Cameco Australia Pty Ltd

ARNHEM LAND WEST JOINT VENTURE
LIVERPOOL PROJECT
EL 2855
ANNUAL REPORT FOR PERIOD 25 JULY 2001 TO 24 JULY 2002

CONFIDENTIAL

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SUMMARY

This report describes exploration work undertaken for the Arnhem Land West Joint Venture (AWJV) on the Liverpool project during the field season over the period 25 July 2001 to 24 July 2002. The tenement forms part of the Arnhem Land West Joint Venture, a joint venture between Cameco Australia Pty Ltd (Cameco), PNC Exploration Australia Pty Ltd (PNC) and the Ngalangak Aboriginal Corporation

The current year's exploration activities included review of a report on a pilot ARGUS multispectral aerial survey, as well as processing, interpretation and analysis of hyperspectral survey data covering the exploration licence. Regional sandstone traverse sampling was conducted with samples being analysed for a suite of geochemical elements and PIMA clay determinations.

Radiometric anomaly ground truthing failed to locate any significant anomalies, with most being attributed to element scavenging by lateritisation of the Gilruth Volcanic Member. Dickite-Kaolinite was the dominant clay mineral assemblage noted and is consistent with regional clays in the Gumarrirnbang and Marlgowa Sandstone Members.

TABLE OF CONTENTS

TABLE OF FIGURES

TABLE OF TABLES

TABLE OF APPENDICES

INTRODUCTION

This report describes program activities carried out during the 2001 field season on behalf of the Arnhem Land West Joint Venture, (AWJV) a joint venture between Cameco Australia Pty Ltd (Cameco), PNC Exploration (Australia) Pty Ltd (PNC) and the Ngalangak Aboriginal Corporation. Since the Exploration Licence is located on Aboriginal Land the exploration program was carried out under the terms of consent documentation agreed with the Northern Land Council pursuant to the Aboriginal Land Rights (Northern Territory) Act 1976.

The program as described, represents the second year of exploration on the tenements by the Joint Venture. To date there has been no ground-based exploration activities.

The only activity for this year was the flying of a fixed wing airborne survey by UTS Geophysics of Perth. The survey, which was originally planned for October 2000, was postponed and eventually flown in June 2001.

Location and Access

Exploration Licence 2855 is located in central western Arnhem Land. The tenement is centred about 70 km southeast of Nabarlek and 100 km east of Jabiru. It is situated approximately 120 km southeast of the King River project.

The project area has extremely limited vehicular access. A four-wheel drive track is indicated as traversing the extreme south east of the tenement and another accesses the Marlgowa Outstation on the Mann River.

Location Map

Tenure

EL 2855 was granted on the 25th July 2000 for an initial period of six years. On granting, the total area covered by the licence is 1255 km^2 with 213 km^2 being excluded from exploration.

Physiography

The tenement consists predominantly of relatively flat-lying sandstone plateau covered by savannah woodland and scrubland. The plateau is dissected by numerous, mostly north flowing drainages including the Liverpool and Mann Rivers. Gorges and waterfalls have developed in places.

Tenement Geology

Based on the NTGS mapping of the Milingimbi 1:250000 geological series (Carson and others 1999), the tenement is dominated by the Kombolgie Subgroup (formerly Kombolgie Formation) of the Paleoproterozoic Katherine River Group. The latter forms an extensive area of platform cover sediments in western Arnhem Land. The Marlgowa Sandstone, which is the stratigraphically highest unit of the Kombolgie, predominates with lesser exposures of the McKay Sandstone. The former consists of coarse to occasionally pebbly white-grey quartz arenite and was formed in a fluviatile

depositional environment. The McKay, which lies conformably on the Marlgowa, consists of interbedded fine to medium grained white-grey quartz arenite and red-brown to purple ferruginous sandstone, occasionally pebbly. The depositional environment varied from fluviatile to shallow tidal marine.

The Gilruth Volcanic Member is present over a very limited area in the extreme south western corner of the tenement. This unit, represented by ferricrete and saprolite rubble, separates the Marlgowa from the underlying Gumarririnbang Sandstone. Isolated outcrops of Oenpelli dolerite have been mapped within the tenement. Stratigraphically, these sandstone formations are located at the top of the Kombolgie Subgroup. Depth to basement from the top of the Marlgowa Sandstone on the Milingimbi sheet area is estimated to be at least 700 metres, calculated from the measurement of sections through the various sandstone units by NTGS.

