**Cameco Australia Pty Ltd**

# Exploration Licenses EL 5061 & EL 5062

## Deaf Adder Project
## Arnhem Land – Northern Territory

## Annual and Final Report for Period 27th May 2001 to 26th May 2002

**CONFIDENTIAL**

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**Authors:** G Otto, Geologist II
G Zaluski, Geoscientist
T O'Connor, P.Geo., Project Geologist

**Copies:** Cameco Australia Pty Ltd (1)
Northern Land Council (1)
NT Department of Mines & Energy (1)
Jawoyn Association (1)

**SUMMARY**

Exploration licences 5061 and 5062 comprising the Deaf Adder Project are being relinquished in their fifth year of tenure. This final report describes exploration work undertaken on the Deaf Adder project within the 217 remaining blocks forming EL 5061 and the 147 remaining blocks forming EL 5062 during the period 2001 and 2002. All previous Annual Reports will be released to open file by request in lieu of a final surrender report. A partial surrender in August 2001 was submitted following the relinquishment of 218 blocks from EL 5061 and 130 blocks from EL 5062. The tenements are located in north-central Arnhem Land and were granted 27th May 1997.

Exploration during 2001 consisted of follow up helicopter assisted sampling of fractures at anomalous sites identified from the compilation of previous exploration results, and in likely areas of inferred structural disruption. Further work was aimed at defining drill targets for an exploration program in 2002. Excessive depth to the sub-Kombolgie unconformity underlies the decision to relinquish the remaining portions of ELs 5061 and 5062.

Results from sampling are discouraging with the exception of one sample in the Spectre area where possible uranium secondary mineralisation was discovered along trend from previously identified mineralised outcrops, extending the zone of anomalous uranium to 1.5 km.

A DeBeers Airborne Multispectral Scanner (AMS) survey was flown during July 2000, covering both exploration licences with the objective of identifying clay alteration patterns attributable to uranium (U) mineralisation. Processed data was not available at the time of submission for the 2001 Annual Report and has been included with this report. Results are disappointing; the AMS did not identify any clay alteration that may be associated with the known uranium occurrences on the exploration licences. Clay patterns identified by the survey appear to be stratigraphic in origin.

Drilling on EL 5061 and EL 5062 has suggested that the Kombolgie Sandstone basal unconformity lies at depths in excess of 993m (drill hole DAD-0008) and most likely at least 1400m deep for areas underlain by Mackay Formation. The prospectivity of these exploration licences is severely diminished by the economics involved with exploration costs, and with feasibility of mining a discovered resource at the expected depth to basement. These two ELs have been surrendered effective June 2002.

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## INTRODUCTION

The Deaf Adder project is a uranium exploration project owned and operated by Cameco Australia Pty Ltd (Cameco). The prime objective of the project is to discover economic uranium mineralisation within a geological environment similar to deposits in the Athabasca basin of Canada, associated with the Kombolgie basin of the Northern Territory.

The objectives of the work completed by Cameco during the 5th year of the Exploration Licences were:

- To characterise the stratigraphy, structure, alteration and uranium mineralisation potential within regions sampled by diamond drilling. These objectives were to be achieved by evaluating features identified megascopically and by using physical properties, reflectance spectroscopy (PIMA) and geochemistry;
- To further evaluate anomalous areas delineated by multi-spectral analysis of existing data collected during the 3 years exploration of the tenements;
- To continue with regional and detailed geological mapping and prospecting;
- To use remote sensing techniques such as the AMS survey to delineate surface features structure, lithology, alteration etc.
- To delineate further areas requiring investigation by drilling.

The two exploration licences, EL5061 and EL5062, prior to partial relinquishment covered an of 2,369 $km^2$ near the south-west margin of Arnhem Land, approximately 150km north-east of Katherine. In August 2001, a partial relinquishment of areas was submitted. EL 5061 was reduced by 47% and EL 5062 was reduced by 50% retaining a total exploration area of 1216.1 $km^2$.

On 27 April 2002, the Titles division of Department of Business, Resource and Industry Development (DBIRD), Mines and Energy, was notified of Cameco's intention to fully relinquish EL 5061 and EL 5062.

Location Map

Routine sampling and prospecting during the 1997 exploration program led to the discovery of significant radioactivity within the Kombolgie Sandstone formation at the Flying Ghost (Prospect Location Map). After preliminary evaluation of an airborne survey flown during August 1997, two additional areas of radioactivity were defined (Casper-Banshee and Stretch). Geochemical analysis of samples collected from Flying Ghost and Casper-Banshee contained elevated gold (Au) and uranium values.

