



Cameco Australia Pty Ltd

**KING RIVER PROJECT
EXPLORATION LICENCE EL734
NORTHERN TERRITORY
ANNUAL REPORT 2002 FIELD SEASON**

CONFIDENTIAL

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DBIRD Minerals and Energy
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SUMMARY

This report describes exploration work undertaken within Exploration Licence 734 (EL734) during the seventh year of tenure ending 12 May 2003. The licence area is located in north western Arnhem Land and was initially granted on the 13 May 1996 for a period of six years.

Renewal of the licence area was required under the Mining Act at the cessation of the six year period. An application for renewal accompanied by supporting documents was forwarded to DBIRD in February 2002. Granting of the renewal for a further 2 years commencing 13 May 2002 was approved

The exploration program was managed by Cameco Australia Pty Ltd on behalf of the Nadjinem Joint Venture partners, Cameco Australia Pty Ltd and the Nadjinem Aboriginal Corporation.

The primary exploration target is for unconformity related uranium deposits similar to the nearby Ranger, Jabiluka and Koongarra deposits and the now depleted Nabarlek mine.

The current years exploration activities consisted solely of a RAB drilling program, which covered specific areas of the Myra Falls Metamorphics (MFM) stratigraphy. The aim of the program was to follow up prospective results from the previous years' drilling and to investigate pre-existing anomalies as well as adding further geological clarification in the process.

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INTRODUCTION

This report describes program activities carried out during the 2002 field season on behalf of the Nadjinem Joint Venture, a joint venture between Cameco Australia Pty Ltd (Cameco) and the Nadjinem Aboriginal Corporation. EL734 forms part of the King River Project which is included within the Cameco agreement termed the 'Arnhem Land West Joint Venture' (AWJV). Exploration on this licence is presently being conducted simultaneously with the adjoining King River tenements, EL 5890 and EL 5891. Since the Exploration Licences are located on Aboriginal Land the exploration program was carried out under the terms of consent documentation as agreed with the Northern Land Council pursuant to the Aboriginal Land Rights (Northern Territory) Act and dated 1 March 1996.

Clearance for the program was given by the Northern Land Council, following the Liaison Committee Meeting, held on 30 April at Gunbalanya (Oenpelli).

A RAB program was the only activity undertaken. The work was performed by Johannsen Drilling Pty Ltd of Port Lincoln, South Australia. Drilling on the tenement commenced on the 2 September and was completed on 6 September.

Location and Access

The tenement is located in western Arnhem Land immediately north-east of the Aboriginal settlement of Gunbalanya and is wholly within Aboriginal Land. The Ranger uranium mine is situated approximately 100km to the south-west and the rehabilitated Nabarlek site is within tenements which adjoin the southern boundary of the licence. Access from Darwin is via the Arnhem Highway to Jabiru then north to Gunbalanya. Two main roads traverse the licence, the Gurig National Park and Maningrida-Nhulunbuy roads. The old Murgendela (Wark) road straddles the western edge.

Location Plan

Vehicular access is variable dependent upon topography. In general, most of the country is flat lying and can be traversed relatively easily by four-wheel drive vehicle.

Tenure

EL734 was granted on 13 May 1996 for an initial period of six years. The tenement was renewed for a further two years commencing 13 May 2002. On granting, the total area under licence was 919.6 square kilometres of which 67.5 square kilometers was designated as restricted zones following site surveys undertaken by the Northern Land Council. An area of 481.4 square kilometres now constitutes the tenement. There was no land reduction sought for Year Seven.

Physiography

Remnant sandstone escarpment country is present along the southern boundary of the licence area. The remainder of the tenement consists dominantly of gently undulating sandy plains, generally underlain by a ferruginous duricrust. Erosion of this duricrust

in the western part of the licence area has led to the development of a 'breakaway' along the erosional boundary. Thin remnants of lateritised Cretaceous sediments form tablelands in the east of the tenement. The main drainage systems are the north flowing Cooper and Birraduk Creeks.

