

# NAMARRKON PROJECT (EL23700)

Annual Technical Report for the period 31/05/12 – 30/05/13

> Author: Grant Williamson Date: 10/06/2013



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Contact Details	Uranium Equities Limited Level 5 29 King William Street ADELAIDE SA 5000
	Phone08 81100700Fax08 81100777
Email for Technical Details	grant.williamson@uel.com.au
Email for Expenditure	grant.williamson@uel.com.au



#### NAMARRKON PROJECT, WEST ARNHEM LAND, NORTHERN TERRITORY

#### ABSTRACT

The Namarrkon Project is located in the western portion of the Arnhem Land Aboriginal Reserve, 28km east of the Gunbalanya (Oenpelli) Aboriginal Community and approximately 300km east of Darwin.

Namarrkon consists of a single exploration licence, EL23700, with a total area of 43.8km<sup>2</sup>. Initially granted for a period of six years to Cameco Australia Pty Ltd (Cameco), the project is currently operated by Uranium Equities Limited (UEL) who is earning a 100% interest in the tenement.

The 2012 exploration program consisted of a desktop review of previous exploration completed within the licence area and target evaluation of current and potential anomalous zones. Work completed included reprocessing and interpretation of recent geophysical datasets to assist with the structural interpretation of the region. Various images were produced and interpreted to determine likely structural positions with the view to further examination to determine their veracity and importance.

No field work was completed during the reporting period.

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ABSTRACT

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### **1** INTRODUCTION

#### 1.1 Location

The Namarrkon Project is located in the western portion of the Arnhem Land Aboriginal Reserve, 40km east of the Gunbalanya (Oenpelli) Aboriginal Community and approximately 300km east of Darwin. The Project area lies within the prospective Alligator Rivers Uranium Field in close proximity to the historical Nabarlek Uranium Mine (Figure 1).

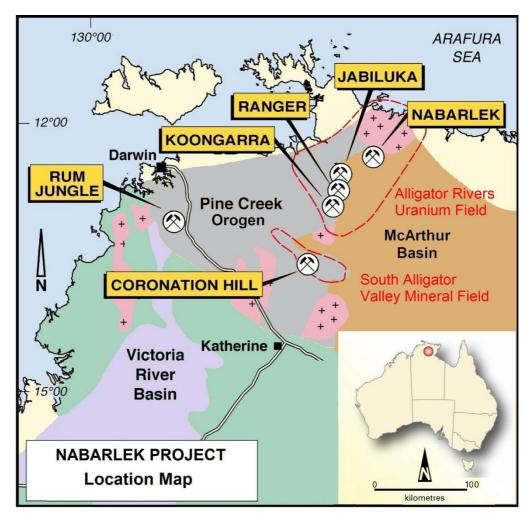


Figure 1: Location Map

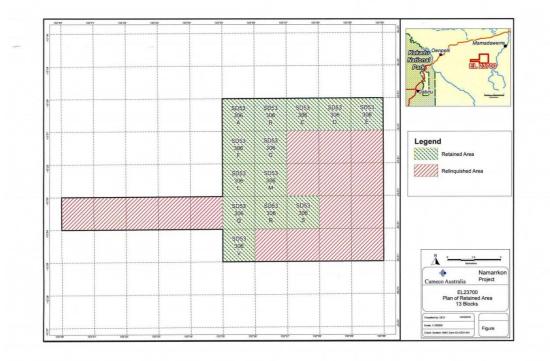
The topography is dominantly Arnhem Land Plateau and escarpment country with open savannah woodlands and sparse spinifex predominate on the sandstone. Soils consist of thin sandy types and some black loams covering (in part) the plateau country. Gorges and valleys within the plateau contain alluvium with some soil development, and denser vegetation. Various transported materials and soils cover the limited lowlands.



### 1.2 Tenement Status

Application for EL23700 was lodged on 27 March 2003 and grant of title was given to Cameco Australia on May 31 2005, for an initial period of six years. The original area of grant was 100.6km<sup>2</sup> (30 blocks).

