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Authors: Pete Moorhouse, Alligator Energy Ltd
Contact Details: PO Box 338
Spring Hill, QLD 4004
Ph. 07 3852 4712
Email for further technical details: apm@alligatorenergy.com.au
Email for expenditure: mm@alligatorenergy.com.au
Datum/Zone: GDA94 (Zone 53)
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Tenement manager: AMETS
Copies: DME (1)
Northern Land Council (1)
Alligator Energy Ltd (1)
ABSTRACT

This Annual Report is in respect of “The Beatrice East Project”. The project comprises of one exploration licence (EL), EL 27250 which is held by Northern Prospector Pty Ltd, a wholly owned subsidiary of Alligator Energy Ltd. The tenement was granted on 09 December 2013 for a period of 6 years. This report is for the second year of tenure. The project is located in West Arnhem Land approximately 280 km east of Darwin and 70 km east of Jabiru. The tenement is considered prospective for unconformity-style uranium deposits similar to Ranger, Jabiluka, Koongarra and Nabarlek. Cameco Australia highlighted the potential of Westmoreland style mineralisation as an additional mineralisation target model for the area, which warrants further investigation. During this reporting period, the project was assessed in conjunction with the Alligator operated Beatrice project. A regional geological review was conducted and reconnaissance study to establish suitability for Sub Audio Magnetic geophysics survey within the area occurred.
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1. INTRODUCTION

1.1 Exploration Activities

Details of field activities for the 2015 exploration campaign for the Beatrice East Project, EL 27250 are included in this report.

A variation of condition was sought on expenditure for the project. Alligator is exploring EL27250 in conjunction with its activities on the neighbouring Beatrice project (EL24291) where expenditure exceeded two million dollars. The covenant for Year 2 was $50,000 however expenditure at EL27250 for this period was $35,075.

The project is located within the Arnhem Land Aboriginal Reserve and is subject to a Consent Deed with the Northern Land Council (NLC) and the Traditional Owners. Clearance for work was given by the NLC, on behalf of the Traditional Owners, following the Exploration and Liaison Committee Meeting held in April 2015 at Gunbalanya.

Work on the Beatrice East Project for this reporting period consisted of:

- Regional geological review
- Ground reconnaissance to assess suitability of SAM geophysical technique

1.2 Location and Access

The project is located in western Arnhem Land approximately 280 km east of Darwin and 70 km east of Jabiru in the Northern Territory, Australia refer Figure 1- Lease Location Map. All work has been based out of Myra camp, located 40 km north-west of the project area utilising a helicopter. No vehicular access is achievable to the project area and no historic tracks are known of refer: Figure 2 - Beatrice East Tenement Topography Map.
1.3 Tenure

The Beatrice East Project comprises of one exploration licence (EL), EL 27250 and is held by Northern Prospector Pty Ltd, a wholly owned subsidiary of Alligator Energy Ltd. The project was granted on 09 December 2013 for a period of 6 years. The project consists of 13 blocks for 28.92sq.km. During 2014, Alligator Energy entered into a joint venture agreement with Cameco Australia Pty Ltd to explore within the neighbouring tenements included in the Beatrice Project. The Beatrice project comprises of ELs 24291 and 26796, and ELAs 26793, 26794 & 26795. This landholding creates contiguous tenure between The Beatrice East project and the Tin Camp Creek project.

EL27250 was held in the 1970s by Queensland Mines Limited (QML) as part of a much larger tenement (authority to prospect 2221). From 1990 to 1996, the area was held under EL 4015 by PNC Exploration Australia Pty Ltd. Cameco Australia Applied for the area in 1997 and it was granted in June 2005 as EL 9929 as part of a wider package.
2. REGIONAL and PROJECT GEOLOGY

2.1 Regional Geology

The Beatrice East project area is located within the eastern margin of the Pine Creek Orogen (PCO) and is situated on the Arnhem land Plateau.

This following description of the regional geology is largely based on the work by (Needham, Crick et al. 1980; Needham, Smart et al. 1983 and Needham and De Ross 1990). Information that is not based on these references is indicated below.