Prospect Location Map

During 1998, a small diamond drill program was completed at the Flying Ghost prospect. A total of 1603 m was drilled in five holes. Extension of radioactivity below surface was unsuccessful; however, valuable technical and stratigraphic information was obtained during the program. Aerial photography, detailed airborne geophysics, regional sandstone sampling, diamond indicator sampling and detailed and regional mapping were also completed. At the conclusion of the program, regional sampling on a one-kilometre scale was achieved over the extent of the Kombolgie Sandstone. A first pass geological mapping over the entire project area was achieved. Two new areas of radioactivity were delineated at Spectre and Writer areas.

In 1999, two drill holes were completed in the southern portions of the two exploration licences. Both holes were abandoned in Kombolgie Sandstone. They failed to reach the targeted horizon due to drill equipment limitations. Other exploration during 1999 consisted of detailed sampling and prospecting over anomalous sites identified from the multi-spectral analysis of existing datasets and detailed to regional geophysics. One new area of radioactivity was discovered along the Katherine River and was named Slimer.

Exploration during 2000, consisted of follow up of anomalous outcrop samples and sampling along areas of suspected structural disruption. Drill hole DAD-0006 was deepened to the limits of the UDR 1500 drill rig without intersecting basement rocks. One drill hole was drilled in the western portion of EL 5062 and intersected basement rocks interpreted to be attributable to the Burrell Creek Formation or possibly the Nourlangie Schist.

## Location

The Deaf Adder Project is located at the southwest margin of Arnhem Land in the Northern Territory approximately 100 km southeast of the Ranger uranium mine. The tenements are situated along the southeast margin of Kakadu National Park.

The location of the Cameco exploration base camp is indicated on the Prospect Location Map, and is referred to as the Mann River Camp. This site is within EL5061 and lies adjacent to a large waterhole near the headwaters of the Mann River. The base camp is referred to as "Bindalak" by Traditional Owners.

The base camp was established in August 1998 and consists of two demountable buildings, an ablution block, air-conditioned office and kitchen caravans with up to 15 sleeping tents. The camp was occupied for just over one month during July and August. Electric power generation was supplied by a 20-kVa diesel powered unit and a small diesel-driven pump was used to obtain water from the Mann River which is 750 m away.

Four-wheel-drive passenger vehicles were used for personnel movements between Darwin and the camp, and for provisions obtained from Katherine and Darwin. Regular food supplies were picked up from Katherine. A 7-tonne truck was used to deliver fuel drums and mobilise and demobilise camp equipment.

A Rotor Services 206 Jet Ranger helicopter was on site at for three weeks to assist in the sampling program and transport personnel to work areas.

The main track, which extends 160 km northeast from Eva Valley to the Mann River exploration camp, required only minimal refurbishment. The Traditional Owners have named the track "Bat Guyangguyang".

## Tenure

The project permits comprise 1216.1 km$^2$ within Exploration Licences EL5061 and EL5062, (217 blocks and 130 blocks respectively) which were granted on May 27th

1997, and an additional 3,750 $km^2$ of Exploration Licence applications (ELA 9781) subject to negotiation with the Aboriginal Traditional Owners (Project Location Map). In April 2001, Cameco relinquished 130 blocks from EL 5061 for 47% of the licence and 218 blocks from EL 5062 for 50% of the licence.

In April 2002, Cameco notified DBIRD Mines and Energy Titles Division of their intention to fully surrender EL 5061 and EL 5062. This submission was not recognised by the Titles Division as the notification was presented without an accompanying company seal. The surrender notification was again presented in June 2002, with recognition by Titles Division.

Final reporting for the surrendered tenements EL 5061 and EL 5062 is due within three month of the anniversary date (due no later than August 27th, 2002). The expenditure commitment for 2001 was $80,000.

Current Tenement Status

## Regional Geology

The Deaf Adder tenements lie on the Arnhem Land Plateau, which forms the western margin of the Palaeoproterozoic McArthur Basin, and comprises undeformed sediments of the Katherine River Supergroup. These platform fluviatile and shallow marine sediments unconformably overlie the strongly deformed and metamorphosed sedimentary successions of the Pine Creek Basin which host the major unconformity-related uranium deposits of the Alligator Rivers Region.

The nearest exposure of the prospective Pine Creek Basin succession occurs within the Gilruth Inlier some 5km northwest of EL5061. Older basement to the Pine Creek Basin successions, the Archaean Nanambu Complex, is exposed only in the general vicinity of the Alligator Rivers uranium deposits.

The thickness of the McArthur Basin platform cover in the Deaf Adder tenements is uncertain but estimates range from 300m in the west and north-west areas, near the Gilruth Inlier, to as much as an greater than 1450m (drill hole DAW-0006) in the south-east.