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 northwest (Bulman), north-north-west and northerly (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 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.

In a regional context, the Liverpool project is located adjacent to the Arnhem Shelf at the northern extent of the McArthur Basin. The tectonic environments that existed during deposition of the Katherine River Group varied, ranging from extension and local basin formation with probable fault-controlled sedimentation (Mamadawerre Sandstone), to a basin-wide extensional setting. As noted above the exposed sandstone units illustrate spectacular eroded joint and fault patterns, however the near horizontal to shallow-dipping bedding would imply a tectonically inactive post depositional environment.

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.

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

Previous field activity that took place during the 2000-2001 field season was flying a fixed-wing magnetic, radiometric and DTM (digital terrain model) survey over the extent of the exploration licence.

EXPLORATION PROGRAM

During the 2001-2002 field data from the ARGUS survey flown over a strip of the project area to the west, was received along with a review report. Further review of this survey was conducted by Cameco personnel and two zones of interest noted.

Data from the hyperspectral Hymap Mark I survey, flown in 2000, was processed and interpreted early in the current lease year. Analysis of the interpreted dated revealed several zones of high clay content.

Later helicopter assisted regional sandstone sampling program was conducted over 'anomalies' highlighted by all the flown surveys. This consisted of the collection of 100 'brick' sized samples for geochemical assay, clay estimation analysis (PIMA), and petrographical work.

Digital data for the surveys and that available for the sample analyses has been submitted on CDs with this report.

The Summary of Exploration Work table itemises work completed during 2001-2002 field season. The Summary of Expenditures table is the expenditure statistics itemised by work and exploration license.

Summary of Exploration Work Completed during Reporting Period
Summary of Expenditures Cameco Australia Pty Ltd

Airborne Surveys

During June 2001, a combined magnetics, radiometrics and hyperspectral ARGUS survey was flown by FUGRO over the western 1/8th of the project totalling 2000 line km. Survey specifications employed for were flight height of 80m, 100m spaced lines flown in a north - south direction.

The primary aim of the survey was to test the effectiveness and results of the system.

In 2000 a 1255km^2 hyperspectral survey was flown over the Kombolgie Sandstone outcrops within EL2855. The survey was conducted by De Beers using their AMS (Airborne Multi-spectral Scanner) which has recently been renamed Hymap Mk1. The survey was designed to map minerals and identify alteration associated with unconformity uranium mineralisation. In particular, it was hoped that this system would identify and map variations in kaolinite, illite, dickite, halloysite, iron and magnesium chlorites and silicification, which could be attributed to the above alteration phenomena.

Whilst the survey was flown in July 2000, no data had been processed or interpreted prior to the 2001-2002 annual report. Consequently, this report documents 2000 data along with a logistics report and interpretation/processing. As described in the logistics report, the data has been submitted in ENVI BIL (Band Interleaved by Line) format because ENVI is the usual processing package for hyperspectral data and allows the survey parameters to be stored. This data can be imported into ERMapper if required.

Location of ARGUS and AMS Surveys

ARGUS Survey Logistics Report by Fugro
Hymap Mark I Survey Logistics Report

ARGUS Clay Intensity Image
Hymap Mark I - AMS Clay Intensity Image

Cameco's Technical Services (G. Zaluski) completed the interpretation and processing of the AMS data. The interpretation is highly detailed with considerable effort made to describe the processing and processing products, which is important if Cameco is to embrace this relatively new technology.

The data indicate that the dominant clay layers within the Kombolgie are (in order from bottom to top) illite and kaolinite, dickite, and illite. Alteration is suggested by muscovite plus illite in zones along faults, particularly in the west, and at the edges of disturbed blocks. The processing has not identified chlorite alteration.

Cameco Australia's geophysical staff conducted a preliminary study of the radiometric, magnetic and DTM data in-house, resulting in five low-level radiometric anomalies being defined.