The Bureau of Mineral Resources (now Geoscience Australia) completed 1:250 000-scale geological maps of the Pine Creek Orogen between the 1940s and 1960s following the discovery of uranium at Rum Jungle. The Alligator Rivers region was systematically mapped by the Bureau of Mineral Resources and the Northern Territory Geological Survey between 1972 and 1983. This later work produced 1:100 000-scale geological maps and reports for the region from Darwin to Katherine to the Alligator Rivers region

The oldest exposed rocks in the Alligator Rivers region are included in the Neoarchaean (ca. 2500 Ma) Nanambu Complex. The complex consists of paragneiss, orthogneiss, migmatite, and schist forming domical structures that are unconformably overlain by
Palaeoproterozoic metasedimentary and metavolcanic rocks which were formerly included in the Pine Creek Geosyncline. Recent collaborative research work by the NTGS and Geoscience Australia indicates that SHRIMP U-Pb age dating of an area of previously mapped Myra Falls Metamorphics outcropping within the Myra Inlier is Neoarchean in age (Hollis, Carson et al. 2009a) and these quartzofeldspathic gneisses are named the ‘Kukalak Gneiss’ (Hollis, Carson et al. 2009b). Palaeoproterozoic rocks in the Alligator Rivers region are amphibolite-facies psammites assigned in the Mount Howship Gneiss and the Kudjumarndi Quartzite. These formations are included in the Kakadu Group and are probably correlatives of the Mount Basedow Gneiss and Munmarlary Quartzite, respectively (Ferenczi, Sweet et al. 2005). The group appears to on-lap Neoarchaean basement highs, but gneissic variants are also thought to pass transitional into paragneiss of the Nanambu Complex.

The Cahill Formation of the Namoona Group conformably overlies the Kudjumarndi Quartzite. The lower part of the Cahill Formation (informally referred to as the Lower Cahill Formation) hosts the Nabarlek, Ranger and Jabiluka uranium deposits. The Lower Cahill Formation consists of a structurally lower calcareous marble and calc-silicate gneiss, which is overlain by pyritic, garnetiferous and carbonaceous schist, quartz-feldspar-mica gneiss, and minor proportions of amphibolite.

The informally named Upper Cahill Formation is psammitic and consists of feldspar-quartz schist, quartzite, lesser proportions of mica-feldspar-quartz-magnetite schist, and minor proportions of metaconglomerate and amphibolite. The Upper Cahill Formation is magnetic and significantly so at the base of psammitic unit in what is informally known as ‘hanging wall sequence’. The magnetic characteristic of this unit is due to the presence of mafic sills or magnetite and it is a useful characteristic used for distinguishing the Cahill Formation from surrounding less magnetic rocks (Kendall 1990). Mafic sills and dykes assigned to the Goodparla and Zamu Dolerites intruded the Cahill Formation prior to metamorphism.

The Nourlangie Schist overlies the Cahill Formation and consists of argillaceous to quartzose phyllite and quartz-mica schist that locally contain garnet and staurolite.

The supercrustal rocks of the region are structurally complex, having been affected by at least three deformation event before deposition of the late Palaeo- to Mesoproterozoic Kombolgie Subgroup (Thomas 2002). The rocks have also been locally migmatised during the ca.1847-30 Ma Nimbuwah Event. A broad trend of increasing metamorphic grade is evident from southwest to northeast in the Nimbuwah Domain. This gradient is thought to reflect the synchronous emplacement
of ca. 1865 Ma granites in the Nimbuwah Complex.

The Kombolgie Subgroup is the basal unit of the late Palaeo- to Mesoproterozoic Katherine River Group of the McArthur Basin (Sweet, Brakel et al. 1999; Sweet, Brakel et al. 1999). The subgroup consists of sandstone units called the Mamadawerre Sandstone, Gumarrirnbang Sandstone, and Marlgowa Sandstone, which are divided by thin basaltic units called the Nungbalgarri Volcanics and Gilruth Volcanics. The Mamadawerre Sandstone has a minimum age of ca. 1700 Ma, which is the minimum age of the intrusive Oenpelli Dolerite. Detrital zircon SHRIMP data from the GA OZCRON database constrain the maximum age of the sandstone at ca. 1810 Ma.

The Oenpelli Dolerite is the most pervasive mafic intrusive suite to affect the Alligator Rivers region and is the youngest Proterozoic rock unit exposed. It intrudes various Neoarchaean and Palaeoproterozoic units, and the Kombolgie Subgroup, forming magnetic sills, dykes, lopoliths, and laccoliths. The Oenpelli Dolerite has a SHRIMP U-Pb baddeleyite date of 1723 ± 6 Ma (Ferenczi, Sweet et al. 2005), however, geochemical and geophysical data suggest several phases of intrusion throughout the region. These intrusive events had a pronounced thermal effect within the Kombolgie Subgroup, with the promotion of fluid flow and aquifer or aquitard modification. Localised effects in the sandstone include silicification, desilicification, chloritisation, sericitisation, and pyrophyllite alteration. A characteristic mineral assemblage of prehnite-pumpellyite-epidote has formed in the quartzofeldspathic basement rocks adjacent to the intrusions.