On 31 May 2010, the anniversary of the fifth year of tenure, Cameco relinquished 17 blocks for 56.8km<sup>2</sup> retaining 43.8km<sup>2</sup> (Figure 2). This report details exploration work conducted during the eighth year of tenure.



#### Figure 2: Namarrkon Original Outline and Retained Areas

In December 2006 a Joint Venture agreement was signed between Cameco Australia Pty Ltd and Uranium Equities Limited (UEL) allowing UEL to earn a 40% interest in EL23700. To participate in the Joint Venture, UEL agreed to sole-fund exploration expenditure for a number of years (through a wholly-owned subsidiary GE Resources Pty Ltd) to earn its 40% stake.

Late in 2012, UEL finalised an agreement to acquire Cameco Australia remaining 60% interest in the tenement. This acquisition gives UEL the opportunity to secure 100% ownership and full exploration management of a contiguous land holding in the heart of the Alligator Rivers Uranium Field.

Uranium Equities has become the Manager and Operator of the Project and has lodged an initial Mine Management Plan (MMP) with the Department of Mines and Energy.

#### **1.3** Aboriginal Heritage

The project area lies within the Arnhem Land Aboriginal Reserve and is therefore freehold Aboriginal Land. All personnel entering the project area are required to obtain the appropriate Northern Land Council (NLC) permit.

Permission to explore over Aboriginal Freehold land is gained via Exploration Agreements with the relevant Traditional Owners under the Commonwealth *Aboriginal Land Rights (NT) Act.* 

Legislation requires that all sacred, cultural and heritage sites are initially documented by the Traditional Owners and NLC Anthropologists and Archaeologists prior to exploration commencing. This information is then utilised to determine 'No-Go' areas.

Uranium Equities Limited liaises with the Traditional Owners each year to discuss future exploration activities and have developed a strong professional relationship, which includes employment in exploration and rehabilitation activities.

#### 1.4 Access

Access to the site is via the unsealed and seasonal Oenpelli – Maningrida road from Cahill's Crossing at the East Alligator River to the 'Three Ways' intersection to the Coburg Peninsula. From there, access is via the old Nabarlek Mine access road to the Nabarlek Mineral Lease.

From Nabarlek, access can be obtained along 4WD bush tracks, however vehicle access is limited to the north-western parts of the Project area. The rugged nature of the sandstone plateau that almost entirely covers EL23700 necessitates the use of a helicopter for most exploration activities.

Access to the Nabarlek site is also possible using a light plane direct from Darwin, to land on the all-weather sealed airstrip at the Nabarlek Mineral Lease. Uranium Equities Limited has established a semi-permanent twelve person field camp adjacent to the airstrip. Transportable office, accommodation, kitchen and ablution blocks have been installed, serviced by both power and water (Figure 3).



Figure 3: Aerial View of Nabarlek Camp and Airstrip



## 2 PROJECT GEOLOGY

#### 2.1 Conceptual Model

The primary focus of exploration on Namarrkon is for the discovery of a high grade Nabarlekstyle uranium deposit. Nabarlek is an unconformity-associated uranium deposit whereby mineralisation is concentrated within structural zones, spatially associated with a regional unconformity between flat-lying siliciclastic basinal sediments and the underlying metamorphic basement rocks.

The highly prospective nature of the Alligator Rivers Region for this type of mineralisation is demonstrated by the presence of economic uranium deposits not only at Nabarlek, but also at Ranger, Jabiluka and Koongarra.

In addition to uranium, significant gold, platinum and palladium resources are present at existing uranium occurrences within the Alligator Rivers Uranium Field (Ranger, Jabiluka, Koongarra and Coronation Hill/South Alligator Valley-style deposits) suggesting that economic mineralisation of gold and PGE's (Platinum Group Elements) associated with economic or sub-economic uranium may also be present within the project area.

## 2.2 Geological Setting

The Namarrkon Project area is located within the eastern margin of the Neoarchaean and Palaeoproterozoic Pine Creek Orogen in a region that has been subdivided into the Nimbuwah Domain of the Alligator Rivers region.

