



Cameco Australia Pty Ltd

MAJARI PROJECT

EL 3346

ANNUAL REPORT FOR 2003 - 2004

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**Authors: P Melville, Senior Project Geologist
G Otto, Geologist III
G Beckitt, Geophysicist III**

**Copies: DBIRD Minerals & Energy (1)
Northern Land Council (1)
Cameco Australia Pty Ltd (1)**

SUMMARY

This report describes exploration work undertaken on the Majari project between 6 September 2002 and 5 September 2003. The tenement is situated approximately 330 km to the east of Darwin, and is wholly within the Arnhem Land Aboriginal Reserve.

The tenement was granted to Afmeco Mining and Exploration Pty Ltd on 6 September 2000 for a period of six years. AFMEX was in joint venture with SAE Australia Pty Ltd and Cameco Australia Pty Ltd. Cameco became sole owner and manager of the tenement in 2002.

This report details work performed by Cameco Australia on EL 3346, during the period 6 September 2003 to 5 September 2004. One diamond drill hole was drilled to test the TEMPEST target, located in the central portion of the tenement, defined in the 2002 geophysical survey. The drill hole was collared in Gumarrirbang Sandstone passing into Mamadawerre Sandstone and then basement Nimbuwah Metamorphic Complex granitoids. The Nungbalgarri Volcanic Member is absent within this section of the stratigraphy, as tested by drilling. The drill hole was terminated at 419.2m depth.

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INTRODUCTION

Exploration Licence 3346 was explored in joint venture by Afmeco Mining and Exploration Pty Ltd, SAE Australia Pty Ltd and UAL Pty Ltd. In 2002, Cameco Australia Pty Ltd entered into the joint venture and has now attained ownership of the licence.

The prime objective of the project is to discover economic uranium mineralisation within a geological environment similar to deposits to the known deposits of the Alligator Rivers Region, Northern Territory and the concealed high-grade deposits of the Athabasca Region, Saskatchewan, Canada.

The project is underlain by interpreted Nimbuwah granitoid basement rocks, which are not considered favourable to host unconformity uranium mineralisation. The Kombolgie Subgroup sandstone outcrops extensively throughout the southern portion of the tenement. Several large structures are present in the region. Uranium occurrences have been identified to the west of the project area, an indication of a favourable mineralising and alteration event.

The exploration activities planned for 2004 were designed to test the TEMPEST airborne electromagnetic target identified within the central portion of the licence. Sandstone outcrop sampling over the area, during 2003, identified rotated bedding which is interpreted to represent structural disruption. One diamond-cored hole was drilled into the target, however the TEMPEST response remains unexplained.

The 2004 drilling exploration activities were conducted over a period of eighteen days from the end of May. A temporary base camp was established at the drill site for the drilling activities.

The objectives of the work completed by Cameco during the 2004 were:

- To explain the target identified in the TEMPEST airborne electromagnetic survey.
- To characterise the stratigraphy, structure, alteration and uranium mineralisation potential of this target by diamond cored drilling.

These objectives were to be achieved by evaluating features identified in the drill core and by using physical properties, reflectance spectroscopy (PIMA) and geochemistry;

Location and Access

Exploration Licence 3346 is located in western Arnhem Land. The tenement is centred approximately 340km east of Darwin and 35km southwest of Maningrida.

Road access is via the Oenpelli – Maningrida road that traverses the tenement. Several subsidiary tracks branch off the main road, servicing outstations in the region. Much of the tenement is flat lying and can most likely be accessed by four-wheel drive vehicle. The principal access to most of the tenement is by helicopter.

A 2.2km track was constructed to the drill area utilising and extending an established track servicing Narlaberrberr (Maxwell Telstra Tower).

