PARTIAL RELINQUISHMENT REPORT FOR EL30006

DAVIS GAP

NGALIA REGIONAL PROJECT

PERIOD ENDING 24 March, 2017

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SUMMARY

EL30006 comprising of 56 graticular blocks and located between 7 and 20 km 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. 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, which are mostly covered by regolith materials, are located too high up in the stratigraphy to be prospective for Bigrlyi-style uranium deposits. However, the results of the review indicate the potential for Camel Flat style deposits associated with the Yuendumu thrust fault system still remains. Surrender of 50 blocks of non-prospective ground was undertaken.

INTRODUCTION

The Ngalia Regional project comprises twelve 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-url)
Figure 2: Granted tenements within the Ngalia Regional project area (in blue), and tenement applications (outlined in red). 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.

Figure 3: Location map showing the EL30006 relinquished area (red hatching), retained blocks (red outline), and location of the Bigryli deposit. The area is traversed E-W by the main Mt Doreen Station access road through Cusacks Bore and by the Nyirripi Road to the south.
LOCAL GEOLOGY & MINERALISATION

The Ngalia Basin is a large 300 km by 70 km east-west elongate intracratonic basin covering an area of 15,000 km². The basin contains sediments up to 6000 m 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).

EL30006 (“Davis Gap”) is situated on the north-western margin of the Ngalia Basin in an area comprised of the Carboniferous Mt Eclipse Sandstone. Outcrop is, however, sparse and much of the tenement is covered by Quaternary to recent regolith materials.

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 central part of the tenement area (Figure 4).

![Figure 4: Geological map showing the location of EL30006 relinquished area (red hatching) and retained blocks with Mount Doreen 250K geology map-sheet background. Mt Eclipse Sandstone outcrop in grey, Vaughan Springs Quartzite in pink. Yuendumu Thrust Fault system shown. Boundary of Eclipse Uranium AEM survey on neighbouring tenement EL24808 in blue.](image-url)
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 project area comprises scattered outcrop and subcrop of Mt Eclipse Sandstone and there is an extensive cover of Quaternary to recent alluvial, colluvial and aeolian (regolith) deposits (Figure 4). The tenement is largely comprised of sandplain 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 in the far northeast corner.

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 U₃O₈ at a grade of 3,420 ppm U₃O₈ 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 @ 2,841ppm eU3O8 from 167.5m (CF55P) and 0.8m @ 1,186ppm eU3O8 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. 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 (Figure 4) 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 2011 to 2013 as part of their Yatjalu Project spanning ELs 27633, 28700 and 27634. 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 THE SURRENDERED AREA - 9TH APRIL 2014 TO 24TH MARCH 2017

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

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 has been 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 5; if this model is correct Royal Resources did not adequately drill-test the structure as their rotary-mud drilling was conducted in the 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 5 are considered prospective.

![Figure 5: Map showing an alternative interpretation of the palaeochannel on the southern part of EL30006 (based on gravity data from Royal Resources). Channel branch labelled ‘S’ considered prospective for mineralisation. Royal resources drill holes shown in green.](image-url)
Royal Resources also drill tested for Camel Flat-style mineralisation over the inferred Yuendumu thrust fault without result (see drill hole traverse shown in Figure 5). Because the fault system is complex and the displacements and orientations of the various fault branches are not well understood, Energy Metals considers 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 up 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. Imagery was produced from radiometric, magnetic and DEM data. 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 6 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 7 highlights the Yuendumu thrust fault system.

Ternary radiometric K-Th-U RGB imagery is shown in Figure 8. The radiometric response is subdued and no significant U anomalies are present in the relinquished area.

Figure 9 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 6: DEM imagery (NE sun) with geological units from the Mt Doreen map sheet outlined. Prominent hill country is associated with outcrop of Mt Eclipse Sandstone.
Figure 7: Magnetic imagery (tmi_rtp_2vda_gic) highlighting the Yuendumu thrust fault system.
Figure 8: 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 9: Merged survey radiometric $U^\alpha$/Th ratio imagery showing surrender area. No significant U anomalies are present in the relinquished area. Note the strong feature associated with Bigryi Anomaly-1 (labelled 'A1') in the northwest.
Geological Reconnaissance

No on-ground geological investigations were undertaken in the surrendered area.

Digital Data

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

Partial Surrender

In March 2017, following a review, Energy Metals elected to surrender 50 blocks of the tenement deemed to be non-prospective and retain those parts of the tenement (6 blocks) that include intersections with the Yuendumu fault system.

Figure 10: EL30006 tenement map showing blocks surrendered and those retained (green hatch).

CONCLUSIONS

Fifty blocks of EL30006 judged to be non-prospective for uranium were relinquished in March 2017 and six blocks were retained. The potential for Bigryi-style or palaeochannel-hosted uranium is considered to be low within the surrendered area.
REFERENCES


Kerr, S., 2015: EME Technical Memorandum - Regional Reconnaissance, Ngalia Basin, NT.