## Structure

It has been regarded by many that the key mineralising structures in Arnhem Land, are second order reverse faults, which form dilation zones in conjunction with major strike slip fault systems within a compressional domain. Conversely, similar dilation zones could be associated with normal faults in an extensional tectonic domain (Regional Structural Map).

Regional Structural Map

Extensional basin tectonics was responsible for the formation of the Palaeoproterozoic Barramundian sequences (Pine Creek Basin) and the Kombolgie Subgroup cover sequence (McArthur Basin). Between these two extension phases, a compression phase

(Barramundi-Top End Orogeny) gave rise to multiple deformation and metamorphism of the Barramundian sequences and late tectonic granite intrusion.

In West Arnhem Land, steep 320°-340° (reverse?) faults such as the Khyber Pass Fault are linked to the major east-west (070°) trending strike slip fault systems in a regional sense. The Caramal uranium Prospect is situated near the intersection of these structures. The Khyber Pass Fault which, based on radiometric evidence, can be considered a fertile structure in terms of mineralising fluid flow. Results to date from exploration on the King River Project also emphasise the importance of the 340° structural trend, particularly at Black Rock.

Within this framework, it is worth considering the main structural elements of the Deaf Adder tenements in South West Arnhem Land and how they relate to known uranium occurrences.

On a local scale, two conjugate fault sets predominate at Deaf Adder, 340°-070° and 310°-030° (Regional Structural Map). The Kub-O-Wer Fault, a 340°-350° trending right-lateral (dextral) fault displaces the 070° structures between 1-2 km. The 310° Bulman Fault, and a major parallel structure in the far northeast of EL5061, also exhibit dextral movement, displacing the 030° structures up to 2 km. A 295° fault that controls the outcrop of metamorphic basement in the Gilruth Inlier northwest of EL5061, is most probably a reverse fault.

## Local Geology

The Deaf Adder tenements predominantly comprise outcrops of undeformed platform sediments of the Katherine River Group representing the basal portion of the McArthur Basin. Recent mapping by the NTGS and AGSO on the adjacent Milingimbi 1:250,000 mapsheet has renamed the lowermost sequence, previously called the Kombolgie Sandstone, as the Kombolgie Subgroup. This subgroup has been further subdivided into three units, the lowermost Mamadawerre Sandstone (Phe), the middle Gumarrimbang Sandstone (Phl) and the upper Marlgowa Sandstone (Phr). The McKay Sandstone, previously overlying the Kombolgie Sandstone, is now incorporated as a member overlying the upper Marlgowa Sandstone.

Locally within the project area, the Kombolgie Subgroup is represented by the Gumarrimbang and Marlgowa Sandstone units which are separated by a ferruginous (lateritic) horizon called the Gilruth Volcanic Member (Phkg). This unit was intersected during the 1998 and 1999 drill programs. True thicknesses of up to 14 m of clay-sericite-leucoxene altered, porphyritic, basaltic rock were encountered. The unit was absent in drill hole DAD-0008 drilled in the western portion of the EL 5061. A small erosion boundary marks the stratigraphic position of where the Gilruth Volcanic Member has been removed.

## Previous Explorers

Historically, uranium exploration in this region has concentrated on the South Alligator Valley, 50km to the west, and the Pine Creek Basin 100 km to the north. The project area, which falls largely on the Mt. Evelyn 1:250,000 map-sheet remains essentially unexplored.

Fieldwork associated with the BMR mapping of the Mt. Evelyn map-sheet was carried out in 1954-58, with work on the Gilruth 1:100,000 map-sheet being carried out in 1973-74. NTGS re-mapping of the 1:100,000 map sheets was carried out during 1999 and 2000.

The adjoining 1:250,000 Mt. Marumba map-sheet to the west, was originally mapped in 1962, however, compilation of new work by AGSO (1993-4), and by NTGS (1994-95) on the Milingimbi map-sheet, is complete and has been released.

Broad spaced regional airborne radiometric-magnetic surveys were carried out by the BMR (now AGSO) and Queensland Mines Ltd between 1970-80, however the data quality is limited. There is no record of any ground follow-up work associated with these early surveys.

More recently in 1995, the NTGS acquired airborne radiometric and magnetic data for the Mt. Marumba and Milingimbi map-sheet areas to assist with the geological compilations.

**Previous Exploration by Cameco**

Cameco commenced a systematic technical evaluation of the project area in 1996 following the successful negotiation of an access agreement with the NLC on behalf of the Aboriginal Traditional Owners. This technical evaluation comprised data acquisition, examination of Landsat TM and SPOT imagery and preparation of an exploration proposal by WJ Fraser (Cameco Australia Pty Ltd Report R97-03).