Location Map

Tenure

On 5 September 2004 the subject licence will reach the end of its fourth year of tenure. The licence, which is on Aboriginal freehold land in northwestern Arnhem Land, was granted to Afmeco Mining and Exploration Pty Ltd (Afmex) on 6 September 2000 for a period of six years. Afmex were in joint venture with SAE Australia Pty Ltd and UAL Pty Ltd. Cameco, through acquisition of UAL assets became involved with the project in 2001. After the withdrawal of Afmex from Arnhem Land in late 2002, Cameco became sole owner and manager of the tenement.

The original area of EL3346 comprised 178 blocks covering an area of 597.7 square kilometres. Relinquishment, effective from 5 September 2004, of 94 blocks (315.7 square kilometres) reduced the retained portion of the tenement to 84 blocks covering 282 square kilometres. The relinquished area covered the north-eastern portion of the licence.

Physiography

Much of the topography in the north of the tenement is relatively flat lying and covered by savannah woodland. The western and southern portions of the tenement are sandstone covered and mark the northern and eastern limits of the Arnhem Land plateau country in the region.

The principal drainage on EL 3346 is the north flowing Liverpool River, located to south and east of the tenement. Several minor creeks traverse EL 3346.

Tenement Geology

Based on the most recent NTGS mapping (Milingimbi 1:250000 geological series), the oldest rocks within the tenements comprise the basement Paleoproterozoic Nimbuwah Complex. Sandstones of the Kombolgie Subgroup sediments overlie these basement rocks. Cambrian Buckingham Bay sandstone crops out as scattered remnants to the north and east of the tenement, which is largely covered by Quaternary sands and black soil floodplains.

The Nimbuwah Complex consists of gneiss, migmatite and various granitic intrusives. The most recent age determinations place the Nimbuwah within 1870-1850 Ma. The 'complex' has an I-type granite origin and is considered to be, in part, intrusive into Paleoproterozoic metasediments, in this case the Myra Falls Metamorphics. (Carson et. al., 1999). Within EL 3346, visible Nimbuwah is restricted to a series of scattered outcrops in the northwest corner of the tenement.

The basement Nimbuwah Complex rocks are overlain by the Kombolgie Subgroup, which comprise the lower subgroup of the early Proterozoic Katherine River Group, the oldest rocks of the McArthur Basin. The Kombolgie Subgroup comprises an alternating sequence of quartz arenite sandstones and basaltic flow volcanics. The Mamadawerre Sandstone is the basal unit of the Kombolgie Subgroup, which is disconformably overlain by the Nungbalgarri Volcanic Member, a regionally distributed basaltic flow volcanic. Gumarrirbang Sandstone overlies the volcanic member. The age of the Mamadawerre has been constrained between 1822 and 1720 Ma and is probably closer to 1800 Ma (Sweet and others 1999). Mamadawerre

Sandstone outcrops in the central-western portion of the tenement and disappears under sand and ferricrete cover to the east. The ferricrete may be interpreted as being the residual debris from the now eroded Nungbalgarri Volcanic Member. Dissected sandstone plateaux and rugged hills of the Gumarrirbang Sandstone overlie the southern portion of the tenement.

The basal unit of the Cambrian Wessel Group, the Buckingham Bay Sandstone, crops out in EL 3346 as scattered outcrops in the eastern portions of the tenement. These Cambrian sediments, which comprise the oldest rocks of the Arafura Basin, obscure any northern and eastern extensions of the Paleoproterozoic basement and sandstone.

Oenpelli dolerite has been observed at one location on EL 3346, within a northwest trending lineament intruding the Gumarrirbang Sandstone. The dolerite is exposed as small boulders and rounded outcrop in the bottom of the linear.

A variety of quaternary surficial materials cover much of the region, obscuring the basement rocks and Kombolgie Subgroup sediments.

Geology Map

Regional Structure and Geological History

The early Proterozoic rocks of the region have been affected by the Top End orogeny (1880 to 1780 Ma), which includes the initial Nimbuwah Event or Barramundi Orogeny at about 1870 Ma. This event produced a prograde metamorphic effect with associated tight folding and faulting. The various 'domains' exhibit a variability of deformation and metamorphic grade, with the western and eastern margins of the Pine Creek Inlier (Litchfield Province and Nimbuwah domain respectively) exhibiting the most pronounced effects.