Tenement Geology

Paleoproterozoic rocks, which are present in the project area, have been named the Myra Falls Metamorphics (MFM). These are considered to be the higher metamorphic grade equivalents of the Cahill Formation (the host rocks to the Alligator Rivers uranium deposits) and consist broadly of quartzo-feldspathic±garnet gneiss, quartz-mica-amphibole-garnet schist and amphibolite. No carbonates have as yet been identified on the tenements but probable calc-silicate lithotypes are present as amphibole-rich schists and ?para-amphibolite. Structurally the MFM form a broad synclinal structure (the 'Oenpelli Syncline'), which is confined to the western half of the tenement. The structure contains a well defined and easily traceable sequence of 'lower' and 'upper' units. A thin but fairly persistent quartzitic unit, formerly considered to be Kudjumarndi Quartzite by the BMR (now Geoscience Australia), forms a stratigraphic marker in the upper MFM and accurately outlines the fold structure. Outcrop is extremely sparse, being confined mostly to drainage channels. Ferricrete and Quaternary sands cover much of the area. Mapping of the stratigraphy has been made possible by a combination of air photo studies, geophysical interpretation and regional RAB drilling programs.

The Myra Falls Metamorphics abut the granulite facies Nimbuwah Complex, which consist of gneiss and 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 the paleoproterozoic metasediments (Carson and others 1999). An anomalously magnetic unit, termed the Stromatic Migmatite marks the inferred contact with the MFM. It is a finely banded, fine grained quartzofeldspathic gneiss containing magnetite and almandine garnet and is considered to be a transitional phase between the MFM and the Nimbuwah Complex. There appears to be a rapid regional progression of metamorphic grade increasing from west to east. Outcrop tends to be more extensive in comparison to the MFM. Good exposures of both gneissic rocks and the intrusive granitic variants occur throughout the area.

The basement rocks are overlain by the Kombolgie Subgroup (formerly Kombolgie Formation), which forms the base of the early Proterozoic Katherine River Group. The Mamadawerre Sandstone, the fluvial basal unit of the Kombolgie outcrops as the characteristic escarpment country of the Arnhem Land plateau. In the project area it outcrops along the southern boundary of the tenement forming rugged cliffs and dissected plateau as part of the north eastern extension of the Oenpelli Massif. The age of the Mamadawerre has been constrained between 1822 and 1720 Ma and is probably closer to 1800 Ma (Sweet and others 1999).

Thin Cretaceous platform cover overlies Nimbuwah complex rocks in the east of the tenement.

Intrusive rocks other than the Nimbuwah granites include extensive sills and lopoliths of Oenpelli dolerite, several generations of younger crosscutting dolerite, and an isolated occurrence of Maningkorri Phonolite, which intrudes Nimbuwah migmatite in the extreme east of the licence area. Circular magnetic features, as defined by airborne magnetics, are considered to be pipe-like mafic bodies, which have been identified elsewhere in the region (Andrew Brown, pers. comm.). These were the focus of diamond exploration by De Beers on the tenement.

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 produced a prograde metamorphic effect with associated tight folding and faulting. The various 'domains' exhibited 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 north-west (Bulman), north-north-west (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 principle 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 north-west, east, north-east and north trends. Both faulting and jointing with displacements ranging from a few metres up to 100 metres locally heavily dissect the Kombolgie.

The King River region occupies the north-western extension of the Arnhem Shelf in the northern McArthur Basin. 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.

Regional Geology and Major Structures Plan

Exploration Target

The focus of the exploration strategy is the discovery of unconformity-related uranium deposits. The nearby economic deposits at Ranger, Jabiluka, 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

Union Carbide Exploration Corporation

During the period 1970-1972 Union Carbide Exploration Corporation undertook substantial exploration, principally for uranium. This work comprised airborne magnetics and radiometrics, regional geochemical surveys and geological mapping. Numerous radiometric anomalies were investigated including the Tadpole group of prospects and Dreadnought Creek. Results were discouraging.

Union Carbide's exploration work was curtailed in early 1973 by a federal Government imposed moratorium on exploration pending a resolution on the issue of aboriginal land rights.

Previous Joint Venture Exploration

1996 Field Season

Grant of title was given in May 1996. Initial reconnaissance work included regional outcrop mapping, orientation soil geochemistry and regional drainage BLEG in conjunction with diamond indicator sampling (Mackie, 1997). A regional fixed wing airborne survey at 200-metre line spacing was conducted and included magnetics, spectrometrics and VLF. The survey was carried out by Geoterrex Pty Ltd (now Fugro Airborne Systems Corp). A consultant was used to conduct the regional stream sampling program.