The proposed exploration program comprised broad spaced lithogeochemical rock chip sampling (1x10km) and regional stream sediment geochemistry (85 sites approved by the NLC). The exploration proposal was subsequently modified in early 1997 to incorporate a fixed-wing airborne magnetic-radiometric survey contracted to World Geoscience (WGC), Perth, WA.

The exploration objective in 1997 was to develop a lithogeochemical database for the Kombolgie Subgroup cover sequence. This data set would be used as a basis for definition of alteration systems associated with unconformity-style uranium mineralisation (from expertise gained in the Athabasca Basin area of Saskatchewan, Canada).

In the early stages of the 1997 exploration, an area of anomalous radioactivity and alteration was discovered within the Kombolgie Sandstone. This discovery and its potential significance for future exploration strategy indicated the need to focus on the evaluation of this prospect type. This was achieved by implementing a program of detailed grid based geological mapping, radiometrics and lithogeochemical sampling and semi-regional orientation stream-sediment sampling.

The results of this detailed work were used to re-assess other similar radiometric anomalies detected by the 1997 airborne survey.

In addition to the detailed grid-based work, routine ground checking of selected radiometric anomalies and regional lithogeochemical sampling was completed.

Secondary uranium mineralisation was located in two widely separated areas of strong radiometric anomalism, the Flying Ghost and the Casper-Banshee anomaly group. Geochemically these occurrences are spatially associated with strongly elevated Au values (up to 236.5 ppm), where the gold is restricted to goethitic alteration along fractures. In general, the uranium is associated with clays within zones of intense fracturing in the Kombolgie Sandstone, and may represent a leakage from a primary uranium source at depth. Both anomalies also contain significant areas of surficial enrichment and dispersion of uranium (within goethitic patches) that has enhanced their airborne radiometric signature.

In the Stretch area, intense structurally related radioactivity over a 1 km-strike length appears to be thorium (Th) dominant but still warrants further evaluation.

In 1998, the exploration program objectives were to complete the regional grid spaced lithogeochemical sampling over the exposed Kombolgie Sandstone as well as completing the airborne radiometric anomaly follow-up. Regional geological mapping was finalised by A. Mackie. Drilling was initiated at the Flying Ghost prospect targeting unconformity style uranium mineralisation. An airborne geophysics program was completed covering the Banshee-Casper and Stretch prospect areas.

During this field program, lithogeochemical sampling in continuation with the 1997 exploration program completed the regional sampling coverage of the Kombolgie Sandstone, achieving a sample density of one sample per 2 $km^2$. Airborne radiometric anomaly follow-up was completed, with two new areas identified, namely Spectre and Writer prospects. Detailed sampling programs (and some ground radiometrics) were completed at Banshee-Casper, Spectre, Writer and Phantom areas. Satellite imagery and aerial photography was used together with small traverses to complete a first pass regional geological map at 1:50,000 scale. Smaller scale mapping was completed at the Banshee-Casper and Spectre prospects. Detailed airborne electromagnetics (Dighem), magnetics, radiometrics and photography was acquired to facilitate targeting and geological analysis of the Flying Ghost and Banshee-Casper prospects. While the airborne geophysics increased the geological knowledge of the area no response could be attributed to large-scale alteration or structure typical of unconformity uranium mineralisation.

The diamond drill program at the Flying Ghost prospect failed to reach the basement stratigraphy below the Kombolgie (depth of 794 m exceeded the capacity of the drill). Intersections of the Nungbalgarri and Gilruth volcanic members clearly established the stratigraphic location within the Kombolgie. The volcanic contacts are variably radioactive and altered. Silicification and structure (stress/shearing) within the Kombolgie occurs at both the upper and lower contacts with the Nungbalgarri volcanic unit. Elevated geochemistry is associated with the volcanic horizons (contacts) and locally within the Kombolgie related to facies variations. Kandite clay species have been identified by PIMA to occur stratigraphically beneath the Gilruth horizon (narrow 3 to 5 m unit) and at depth possibly indicative of basal sandstone.

In 1999 four traverses of regional gravity were undertaken in the eastern part of the project with the aim of inferring basement type and sandstone depth away from DAD-0006. Although strong gravity changes are observed in the data, modelling has been inconclusive because of the lack of basement knowledge since DAD-0006 was unsuccessful at penetrating through the sandstone.