Major regional faults, which affect the early Proterozoic, have northwest (Bulman), north-northwest (Aurari) and northerly (Anuru, Goomadeer) strikes. Another significant set trends to the east and includes both the Ranger and Beatrice faults. The Bulman Fault Zone is the principal regional feature and is considered to represent a long-lived, deep crustal structure, which has exerted a large lateral component in rocks of the Pine Creek Inlier.

A more intense concentration of structures traverse the mid Proterozoic and younger rocks and include northwest, east, northeast and north trends. Both faulting and jointing, with displacements ranging from a few metres up to 100 metres, locally heavily dissect the Kombolgie.

Deposition of the Mamadawerre Sandstone took place in an environment of extension and local basin formation with probable fault-controlled sedimentation. Rapid thickening and thinning of the sequence imply this.

The widespread Oenpelli Dolerite intrusive event took place at about 1715 Ma. Localised effects in the sandstone include silicification, the introduction of magnesium rich to intermediate chlorite and the formation of muscovite-illite. A characteristic mineral assemblage of prehnite-pumpellyite-epidote has formed in the quartzofeldspathic basement rocks adjacent to the intrusions.

Exploration Target

The focus of the exploration strategy is the discovery of unconformity-related uranium deposits. The nearby deposits at Ranger, Jabiluka and Koongarra and the now depleted Nabarlek Mine serve as models for this strategy. The presence of gold, palladium and platinum in these deposits plus the economic gold-platinum resource at Coronation Hill in the South Alligator Valley, indicates an additional potential for this deposit style.

Previous Exploration

McIntyre Mines (Australia) in joint venture with Canadian Superior Oil (Australia) and Ocean Resources conducted exploration on Exploration License 144 from 1971 to 1973. An airborne radiometric survey over the western portion of EL 3346, and the eastern portion of Cameco operated EL 5892 located two significant U anomalies associated with the Nungbalgarri Volcanic Member to the northwest of Gudjekbinj outstation. Drilling was recommended for the prospect, but was not conducted before the EL was relinquished in 1973. The prospect lies outside of EL 3346 and EL 5892.

Afmex gained exploration access to EL 3346 in September 2000. Afmex carried out limited exploration prior to Cameco involvement, and was restricted to geophysical remote sensing surveys. A detailed (100m line spacing) airborne radiometric and magnetic survey was conducted over the entire tenement during September 2001. Results from the radiometric survey identified 15 low order anomalies for follow up ground investigation. An airborne electromagnetic survey (TEMPEST) was flown in August 2002 over a small area in the central portion of the tenement. The survey area was selected based on an interpreted shallow depth to basement rocks and a suggestion from magnetics that several large structures are present in an area of relatively sparse rock outcrop. During early September 2002, Cameco personnel conducted ground investigations of radiometric anomalies and performed broad regional outcrop sampling over sandstone outcropping areas.

A total of 82 outcrop samples, which includes regional and radiometric follow-up samples, were collected over the project during 2002 and 2003. Geochemical results from the sampling have not highlighted any areas requiring further follow-up work. Fault breccias were located in two locations on the licence area; neither location displayed hydrothermal quartz veining or other characteristics that would indicate favourable conditions for U mineralising processes.

EXPLORATION PROGRAM

The 2004 work program consisting solely of diamond drilling commenced on 23 July and was completed on 9 August 2004. United Drilling Services based in Gympie Queensland conducted the diamond drilling.

Drill Hole Location

Vehicle access to the drill site was via an established track to Narlaberrberr, a Telstra communications tower, with a further 2.2km of track constructed by Wildman River Stock Contractors. Water for drilling purposes was sourced from the nearby Nei-igmud Creek.

A temporary camp was established for the drillers at the drill site, with all drill core transported to and stored at the Cameco King River Exploration Camp.

All digital data, which has been acquired by Cameco has been submitted on CD with this report. In some cases data over culturally sensitive “nogo” zones has been excised from figures and data in accordance with requests by Traditional Owners.