Deformation since deposition of the Katherine River Group includes transpressional movement along steep regional-scale strike-slip faults and possibly some shallow thrusting. These regional faults follow a pattern of predominantly north, northwest, north – northwest and northeast strikes, giving rise to the characteristic linearly dissected landform pattern of the Kombolgie Plateau. Another significant set trends east – west and includes both the Ranger and Beatrice Faults. The Bulman Fault Zone is a principal regional feature and is considered to represent a long-lived deep crustal structure, with a large lateral component in rocks of the PCS. However, it appears that post-Kombolgie displacements along this and other faults have not been great because the Arnhem Land Plateau is essentially coherent and offsets along lineaments are generally minor. Field investigations of many interpreted ‘faults’, including those with a marked geomorphic expression, show no displacement, and are best described as joints or lineaments (Thomas 2002).

Erosional remnants of flat-lying Palaeozoic Arafura Basin and Cretaceous Carpentaria
Basin are present as a veneer throughout the coastal zone of the Top End. Various regolith components are ubiquitous as cover throughout much of the region.

### 2.2 Project Geology

The Beatrice East Project is entirely covered by Gummarinbang sandstone. The only drilling on the tenement was completed by Cameco Australia with a single drill hole to 674.4 metres (PLD001). The hole was collared in Gummarinbang Sandstone, and intersected Nungbalarri Volcanics 259.4m. Mamadawerre Sandstone was intersected at 420.80 m before reaching Oenpelli dolerite from 498 metres. Drilling terminated at 674.4 metres, still in dolerite. Drilling by AFMEX approximately 5km to the north west of EL27250 (hole KPE001) places the unconformity at 244.3 m depth, with Mamadawerre Sandstone underlain by foliated granitoid rocks of the Nimbuwah Complex. In 1992 PNC drilled 5 holes (BDD-BDD5) approximately 15km northwest of EL27250. The sandstone-basement unconformity was intersected between 66 (BDD4) and 110.55 m depth (BDD1). Basement here consists of Tin Camp Granite and Nimbuwah Complex gneisses variably intruded by Oenpelli Dolerite. Drilling results correspond with overall outcrop patterns, which suggest increasing depth to unconformity towards the southeast. Oenpelli Dolerite also occurs in the valley directly north of the the project area.

![Figure 3 - Beatrice East Tenement Geology Map.](image)
3. PREVIOUS WORK

3.1 Overview
Modern exploration for uranium commenced in the region following regional airborne radiometric surveys over the Alligator Rivers Province by the BMR in 1969. QML held the ground which now forms EL27250 as part of a much broader tenement package. Most of their follow up focussed on areas of exposed basement, in particular the Tin Camp Creek project area.

Exploration ceased in 1973 following the Federal Government decision to inhibit uranium mining in the Alligator Rivers region. No work was undertaken in the area between 1973 and 1987 due to an embargo on the grant of exploration licences in Arnhem Land.

From 1990 to 1996, the area was held under EL 4015 by PNC Exploration Australia Pty Ltd. Cameco Australia Applied for the area in 1997 and it was granted in June 2005 as EL 9929 as part of a wider package called the Plateau Project. Cameco relinquished EL 9929 in November 2007. The current tenement was granted to Northern Prospector on 09 December 2013 for a period of 6 years.

3.2 1970s
Following the BMR regional radiomeric and gravity surveys, it is believed that QML conducted reconnaissance magnetics and radiometrics survey, along with regional stream sediment survey however no information is available regarding exploration conducted within the Beatrice East project area for this period in open file reporting.

3.3 1980s
Exploration ceased in 1973 following the Federal Government decision to inhibit uranium mining in the Alligator Rivers region. No work was undertaken in the area between 1973 and 1987 due to an embargo on the grant of exploration licences in Arnhem Land.

3.4 1990s
PNC Exploration (Australia) Pty Ltd held the ground of EL27250 as part of a larger package granted from two Licences 3597 and 4015, granted on 27 August 1990 for a period of six years. PNC successfully deferred reduction of the tenement area throughout their tenure, ensuring that the original tenement area (80 and 32 sq km respectively) remained intact. Current EL 2725 corresponds with EL 4015. During 1993 the Arnhem Land West Joint Venture (ALWJV) was formed between
PNC Exploration (Australia) Pty Ltd and Cameco Australia Pty Ltd, with PNC remaining the operator of the project

All exploration in the 90’s was conducted in conjunction with work on historic license 3597. An initial airborne radiometric and magnetic survey was flown, with limited follow up ground reconnaissance including rock chips and streams. An anomaly was observed in the eastern portion of the tenement with 8.9ppm U and 4ppb Au recorded from a clay rich sandstone sample. Mapping of this anomalous zone highlighted “hematite alteration” along fractures within the sandstone.

A baseline “SIROTEM” survey over this anomaly in an attempt to establish depth to the unconformity failed to provide conclusive results.