Semi-detailed mapping was carried out around Spectre and immediately to the north with the aim of understanding the structurally complex faulting of the area. Detailed mapping was also completed over the Slimer prospect located on the Katherine River. Regional based mapping was completed over the two exploration licences with particular attention placed on large-scale lineaments, to determine whether these are surficial expressions of basement structures with small post-Kombolgie reactivation or large weathered joints. Detailed airborne magnetics and radiometrics was conducted over the Spectre, Slimer and Stretch prospects to assist with anomaly follow up and geological mapping. In addition semi-regional gravity was also undertaken at Spectre to assist with geological understanding of the prospect and drill targeting. This data supports the interpreted main NW striking Spectre Fault and is on the inflection of a large gravity anomaly indicating a major change in density, possibly due to a change in depth but more likely attributed to basement lithological change.

A multispectral data compilation of all outcrop sampling was completed covering in excess of 150 items of data for each sample. In total, 629 airborne radiometric, 42 uranium partial, 225 alteration halo, and 143 single element anomalies were generated. Outcrop sampling for 1999 was limited to following up these generated anomalies; a total of 605 follow-up samples were taken representing 298 multi-spectral anomalies. Most of the followed up anomalies were explained after ground checking, with many attributed to lateritic areas, black soil plains or variations in the surrounding topography. Of the other samples taken, only a few stand out as being anomalous in particular elements.

During the 1999 field program, two holes totalling 2,260m (DAD-0006 and DAD-0007) were drilled in the southern portions of the two exploration licences; EL 5061 and EL 5062 respectively; and were abandoned within the Kombolgie Sandstone, failing to reach the unconformity due to drill rig limitations. The depth to the basement exceeded our expectations and the working limits of the respective drill rigs. Both holes were collared within the Mackay Formation.

DAD-0006 was designed as a stratigraphic hole that would intersect the McKay and Kombolgie Sandstone, the unconformity and basement lithologies. Approximately 163m of McKay Sandstone was intersected at the beginning of the hole. Small basaltic sills were intersected between 25-55m, with associated soft sediment deformation and what appears to be very small sandstone dykes. A narrow intersection of Gilruth volcanic unit was intersected at 527m (14m) and associated with a down-hole probe peak of 580cps. At a depth of 763m, 229m of Nungbalgarri volcanics were intersected. A small horizon of very strongly silicified and brittle fractured Mamadawerre Sandstone was intersected between 992m and 1013m. At 1013m, the sandstone sharply contacts with a 175m thick intrusion of massive Oenpelli Dolerite. From 1188m to the end of the hole (1250.4m) strongly silicified and brittle fractured Mamadawerre Sandstone was intersected, before the hole was abandoned. Downhole multiparameter geophysics was performed on DAD-0006 after the completion of the hole, however, an obstruction at the NQ\BQ diameter junction limited the survey to the upper NQ porion of the hole.

DAD-0007 was targeted on the main Spectre Fault, expressed surficially as an extremely silicified breccia with some strong surface uranium anomalies and secondary uranium mineralisation. The hole was targeted to intersect any associated mineralisation at depth. Strong fracturing throughout the hole was encountered, particularly towards the bottom of the Nungbalgarri volcanic horizon. Two small intersections of dolerite were encountered in the Marlgowa Sandstone. The first at 196m showed very strong fracturing and continued until 223m and the second from 441m to 452m, which was also highly fractured. A thin intersection of Mamadawerre Sandstone was encountered below the Nungbalgarri Volcanics at 963m. The sandstone was moderately fractured and sharply (fault?) contacted a fine-grained mafic at 1009m which appeared to be the chilled margin of another intrusion of dolerite. Unfortunately, the drill broke down at this point and further drilling was not possible to fully investigate this intersection. The success of this hole is difficult to gauge; basement rocks were not intersected, nor was uranium mineralisation intersected within drill core.

The 2000 field season was designed with two aims; to understand basement lithologies by deep drilling, and to outcrop sample and test for narrow alteration haloes escaping from blind uranium mineralisation at depth along structural zones. The sampling program for the 2000 field season was designed to follow-up and enhance previously checked anomalies with additional sampling of fractures, drusy quartz veins and breccias within the anomalous area. Samples were collected from fractures, veins and breccias, as these may provide fluid flow conduits from possible uranium mineralisation at depth, which can be detected by low level detection geochemical techniques.

Fracture samples were also collected from within mapped lineaments and lineament junctions in the northern portion of both exploration licences where a high probability of veining and brecciation may occur. Samples were collected from within lineaments as these areas may host favourable locations for the leakage of uranium or indicator element bearing fluids along breccias and drusy quartz fractures from an otherwise blind uranium deposit at the unconformity. No new areas of anomalism were discovered.