A total of \$105 700 was expended on EL 3346 for the reporting period.

EL 3346 Financial Statement

Drilling

Drilling of MJD001 commenced on 23 July and was completed on 9 August 2004. The drill hole was drilled at an inclination of 75° towards 230° azimuth with a total depth of 419.2m. Further deepening of the hole was not possible at this time due to a lack of additional drill rods.

The drill hole was targeted on a TEMPEST feature. The target consists of an unexplained abrupt change in the depth of a weakly conductive horizontal layer, as depicted in the TEMPEST CDI (conductivity depth image). The sloping conductive feature has been implied to either represent structural disruption or the unconformity surface sloping off a basement high.

Broadly the drill hole intersected sandstone, attributed to both Gumarrirbang and Mamadawerre Sandstone, to the unconformity at 401.38m, passing into granitoid gneisses of the Nimbuwah Complex. The Nungbalgarri Volcanic Member was not intersected in drilling.

The base of the Gumarrirbang Sandstone is interpreted at 186.2m. From surface to a depth of approximately 95m, the sandstone is fine-grained, well-sorted, planar-bedded (with some indications of ripple beds) sandstone. From 95m to 186.2m the sandstone is comprised of alternating coarser grained and pebbly cross-bedded sandstone with finer grained intervals of cross-bedded and planar-bedded sandstone sequences. These sequences are interpreted as deposited in distal to proximal fluvial environments.

A zone of strong brittle fracturing, weak brecciation and quartz dissolution fractures is coincident with the base of Gumarrirbang Sandstone from 182 to 190m. The sandstone throughout this structurally disrupted portion of the drill hole appears to be contiguous, with no apparent faulting or displacement. Moderate pervasive hematite alteration of the sandstone is prevalent throughout this interval with strong hematite and goethite noted on fractures and associated with weak brecciation.

The Mamadawerre Sandstone is intersected from 186.2m to the unconformity at 401.38m. The upper portion of the sandstone, to 252.6m is fine to medium grained, planar-bedded and cross-bedded sandstone with minor clay or mud rip-up clasts. Diagenetic hematite is irregularly banded throughout the interval. From 252.6m to the unconformity, the sandstone is dominantly pebbly, coarse grained to granulose, and cross-bedded. Pebble bands and minor conglomeratic units are observed. In the basal 25m, thin pebble bands are commonly hematitic and contain elevated radiometrics that, based on previous experience, is attributed to thorium. These radiometric elevated

pebble bands are similar to those observed elsewhere within basal portion of the Mamadawerre Sandstone within Arnhem Land.

The sandstone unconformity with the granitoid gneisses of the Nimbuwah Complex rocks is dipping 15° towards 355° and is simply marked by a thin layer of pink clay. The granitoid gneisses display a strong red-green zone with a red hematite zone persisting to 409.8m followed by intense green zone to 416m and then grading to weak to moderate black chlorite pervasive alteration. The rocks are dominantly medium grained granitic composition, with a moderate to strong foliation defined by an alignment of biotite flakes. Foliation is variable (but dominantly steep to vertical towards the south) and is modified by folding (S1 folds). The drill hole was terminated within Nimbuwah Complex rocks at 419.2m.

The Nungbalgarri Volcanic Member is not present within the drill hole. The interpreted contact between the Gumarrirbang Sandstone and the Mamadawerre Sandstone is observed to be conformal. Structural disruption is coincident over this interval, although it is not thought to be of sufficient magnitude to have removed the volcanic member from section. The Nungbalgarri Volcanic Member is demonstrated to be absent in some areas of the Kombolgie Subgroup, as is the case in this area. The volcanic member may be absent because the area may lie proximal to the palaeo-basin edge, away from the supposed centre of basin rifting and volcanism, or it may have been thinly deposited and eroded during basin down warping at the commencement of Gumarrirbang Sandstone deposition.