Sandstone Traverse Sampling

The 2001-2002 helicopter assisted regional sampling program was designed as follow-up ground truthing to the airborne surveys over the Kombolgie Subgroup outcrop. A total of 102 samples were collected in May 2002. The following figure shows the areas of coverage. These samples were carefully selected to represent anomaly and regional background signatures for lithological, spectral and geochemical parameters at each location. Geomorphological, geological and radiometric parameters were recorded and a digital photograph at each site was taken. The samples were systematically processed after return to Darwin. Lithological textures, alteration colours (Munsell), grain-size variations and petrophysical parameters (magnetic susceptibility) were routinely recorded.

Outcrop Sample Location Plan
Outcrop Sample Physical Properties

All samples were sent to NTEL in Darwin and Pine Creek for multi-element analysis. In total, four separate methods were being used to analyse for approximately 50 elements. All geochemical data including analytical procedures are included in the following appendix.

Outcrop Sample Geochemistry

102 sandstone samples were collected covering the clay alteration zones of the AMS survey, radiometric anomalies (2000-2001) and ARGUS areas of interest. As well as providing broadly spaced sample coverage between anomalies.

The sandstone within EL2855 was notably flat lying and well bedded, consisting of multiple 10-20cm thick units with occasional interspersed more massive units. Well defined ripple marks and /or beds were noted throughout the EL. Bedding dips rarely exceeded 5^{o}. Pebbles and pebble units are rare as are mud clasts though ripple marks are common. This sandstone has been assigned to the Marlgowa Sandstone Member of the Kombolgie Subgroup. An underlying more massive cross-bedded unit of distinct erosional character is proposed to belong to the Gumarrirnbang Sandstone Member.

Clay determination analysis of PIMA Infrared spectra indicate the targeted areas and the background sandstone are dickite-kaolinite dominant. Minor muscovite and illite was noted in targeted areas along major structure trends.

Rare tight / closed 1-2mm thin quartz veins were noted throughout the lease with no associated alteration, though ferruginous jointing was common. The average radiometric count for the EL2855 sandstone is ~50 – 80 cps.

Airborne Radiometric Anomaly Follow-up

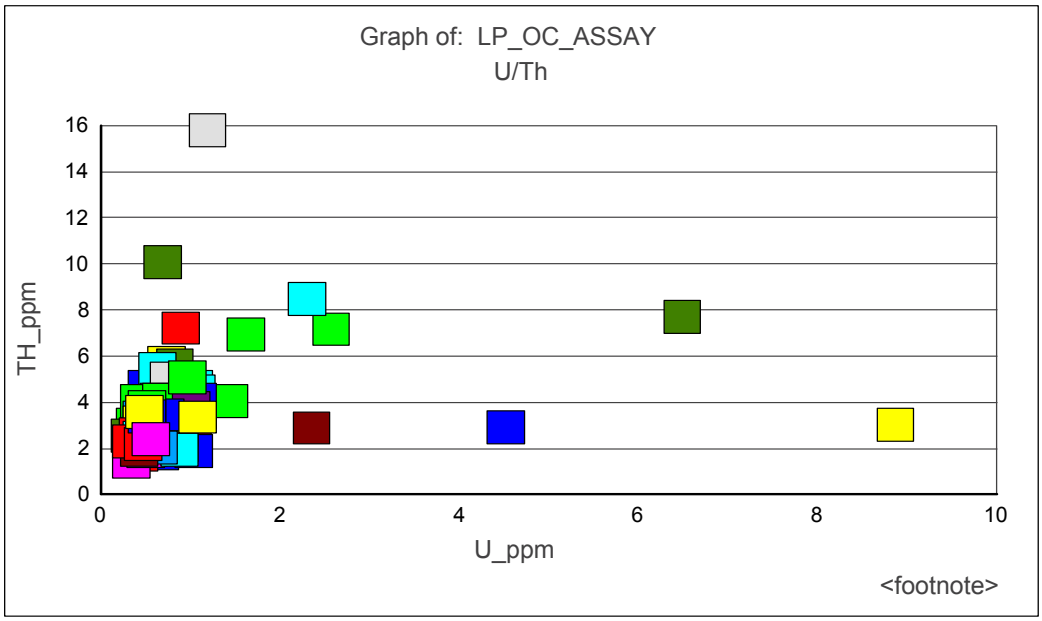
Only one radiometric anomaly could be located on the ground and was noted to spatially relate to lateritised weathered Gilruth Volcanic Member disconformity. Associated hematitic veins in the underlying sandstone had a maximum radiometric count of 672 cps. The sandstone averaged ~300cps, the lateritized Gilruth Volcanic Member averaged ~200cps with a maximum reading of 252cps.

