly areas and former historical drill sites were visited as part of a geological reconnaissance program. Notes and surface sample scintillometer measurements were undertaken at each site on EL30006 using a Radeye PRD instrument (note that these measurements give a guide only to total radioactivity and are intended for qualitative use only; in general background radiation levels are 20-30 cpm).

Table 1: EL30006 Reconnaissance – Sandstone outcrop north of Vaughan Springs Road

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<tr>
<th>Waypoint Name</th>
<th>MGA_E</th>
<th>MGA_N</th>
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<th>Comments</th>
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<tr>
<td>TG79</td>
<td>717407</td>
<td>7529843</td>
<td>21</td>
<td>Coarse oxidised ferruginous sandstone, numerous pebbles &amp; pebble bands (of quartzite), strike ridge NW, dip 40 deg S, kaolinitic, ferruginised &amp; mottled.</td>
</tr>
<tr>
<td>wpt76</td>
<td>716460</td>
<td>7530239</td>
<td>22</td>
<td>Very coarse pebbly &amp; cobble rich sandstone, common slickensides dipping 46 to 50 deg; bedding dips 33 deg S, strike 096.</td>
</tr>
<tr>
<td>wpt77</td>
<td>716387</td>
<td>7530463</td>
<td>22</td>
<td>Coarse arkosic mottled sandstone, pebbly, weathered &amp; kaolinitic, much more massive and thickly bedded than sandstone at wpt76, dips 36 deg S.</td>
</tr>
<tr>
<td>wpt78</td>
<td>716343</td>
<td>7530522</td>
<td>40</td>
<td>Clay collected on shelf between resistant, very ferruginised sandstone ridges - 2x radiometric background.</td>
</tr>
<tr>
<td>wpt79</td>
<td>716122</td>
<td>7530679</td>
<td>20</td>
<td>Medium-coarse grained sandstone oxidised, ferruginous &amp; mottled with red/bleached bands, massive, thin pebble layers with some silicified sandstone clasts. Dips to S.</td>
</tr>
<tr>
<td>Note</td>
<td></td>
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<td></td>
<td>Numerous old N-S drilling line pegs ex Royal Resources encountered - marked but not drilled.</td>
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Digital Data

No digital data was acquired in the surrendered area during the period of tenure.

CONCLUSIONS

EL30006, originally comprising 56 graticular blocks located south of the Bigrlyi resource area was acquired to explore for Bigrlyi-style and Camel Flat-style uranium mineralisation within Mt Eclipse Sandstone and palaeochannel uranium within Cenozoic cover. Fifty blocks of EL30006 judged to be non-prospective for uranium were relinquished in March 2017 and six blocks were retained (Taylor & Jordan, 2017). The two north western blocks of EL30006 were amalgamated with EL24533 in June 2017. The four remaining blocks of EL30006 were situated in the middle of
the basin straddling the Yuendumu thrust fault system. Following field work and a 2017 review, the potential for discovery of a significant Camel Flat style or palaeochannel-hosted uranium deposit was considered to be low within the remaining area of EL30006, which was subsequently surrendered in its entirety.

REFERENCES