An airborne GEOTEM survey highlighted two further anomalies within the project area, these were anomaly 4 & 5 however only anomaly 5 warranted further work. Anomaly 5 was located in the same valley as the previously mentioned anomalous clay sandstone sample. This was followed up with a ground based 100 metre line spaced magnetic survey, and a PROTEM 47 survey. Results from the PROTEM survey have subsequently been disproved.


3.5 Post 2000

Exploration within the Beatrice East Project by Cameco in the post 2000 period was all completed in the field season 2005 and 2006. Eight rock chip surface samples were collected. A HyMap airborne hyperspectral scanner imagery over a project area was commissioned but no response was recorded to suggest the presence of hydrothermal alteration within the Gummarimbang Sandstones exposed within EL27250.

A single heli supported diamond drill hole (PLD001) was completed in proximity to the anomaly highlighted by PNC. The hole failed to reach basement stratigraphy and was terminated at 674.4 metres. The hole was collared in Gummarirnbang Sandstone, and intersected Nungbalgarri Volcanics 259.4m. The Mamadawerre Sandstone was intersected at 420.80 m before reaching Oenpelli dolerite at 498 metres. Drilling terminated at 674.4 m still in dolerite.
In Alligator’s first year of tenure, a data compilation was completed along with acquisition of satellite imagery and a first pass surface geochemical survey consisting of 57 samples.

4. EXPLORATION WORK 2015 TENURE YEAR

4.1 Overview
Exploration activities conducted during 2015 reporting period on the Beatrice East project comprised the following:

- Regional geological review in conjunction with Hinman Geosolutions.
- SAM Survey suitability site visit

Exploration was conducted as part of Alligator’s regional approach to The Alligator Rivers Uranium province, with total expenditure in the terrain being in excess of three million dollars during the 2015 exploration campaign.

4.2 Regional Geological Review
In early 2015 an independent geological review was carried out in conjunction with Mark Hinman (HINMAN GeoSOLUTIONs). The review focused on interpreting regional geological evolution of the Alligator Rivers and Pine Creek mineral provinces, with the aim of highlighting key structural and stratigraphic controls and intersections. This exercise has resulted in a more detailed understanding of stratigraphic and structural relationships and their potential control of uranium mineralisation in the ARUP, along with sub Kombolgie interpretation of key structures as shown in figure X in relation to EL27250. A detailed geological time slice for the Alligator Rivers and Pine Creek mineral provinces was also produced for Proterozoic stratigraphy with relation to North-West Queensland’s mineral provinces (see Appendix 1).
4.3 Tenement reconnaissance and Geophysical survey implementation assessment

Alligator continued to implement Sub Audio Magnetics as part of a strategy to refine sub Kombolgie unconformity uranium exploration targets, flying 1275 line kilometres of Heli Sub Audio Magnetics on the neighbouring Beatrice and Tin Camp Creek projects in 2015. The technique is proving beneficial however the main limitation is electrode placement.

In 2015 a field reconnaissance trip to the northern portion of the tenement was conducted to establish the feasibility of a SAM survey to help define sub Kombolgie stratigraphy. The aim of the reconnaissance was to find potential electrode pit locations. Ideally pits would be located in proximity to basement stratigraphy, however only sandstones and occasional fine grained dolerites intruding the steep sided sandstone valleys have been recorded. Additionally the option of utilising the historic drill hole for a down-hole probe also proved untenable.

It has been theorised that basement penetrating structures observed in the sandstone could also be utilised for pit locations however no suitable such structures are recorded on this tenement.

Fixed loop Electromagnetics has now been trialled on the Tin Camp Creek project, with the advantage that pits are not required. Initial results from this data have been disappointing in sub Kombolgie application however Alligator is working with GAP Geophysics to enhance processing.
techniques. If this data can be refined then this technique may be suitable for deployment on EL27250.

5. CONCLUSIONS AND RECOMMENDATIONS

The Alligator Rivers Uranium province, in particularly West Arnhem Land is considered by Alligator Energy as a highly prospective under explored tenement package which warrants considerable further exploration. The results on Alligator’s Tin Camp Creek project continue to provide justification for extensive further exploration. Following on from the execution of a Joint venture agreement between Alligator and Cameco Australia Pty Ltd on the Beatrice project, EL27250 should continue to be explored on a larger scale in conjunction with the rest of Alligator’s tenement holdings. Alligator is committed to developing new techniques for cost effective ways of exploring underneath sandstone. Sub Audio Magnetics is not viewed as an option for this tenement due to the lack of access to basement stratigraphy however Alligator continues to work on geochemical radiogenic trace element sampling and analysis techniques that may be suitable to EL27250. Furthermore Alligator continues to examine alternative geophysical techniques for Sub Kombolgie exploration.

Alligator also considers the theory of Westmoreland style deposits, as suggested by Cameco Australia as an exciting alternative mineralisation model for the terrain that warrants further investigation.
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