At the southern and northern radiometric anomalies, no distinctive anomaly could be located on the ground. Features in both areas were similar; flat open lightly wooded area with gentle slope away from sandstone edge to a watercourse with orange sand cover, few pisolites and minor laterite fragments. The laterite fragments where an accumulation was noted were weakly elevated, though only marginally above background.

Geochemical Assay Results

A preliminary review of the assay data received up until the end of the month indicate that sandstone in the east has elevated uranium in comparison to the sandstone outcrop

in the western half of EL 2855. The mapped geology for the eastern half of EL 2855 consists of an upper ferruginous sandstone unit and a quartzose sandstone unit of the Marlgowa Sandstone Member overlain in the south eastern quadrant by McKay Sandstone. Both the Upper ferruginous Marlgowa Sandstone unit and the McKay Sandstone are known to have elevated uranium in comparison to the lower Kombolgie Sandstone Subgroup members.



The graph above indicates four distinct but low - level U anomalies. Two of these (dark blue and yellow) anomalies occur spatially together and notably within a window of mapped Gilruth Volcanic Member, the other two anomalies occurs as a distinct occurrence some 10Km and 17Km northeast of the other two.

The two anomalous samples associated with the mapped Gilruth Volcanic Member outcrop are also anomalous in Au, 149ppb and 23 ppb respectively, and have elevated palladium and platinum. In addition weakly elevated LREE and magnesium, as well as zircon and P2O5, with correspondingly low to background values in all the other elements does not indicate an extensive alteration system as inferred from other areas of known uranium mineralisation. Isotopic lead assay ratios suggest that both Th and U contributed to the radiogenic lead as a “typical” crustal system. Further downgrading these two anomalous samples.

A third anomalous sample (dark green) indicated on the graph is only marginally anomalous, U ~6.4ppm, when considered within the context of the overall very low background values for the sandstone samples. Radiogenic lead assay ratios indicate that this sample has a greater contribution from U daughter lead than from Th daughter lead. Ferrous iron and Al2O3 are moderately elevated by comparison to other samples, however all other elements are within background ranges. Sample description indicates this lies within the ferruginous member of the Marlgowa Sandstone Member. Other sample properties such as hematite filled joints and weak distribution of metallic very fine grains in the matrix suggest heavy mineral related radionuclides.

The fourth anomalous sample (brown) is only marginally anomalous and may fall within the background range, as both Th and U are just above 2ppm. Repeat analyses of random samples from the batch does not indicate any contamination, however the sample description indicates limonitic staining of the matrix therefore the anomaly is considered to be due to surficial weathering processes.

Three vein material samples, collected notably from the three major sandstone sample anomalies mentioned above, have high to very high U/Th ratios. Isotopic lead assay ratios indicate that the radiogenic lead is dominantly a thorium daughter element. All three samples were red-brown hematite vein infill. The elevated uranium is suggested to be due to surficial scavenging processes and or remnant limited extent alteration bordering Gilruth Volcanic Member.

CONCLUSIONS/DISCUSSION

Radiometric anomaly ground truthing located one notable anomaly, with most not being located. Although radiometrics in the sandstone are significantly higher than the regional background at this anomaly, the spatial relationship to the Gilruth Volcanic Member downgrades this anomaly. The elevated radiometrics and assays are attributed to element scavenging by lateritisation of the Gilruth Volcanic Member and concentration along fractures and joint planes in the underlying Marlgowa Sandstone Member by groundwater flow.

Other airborne radiometric anomalies investigated noted only few pisolites and marginal scatterings of ferruginous fragments on small orange sand peneplains. Ferruginous material accumulations noted along adjacent watercourses showed slightly elevated spectrometric count, though only marginally above background.

Dickite-Kaolinite clay mineral assemblage is dominant in the samples analysed. This is consistent with regional clays in the Gumarrirnbang and Marlgowa Sandstone Members.

Only one sandstone sample was notable anomalous in U/Th ratio and lead isotope assay ratios. This sample occurs in sandstone known to be of higher radiometric background, though the indication of uranium parent for lead isotopes warrants further investigation.

In conclusion, as another tool for exploration, the AMS method, when used in conjunction with other data, would be useful in identifying areas of interest.

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