Wallis Drilling (Wallis) were contracted to deepen DAD-0006 previously drilled and terminated in 1999, and drill DAD-0008. Both holes were primarily aimed at intersecting basement rocks to increase our understanding of the local geology and interpretation of geophysics.

In DAD-0006, an obstruction at the NQ/BQ junction interface at 1155m prevented Wallis from reaming out the BQ hole, and a daughter hole (DAW-0006) was wedged from this point. The hole was terminated, due to drill rig limitations, in extremely silicified sandstone at a depth of 1432m, failing to intersect basement.

DAD-0008 was designed as a stratigraphic hole, to drill a section through the Kombolgie Sandstone and to hopefully intersect the unconformity and basement lithologies. The hole was placed to the west of the Kub-O-Wer Fault, and it was hoped that sequence correlation of the sandstone might show some degree of displacement across this regional structure.

DAD-0008 commenced in competent Marlgowa Sandstone, the upper portion of the Kombolgie Formation. The Gilruth Volcanic Member was not visually logged, and was initially assumed to be absent, however indications of it's presence may be interpreted from the geochemistry as seen by an increase in all major oxides, and anomalous copper from 76m to 79m. A small erosional surface was noted upon re-analysis of the drill core at ??? which confirms the emplacement and subsequent removal and reworking of the Gilruth Volcanic Member at this interval.

Gumarrimbang Sandstone is intersected from 79m to 349.9m. Approaching the top of the Nungbalgarri Volcanic unit, the lower 10m of Gumarrimbang Sandstone becomes brecciated and fractured (healed) by light apple green chlorite, with very little chlorite infiltrating the matrix of strongly silicified sandstone.

A section of Nungbalgarri Volcanic was intersected from 349.9m to 476m. 26 individual flows are recorded. One interval of possible volcano-sedimentary lapilli tuff was noted from 388.95m to 392.2m.

The Mamadawerre Sandstone, the lower portion of the Kombolgie Formation, was intersected from 476.5m to the unconformity at 993.45m. Chloritic alteration within the lower portion of this coarse unit appears to be structurally controlled, with chlorite haloes surrounding zones of structural disruption and fracturing.

The unconformity was intersected at 993.45m. The unconformity contact is semi-concordant with a fine grained green clay or sericite-serpentinite layer immediately below the contact. Moderate hematite alteration has affected the underlying basement rocks up to two metres below the contact.

Basement rocks consist of intensely sheared to sub-vertically crenulated chloritic-carbonaceous to graphitic volcano-metasedimentary meta-pelitic gneisses and schists (with abundant pyrite) with narrow quartz veins (± pyrite) and thin quartz (± carbonate) segregations and ribbons. Interbedded with the sheared chlorite-graphitic rocks are narrow intervals of massive to brecciated, chloritic metavolcanic rocks with abundant euhedral leucoxene crystals. The greenschist metamorphic grade basement rocks have undergone four phases of deformation. The basement rocks in DAD-0008 appear (from literature descriptions) to be analogous to the chlorite-muscovite-quartz schists and meta-pelites of the Burrell Creek.

## EXPLORATION PROGRAM - YEAR 2001

Exploration on EL 5061 and EL 5062 during the 5$^{th}$ year of licence consisted mainly of fracture sampling of suspected areas of structural disruption, and following up anomalous radioactive areas requiring investigation by drilling. Further reconnaissance work was required on the Slimer prospect before drilling could be planned for this area.

The Summary of Exploration Work table itemises work completed during 2000. The Summary of Expenditures table is the expenditure statistics itemised by work and exploration license. The Summary of Assessment table outlines the attributable expenses and covenant requirements for 2001.

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

### Outcrop Sampling

The sampling program for the 2001 field season was designed to test and sample fractures, quartz veining and breccias within and proximal to identified lineaments as these areas may be structural in origin.

It is proposed that alteration or leakage from an unconformity uranium deposit may not be detected by regional sampling of the sandstone, as alteration fluids may not be able to penetrate the Nungbalgarri Volcanic Member due to it's relative lack of porosity and permeability. A deposit would be located along a post-sandstone structure and would in all probability be present with an associated fluid flow system in the form of tension vein arrays, drusy quartz veining or hydraulic brecciation. These vein systems would penetrate through the Nungbalgarri volcanics to the surface utilising post-sandstone structural pathways. Detection of alteration from an otherwise blind uranium deposit may only be possible by sampling of these mineralising fluids represented in vein systems. Verification of such a model may only be possible by drilling of any such anomalous veining systems and would be represented by an alteration system within the underlying sandstone beneath the Nungbalgarri Volcanics.