1997 Field Season

The 1997 program consisted of airborne anomaly follow up, further geochemistry (soil, rock, stream and BLEG), geological mapping, regional and prospect scale programs of RAB drilling. One diamond drill hole was collared at the Fishtail uranium prospect to gain data on host rock lithology and alteration. (Melville et al 1998).

1998 Field Season

The 1998 program consisted of ongoing regional work including geological mapping and interpretation, stream sediment sampling and RAB drilling. Prospect scale activities included detailed auger soil sampling, ground magnetics, DC resistivity soundings and RAB drilling at Fishtail, RAB drilling at radiometric anomaly NIM6 and gridding and soil sampling along the Dreadnought structure. (Williams and others 1999).

1999 Field Season

RAB drilling was continued at Fishtail Prospect and more regionally to the north and east to more accurately establish major lithological boundaries and trends. A

program of ground magnetics was conducted over radiometric anomaly TP11 and a repeat survey at Fishtail was carried out.

De Beers Exploration Australia undertook detailed airborne magnetic surveys, field inspection and loam sampling of 14 magnetic anomalies. Stream sediment sampling was also conducted around an 'anomalous' sample, which contained possible kimberlitic indicators. Most of this work was concentrated in the south-eastern corner of the licence area.

The negative results of the loam sampling coupled with poor MMI geochemical signatures appeared to rule out the presence of kimberlitic intrusions. Formal notification of De Beers's withdrawal from the King River program was given in early 2000 (Vercoe 2000).

2000 Field Season

Heliborne Dighem was flown over the western half of the tenement by Fugro Airborne Surveys to give complete coverage of the Myra Falls Metamorphics.

2001 Field Season

RAB drilling was carried out on either side of the main road consisting of seven east west traverses to assess the prospectivity of the area and to further the existing geological knowledge. Anomalous geochemistry was encountered in the southeast corner of the grid. In particular hole KRR680 contained uranium values up to 90ppm. Cu, TiO₂ and V also exhibited anomalous values.

King River Exploration Summary

PROGRAM ACTIVITIES

Introduction

RAB drilling for the 2002 field season had two objectives, to follow-up the encouraging results from the drilling carried out in 2001 (KRR680), and to continue investigations in the vicinity of anomaly NIM6 (EL 734). The latter, previously explored by RAB drilling (PNC 1998), produced anomalous uranium values in several holes. The drilling was also useful for the on-going accumulation of lithological data in these areas. All grids were based upon a 200m by 200m spaced system reducing the previous years drilling down from the more regional 800m hole spacings. Total metres for the entire program came to 1106m from 53 holes.

Dingo (KRR680)

The Dingo anomaly is positioned near the interpreted contact of two major gneissic units within the Myra Falls Metamorphics: the 'banded gneiss' and the overlying 'quartzofeldspathic gneiss'. The latter, also referred to as the Tadpole Sequence, contains numerous airborne radiometric anomalies. The presence of garnetiferous

rocks identified in the drilling from both 2001 and 2002 in the vicinity of Dingo suggest some 'tongues' of the lowermost pelitic units occur in the area.

A close-spaced square grid was placed around the anomalous drill hole, allowing for 19 holes to be drilled. The program was successful in that further uranium anomalism was detected in association with zones of hematitic alteration, although the intensity of the uranium values overall are lower. Garnet-bearing chloritic-biotitic schist and schistose gneiss were identified in four holes indicating a further south eastwards extension of the lower Cahill-type lithologies as defined from the previous years' drilling.

A north west striking anomaly some 200 metres long is suggested from the position of the anomalous holes. Of particular interest are KRR838, 853 and 854, all of which surround the 'discovery' hole KRR680. Holes 853 and 854, situated directly north west and north respectively exhibit elevated lead, lead isotopes and uranium along with associated copper, zinc, vanadium and bismuth. Hole KRR838 is directly east of KRR680 and also shows elevated uranium and lead isotopes along with vanadium and moderately elevated thorium. KRR848 is also of interest even though it is slightly offset from the main trend. It shows elevated uranium and vanadium along with slight increases in platinum and palladium. The range of elements present is indicative of both mafic (amphibolite and dolerite are known in the area) and non-mafic lithotypes.