The oldest rocks are a sequence of Early-Proterozoic metamorphosed sediments (semipelites), schists and amphibolites termed the Myra Falls Metamorphics. This unit is considered to be stratigraphically equivalent to the Cahill Formation in the western part of the Alligator Rivers Uranium Field and forms the host lithologies of the Nabarlek Deposit.

The Kombolgie Subgroup is the basal unit of the late Palaeo – Mesoproterozoic Katherine River Group of the McArthur Basin. 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. Mamadawerre Sandstone unconformably overlies the basement sequences described above, forming an extensive inaccessible plateau.

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 units Neoarchaean and Palaeoproterozoic units, and the Kombolgie Subgroup, forming magnetic sills, dykes, lopoliths, and laccoliths.

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.

Mineralisation in the Namarrkon region is believed to be at least partially controlled by the structural regime through the area. 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 trends.



## 2.3 Local Geology

EL23700 is almost completely covered by Palaeoproterozoic sedimentary and volcanic Kombolgie Subgroup. Basement rocks are present in the north-eastern corner of the tenement at the base of the Stevens fault-bound Mamadawerre Sandstone escarpment, although these are largely obscured by Quaternary cover. The local project geology of the Namarrkon Project can be seen in Figure 4.

The Mamadawerre Sandstone, the oldest formation of the Kombolgie Subgroup, occupies most of the tenement, where it forms a deeply dissected plateau surface. This area is composed largely of bare rock with sparse areas of shallow sandy soil supporting spinifex and scrub. Plateau escarpments are developed to the north of the tenement along the Stevens Fault. Mamadawerre Sandstone is unconformably overlain by the Nungbalgarri Volcanics.

The Gumarrirnbang Sandstone disconformably overlies the Nungbalgarri Volcanics forming restricted outcrop occurrences in EL23700. The sandstone comprises fine to coarse-grained quartz arenite with scattered pebbly units. Sedimentary structures include planar and trough cross-stratification, ripples and horizontal planar stratification, suggesting a proximal to distal fluvial braided stream and estuarine depositional environment.

Oenpelli Dolerite intrudes the Mamadawerre Sandstone as sills and outcrops at several localities, most notably along the arcuate Spencer Thrust extending from the centre to the west of the tenement and into the adjacent Nabarlek Project (EL 10176). Oenpelli Dolerite is also present along the Stevens Fault in the north east of the tenement.

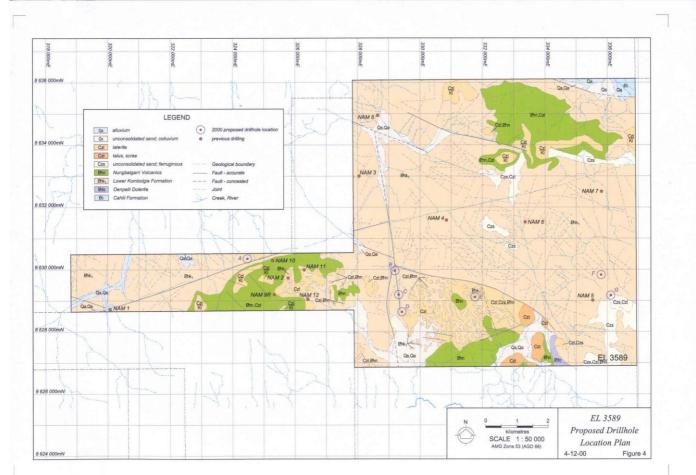


Figure 4: Local Geology



## **3 PREVIOUS INVESTIGATIONS**

#### 3.1 1970 – 1973

Exploration in the Alligator Rivers region of the Northern Territory can be divided into two phases. The first phase of exploration commenced in 1970 and continued until September 1973 when a Federal Government moratorium on mineral exploration on Aboriginal Land halted exploration activity.

Exploration in West Arnhem Land recommenced in 1986 and on the Namarrkon Project area in 1996.