Samples were collected from fractures, veins and breccias, as these may provide fluid flow conduits from possible uranium mineralisation at depth, which can be detected by low level detection geochemical techniques. The fracture, vein and breccia samples may display geochemical anomalies that exhibit indications of alteration, and leakage of uranium or indicator element bearing from an otherwise blind uranium deposit at the unconformity.

Samples were taken using a hammer, and often a chisel, in order to collect only the targeted vein or fracture, and as such the sample often consisted of small broken pieces of rock, which were placed into a 100ml vial. The sample physical shape and size characteristics were not favourable for PIMA spectral measurements. Geomorphological, geological and radiometric parameters were recorded, and a digital photograph at each site was taken.

Outcrop samples were also collected from representative and also anomalous sites where fracture samples were taken. These samples were collected in order to collect a PIMA spectral measurements to determine if possible the clay mineralogy of the sample.

Samples were also collected utilising a mechanical circular rock saw. This was employed for collection of samples from the Slimer prospect located within the Katherine River, as the outcrop consists of flat rock bars and collection of samples using standard techniques is inapplicable. The sample collected is a slab of rock approximately 8cm in depth. Radioactive fractures from rock bars within the riverbed were sampled using this method.

A total of 165 samples from 112 sites were collected during the program.

Outcrop Sample Location Map
Outcrop Sample Locations
Outcrop Sample Lithology and Physical Properties
Outcrop Samples Alteration and Structural Measurements

A list of codes used in the Outcrop Samples Alteration and Structural Measurements Appendix can be found in the following Codes for Unilog table.

Codes for Unilog

Geochemical Techniques

All samples were sent to Northern Territory Environmental Laboratories (NTEL, formally ChemNorth) in Darwin and Pine Creek for low level detection multi-element analysis . Two methods are used to analyse for 68 different elements. Geochemical analytical methods and data for outcrop sampling are included in the following Appendix.

The method utilised by NTEL for the outcrop fracture samples (G950) differs from the standard method (G400), used for the drill samples and outcrop samples, in that samples are only partially digested so that only the mobile fraction or those minerals on the boundaries of quartz grains or are easily dissolved are analysed. The fracture samples (G950) collected are not directly comparable to standard outcrop samples (G400) due to the different collection techniques and different chemistry analytical techniques.

NTEL Fracture Analytical Methods (G950)
NTEL Outcrop Analytical Methods (G400)
Fracture Sample Geochemistry
Outcrop Sample Geochemistry

Reflectance Spectroscopy (PIMA)

Reflectance spectroscopy (PIMA) analysis was completed using the PIMA II short-wave infrared spectrometer on all samples collected. This instrument measures the reflected energy from a sample in the short wave infrared (SWIR) region of the energy spectrum. The sampling area on the rock specimen that is measured is permanently marked. Multiple measurements are occasionally taken, particularly if variations in spectral features are noted. The spectra are converted to an ASCII format and processed using "The Spectral Geologist" (TSG) developed by AusSpec International, and a Cameco in-house software program called Minspec.
TSG is routinely used to process all spectral data. The SWIR spectra, once processed, provide a mineral identification utilising internal software pattern matching algorithms called "The Spectral Assistant" (TSA). The experienced user can collect information on the degree of mineral crystallinity, and chemical

composition variations within mineral groups from the spectra. The program also allows the user to create scalars based on spectral features and parameters. This allows for quantifying crystallinity parameters; classifying chlorite species based on Mg and Fe absorption features and a multitude of other features.

The in-house software "Minspec" utilises the PIMA spectra to classify the data into proportions of six clay mineral species (illite, kaolinite, dickite, halloysite, chlorite and dravite). A signal to noise ratio is calculated. Careful, visual attention to detail along with the signal to noise value within each spectra, is required to determine the validity of the classification.

Outcrop Samples – PIMA – TSA
Outcrop Samples – PIMA – TSA Map
Outcrop Samples - PIMA – Minspec3
Outcrop Samples – PIMA - Minspec3 Map

Results

Results for the 2001 sampling program are generally disappointing. A couple of samples are highly anomalous in uranium and total metal content, with elevated rare earth elements, gold, platinum and palladium. These samples were taken from Slimer and along trend from Spectre; so while the results are highly encouraging, they are simply validating and extending already known prospects.

The sampling to the northwest of Spectre indicates that the anomalous radioactive trend identified from previous years extends the known prospect 950m to the north-west. Sample DA01C10262 returned 561 ppm U, 89 ppb Au, 422 ppm metals (As, Co, Cu, Mo, Ni, Pb, V, Zn) , 0.9 ppb Pt, 5.3 ppb Pd and 122 ppm total REE. This anomalous zone now extends approximately 1.5 kilometres at an approximate trend of 135 degrees. This trend is approximately parallel with the main Spectre Fault, which extends through "sickness country" and into the South Alligator River Valley.