The TEMPEST conductive feature targeted by drilling is not totally explained. The depth to the conductive feature (interpreted as 190m from the CDI image) is coincidental with the base of the Gumarrirbang Sandstone and the structural disruption. The features noted in the drill core at this depth, may contribute to contrasting resistivity effects, which may be of sufficient magnitude to be detected by the TEMPEST. The drill core within the structurally disrupted zone is un-orientated, however, fractures peripheral to the structural zone, which appear to parallel the weak brecciation, are orientated with an average measurement of 80° towards 015°. The TEMPEST CDI's display a conductive feature that could be interpreted as northerly dipping, although the dip of this feature would appear to be of a more moderate to shallow dip than that measured within the core.

[MJD001 Strip Plot](#)

[MJD001 Detailed Drill Log](#)

[Codes for Drill Logs](#)

The Strip Plot displays the lithological intervals and major PIMA results. The Pima results are displayed as Illite – yellow, Muscovite – red, Dickite – fuchsia, Kaolinite – blue. No chemistry has been received for the drilling.

Discussion of TEMPEST

Diamond drill hole MJD001 is located on the TEMPEST line 50260, which is orientated west east. This line depicts a weakly conductive sub-horizontal layer, which deepens towards the west. The response is similar to those found elsewhere in Arnhem

Land, which have been shown to relate to increased conductivity at the sandstone-basement unconformity. Hole MJD001 was targeted on an abrupt shallowing of the weakly conductive layer from 200 m in depth to the surface. This was postulated to represent major faulting, which was also partially supported by the presence of major magnetic structures and local sandstone tilting.

There are several results from the drilling:

1. The sub-horizontal conductive TEMPEST feature appears to relate to the contact between Gumarrirrbang and Mamadawerre Sandstone, rather than the sandstone-basement unconformity.
2. There is no TEMPEST conductive response associated with the actual unconformity.
3. The alteration and structure encountered in drilling is not particularly significant and there is some doubt whether it is sufficient to account for the weakly conductive airborne electromagnetic response.
4. MJD001 failed to intersect significant structure and explain the targeted TEMPEST feature.

[Geophysics Compilation with Tempest and Drill Hole MJD001 \(project scale\)](#)
[Geophysics Compilation with Tempest and Drill Hole MJD001 \(prospect scale\)](#)

Outcrop Sampling

Outstanding geochemical results from outcrop samples from the 2003 exploration program, for those samples that had not been received at the time of report generation, are included with this report.

All samples were sent to NTEL in Darwin and Pine Creek, Northern Territory, for multi-element analysis. In total, four separate methods were used to analyse up to 65 elements and four isotopes. The geochemical methods used are detailed in the following tables.

[G400 Analytical Procedures](#)

[G950 Analytical Procedures](#)

The following tables list the geochemical results for the outcrop samples collected, but not reported from the previous annual report. G400 results for samples MJ03C10240 – MJ03C10248 are included. Results for the G950 (W samples) samples collected that had not been received are included.

[Outcrop G400 Geochemistry](#)

[Fracture Sample \(G950\) Geochemistry](#)

CONCLUSIONS

Drilling conducted in 2004 does not adequately explain the TEMPEST feature noted within the central portion of the tenement. On the basis of U potential, the area drill tested does not warrant further drilling.

Further exploration will concentrate on a structural target in the western portion of the tenement.

WORK PROGRAM 2004 – 4TH YEAR OF TENURE

Planned activities for 2004 on EL 3346 may include follow-up helicopter assisted rock sampling and ground traverses of structural corridors and lineaments. A diamond drill hole is planned to test a structural target in the western portion of tenement. This hole will determine the favourability of this structure in relation to U mineralisation. Dependent on accessibility, a truck mounted drill rig or helicopter supported drill rig will be utilised.

If possible, down-hole resistivity will be undertaken at drill hole MJD001 to assist with reconciling the TEMPEST response targeted in 2004.

The estimated budget for the Majari project during the 5th year is estimated to be \$50,000 to complete the program as planned.

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