#### 3.2 1996 – 2002: EL3589 – Afmex, Namarrkon Joint Venture

Investigations conducted by Afmex includes various airborne geophysical surveys (radiometrics, magnetics, electromagnetics (DIGHEM and TEMPEST)) and helicopter supported gravity. Ground based geophysical surveys include electromagnetics (NanoTem), induced polarisation and radiometrics with follow-up outcrop sampling and stream sediment sampling.

Helicopter-supported diamond drilling of 12 holes (NAM-001 to NAM-012) were completed for 3,691.2m. Eight holes (NAM-001 to NAM-008R) were planned to determine the geology of the basement rocks and determine alteration and/or mineralisation prospectivity of the targeted areas. Four holes (NAM-009 to NAM-012) were drilled to follow up alteration and structural disruption intersected in NAM-002. Results from the drilling were disappointing with the highest result of 2.8ppm  $U_3O_8$ .

EL3589 was relinquished on 26 July 2002.

#### 4 EXPLORATION BY URANIUM EQUITIES AND CAMECO

EL23700 was initially granted to Cameco Australia on 31 May 2005 covering the same area as the former EL3589.

#### 4.1 2005 Field Season

Cameco commenced work on EL23700 during 2005. The work program completed during the first year consisted predominantly of an extensive process of compiling and validating available datasets for the project area with field operations consisting of limited reconnaissance mapping and outcrop sampling. Details can be found in Doyle et al (2006).

#### 4.2 2006 Field Season

The work program during the second year consisted of two helicopter–supported diamond drill holes (NMD0001 and NMD0002) for 893.3m and one ground-based reverse circulation drill hole (NMR0003) for 136m. In addition an airborne hyperspectral (HYMAP) survey was completed.

NMD0002 was drilled at the Black Bream Prospect located at the junction of the Spencer Thrust and the Quarry Fault Zone. The drillhole intersected low-level uranium mineralisation within dolerite sequences. Full details can be found in Wykes (2007).

#### Table 1: 2006 Best Drilling Results

Drillhole	MGA_E	MGA_N	Azi	Dec	TD	Best Result
NMD0002	329299	8630694	100	-80	492.2	0.16m @ 2.82% $U_3O_8$ from 248.34m



#### 4.3 2007 Field Season

The work program during the third year consisted of helicopter-supported ground reconnaissance, mapping and sampling and four helicopter-supported diamond drill holes (NMD0004 to NMD0007) for 1,697.2m.

	5						
Drillhole	MGA_E	MGA_N	Azi	Dec	TD	Best Result	
NMD0005	332315	8629481	020	-65	441.6	20.4m @ 167ppm U <sub>3</sub> O <sub>8</sub> from 0m	
NMD0006	329506	8630665	270	-80	425.66	5.1m @ 172ppm U <sub>3</sub> O <sub>8</sub> from 325.2m	

#### Table 2: 2007 Best Drilling Results

NMD0005 was drilled at the Hot Dot Prospect targeting the Spencer Thrust while NMD0006 was drilled at the Black Bream Prospect attempting to follow-up the scattered mineralisation encountered in NMD0002. Full details of the exploration programs are documented in Otto and Williamson (2008).

#### 4.4 2008 Field Season

The work program during the fourth year consisted of helicopter-supported ground reconnaissance, mapping and sampling and a single reverse circulation drillhole.

#### 4.5 2009 Field Season

The work program during the fifth year consisted of reconnaissance field mapping and outcrop sampling predominantly along the Quarry Fault Zone. In addition, historical core was examined and some intervals resampled.

Details of investigations can be found in Urbatsch and Otto (2010).

#### 4.6 2010 Field Season

The work program during the sixth year consisted of two reverse circulation drillhole (NMR0011 – NMR0012). Samples taken from NRM0011 did not return elevated geochemistry but a few samples taken from NRM0012 returned elevated uranium values in dolerite. The intersection in the dolerite was associated with strong chlorite and moderate hematite alteration with quartz veining and slickensides.

#### Table 3: 2010 Best Drilling Results

Drillhole	MGA_E	MGA_N	Azi	Dec	TD	Best Result
NMR0012	328873	8634525	210	-60	184	$2m @ 222ppm U_3O_8$ from 13m

Full details and discussion on the work program can be found in the Annual Technical Report (Urbatsch, 2011).