RAB Location Map 680 Grid

NIM 6

The NIM6 airborne anomaly originated from the initial regional airborne work carried out by PNC in 1996. Ground follow-up located a large open area covered by scattered outcrops of ferricrete, which exhibited an above background radiometric response. The initial RAB program (1998, 11 holes) located downhole anomalies with a maximum in one hole of 46.7ppm uranium. In addition, several other holes had U values ranging between 20 and 30ppm. Petrographic descriptions of drill cuttings identified quartz and biotite-rich pelitic metasediments.

During the current year, thirty-four holes were drilled, most of which are located immediately north of the originally drilled airborne anomaly. Intersected rock types include interlayered biotitic schists and schistose gneiss, quartz-feldspar gneiss, granitoids and minor mafics. Elevated scintillometer readings were apparent in 10 holes with several of these being restricted to the northeastern corner of the grid. Two of the latter, KRR860 and 861, had elevated radiometrics associated with hematitic alteration.

Chemistry from the NIM6 holes confirms the multiple lithologic associations as noted above. Holes KRR863, 865, 866, and 868, which are located near each other on the central and north west section of the grid, seem to suggest a granitoid association with elevations in U, Th, Rb and Zr along with a minor heavy rare earth component. Adjacent holes KRR857 and 858 have elevated Y and U (47ppm U in 858) while 858 also has elevated Cu, Co, Rb, Th and a slight increase in Sn. Both

holes are in quartzo-feldspathic gneiss with hole 858 having an amphibolite component.

KRR860 was the most interesting from this grid with anomalous uranium (69ppm), nickel (575ppm) and elevated levels of Al₂O₃, Co, Au, Fe₂O₃, Li, Pd and V. Lithological logging identified hematite altered quartzo-feldspathic gneiss although the presence of above background Co, Pd and V suggests a mafic composition. It should be noted here that the regional magnetics are quite flat, ruling out the presence of Oenpelli dolerite. Non or negligibly magnetic mafics such as amphibolite or late stage intrusives are the most likely contributors of these elements.

Eight other holes (KRR872, 873, 875, 876, 885, 886, 887 and 888) are located in the central and south western portion of the grid and all show varying levels of uranium anomalism. Holes 872, 875, 886 and 888 have elevated U with 882 and 888 at 39 ppm and 35 ppm respectively. Other anomalous elements include As, Co, Cu, Pb, Li, Ni, V and Zn.

Given that holes in various locations on the grid contain some degree of uranium anomalism, no definite trend can be firmly established. However, there is a suggestion of a broad northerly strike through the centre of the grid with a branching to both the north and north east on the most northerly line. The close spaced grid-based drilling will be extended to the north and east for several hundred metres followed by more 'regional-style' extensions. Viewing of the Dighem data suggests a regional north east strike of the metasedimentary units complicated by tight folding in the direction of the Dingo anomaly. Magnetics imply a north west trending feature (fault or dike?), which bisects the grid. This direction should also be taken into account when planning further drilling.

[RAB Location Map NIM6 Grid](#)

[Analytical Methods NTEL](#)

[G400 RAB Drilling Geochemistry](#)

[G950 RAB Drilling Geochemistry](#)

[Fire Assay Geochemistry for RAB Drilling](#)

[TSA PIMA for RAB Drilling](#)

WORK PROGRAM EXPENDITURE 2002

Estimated expenditure for the year, as stated in the 2002 work program, was \$68,000. Actual expenditure was \$115,975. Details are contained in the link below 'Summary of Expenditure'.

[Summary of Expenditure](#)

WORK PROGRAM 2003

A summary of the proposed exploration activities, timing and contractors under consideration for Year 8 has been tabulated on the following page. Budgeted exploration expenditure for the tenement is \$80,000. A further \$22,000 will be expended on DBIRD and NLC costs.

Location and Scheduling of Activities

Activity	Duration of Activity	Timing	Amount	Approximate Location
Access and site preparation for grid-based RAB	5 days	Late June	Approximately 10km.	Airborne anomaly NIM6 and environs
RAB Drilling	3 days	Mid July to early August	700 metres (25 to 30 holes)	As above

Listing of On-Site Contractor Requirements

Activity	Equipment	Personnel	Potential Contractor
Track / Site clearing	Front End Loader	1	Gunbalanya Community Council / Wildman River Stock Contractors
RAB Drilling	RAB rig, 4WD support vehicle	2	Johannsen Drilling P/L

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