#### 4.7 2011 Field Season

The 2011 exploration program consisted of desktop review of previous exploration data and ongoing targeting within the tenement. No field work was completed within EL 23700 during the reporting period. Details can be found in the Annual Technical Report by Granholm et al (2012).



#### 5. WORK COMPLETED DURING THE CURRENT REPORTING PERIOD

No field work was completed during the current reporting period. Work completed was restricted to office based research and targeting, including;

- Reprocessing and interpretation of geophysical datasets to assist with the structural interpretation of the region
- On-going review of historical geological and geophysical data to generate potential exploration targets

#### 5.1 Reprocessing Geophysical Data

Consultant Geophysicist Matthew Zengerer reprocessed 2011 ground gravity and merged this data with an adjacent ground gravity dataset from the SMLB Prospect area (on EL10176).

Historical TMI data was also collated and reprocessed to assist with structural interpretation of the Nabarlek ML. Various images were produced (Figure 5) and available for interpretation.

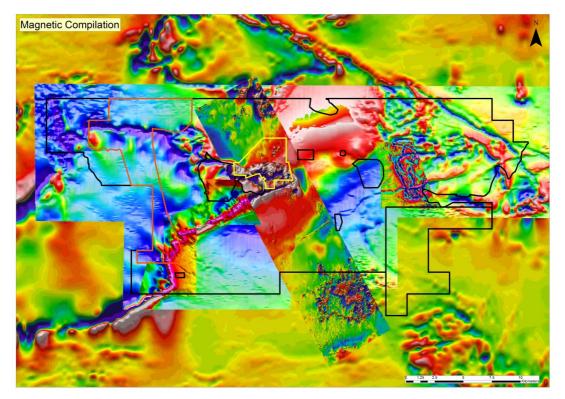


Figure 5: Airborne Total Magnetic Intensity Mosaic



## 5.2 On-going Project Review

A comprehensive project review of all the historical data from the Nabarlek area has been reviewed. This includes;

- Annual Technical and other reports
- Geophysical data (TEMPEST, magnetic, gravity and radiometric)
- Geochemical data (rock chips, soil samples, PIMA, stream sediments, drillhole assays)
- Geology and structure data as compiled from previous explorers over the years and aerial and satellite data

#### 6. FURTHER WORK

In September 2012, Uranium Equities announced that is set to launch a new phase of uranium exploration in the Nabarlek – Namarrkon region after reaching agreement to acquire 100% ownership of the exploration tenements from Cameco Australia Pty Ltd.

The agreement consolidated Uranium Equities long-held desire to consolidate ownership and management of the entire Nabarlek region. This consolidation, together with the Company's existing presence in the Arnhem Land gives Uranium Equities a renewed focus in the region.

Field based exploration is planned to continue in the 2013 field season.

#### 7. **REFERENCES**

Doyle, N, Beckitt, G, Parks, J and Wykes, J, 2006: Namarrkon Project, Exploration Licence 23700, Northern Territory, Annual Report 2005. Cameco Report No NM06-02

Granholm, X, Fitzpatrick, A, Dunlevie, T and Christie, N, 2012: Annual Report – Namarrkon Project 31 May 2011 – 30 May 2012

Lally, JH and Bajwah, ZU, 2006: Uranium Deposits of the Northern Territory. Northern Territory Geological Survey, Report 20

Otto, G and Williamson, G, 2008: Namarrkon Project, Exploration Licence 23700, Northern Territory, Annual Report 2007 - 2008. Cameco Report No NM08-02

Urbatsch, M and Otto, G, 2010: Namarrkon Project, Northern Territory, Annual Report. Cameco Report No: NM10-02

Urbatsch, M, 2011: Namarrkon Project, Northern Territory, Annual Report. Cameco Report No: NM10-01

Wykes, JL, 2007: Exploration Licence 23700, Namarrkon Project, 2006-2007 Annual Report, Cameco Australia Pty Ltd.