The Slimer prospect located on the Katherine River had not been sampled previous to the 2001/2002 field season; spectrometer total gamma readings up to 3500 counts per second had been recorded from small narrow fractures in rock bars within the river bank confines. Sampling was performed using a mechanical circular rock saw, which provided a rock slab perpendicular to the trend of the fractures. These samples have been designated as "H" samples.

Samples DA01H10063 and DA01H10065 from the Slimer prospect recorded the highest uranium values with assays of 418 ppm uranium and 281 ppm uranium respectively. Total metals returned assays of 213 ppm and 148 ppm respectively.

Breccias and drusy quartz veining, which occur within the Slimer prospect, trend approximately 070 degrees. These structures, in the immediate vicinity of the rock saw samples, do not appear to be anomalously radioactive. The origin of the uranium contained within the narrow fractures sampled is somewhat problematic, as these fractures do not appear to be associated with any obvious structural events, but rather appear to be random stress relief fractures.

The nature of the radioactive fracturing and the interpreted depth to basement (in excess of 1400m) detracts from the overall prospectivity of the Slimer prospect.

U and Metal Content Map - All Fracture (G950) Samples
U and Metal Content Map - All Outcrop (G400) Samples

**Geophysics – Airborne Multispectral Survey (AMS)**

A De Beers Pty Ltd hyperspectral survey, the Airborne Multispectral Scanner system (AMS), was flown over the entire project (totalling 2818 km$^2$). 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 uranium alteration. Whilst the survey was flown in July 2000, the results, which data required extensive processing and interpretation, was not completed until December 2001.

<u>AMS Introduction</u>

The De Beers AMS instrument was built by Integrated Spectronics Pty. Ltd (ISPL) in 1996 and is a similar system to the Probe-1 and is an earlier version of the ISPL HYMAP scanner. It is a 96 channel, 3 spectrometer, whiskbroom scanner with a signal to noise ratio greater than 800:1. The scanner measures reflectance from the ground surface, with each spectrometer consisting of 32 channels with an approximate 15 nm spectral resolution; VNIR from 500 to 1000 nm, SWIR1 from 1400 to 1900 nm, and SWIR2 from 2000 to 2450 nm. While most of the geological information is detected by SWIR2 (clays, carbonates, sulphates, etc), the VNIR range can map Fe-oxides and hydroxides, vegetation, and general land cover. Although the most diagnostic spectral features are contained within specific windows or wavelength regions, full VNIR to SWIR spectral sampling is advantageous for properly correcting the data for atmospheric effects.

Gerard Zaluski, Geoscientist completed the AMS data interpretation in Saskatoon at Cameco Corporation Head Office.

<u>Data Collection</u>

Data was collected over all of EL 5061 and EL 5062 of the Deaf Adder project between June 29 and July 7, 2000. The scanner was operated by M. Hornibrook (Spectral Geology Pty. Ltd.) flown aboard Kevron Aviations's Cessna 404 (VH-AZU). Thirty alternating north-south and south-north flight lines of data were collected at a ground speed of 140 knots from an altitude of approximately 2900 m, providing a ground resolution of approximately 5.6 m. Relatively constant solar illumination was maintained by collecting the data near midday (between 9:39 AM. and 1:07 PM local time) with cloud cover less than or equal to 1/8.

AMS Location Map

AMS Processing

Processing of hyperspectral image data involves several major steps. Within each of these stages, a number of different processing approaches are possible. The spectral processing was all undertaken using ENVI 3.4 on the separate, non-georeferenced images. While this is a more laborious process, it is recommended over the use of endmembers derived from other images as the lighting, atmospheric conditions, and atmospheric correction must be identical for each image. Subsequent mosaicking and preparation of the final images was undertaken using ER Mapper 6.1.

Endmember spectra were identified using spectral identification programs in ENVI. The main procedure used was Spectral Feature Fitting™ (SFF). It is a process that compares discrete absorption features of spectra with those of known minerals from a spectral library. This technique works well for minerals with diagnostic, strong absorption features such as clays and carbonates but it may be strongly affected by noise, particularly for spectra with only weak, broad absorption features. A limitation of this technique is that it focuses entirely on absorption features, entirely neglecting the rest of the spectrum.

AMS Results

The processing of AMS airborne hyperspectral scanner data over the Deaf Adder project using standard hyperspectral processing techniques identified prominent clay patterns within the exposed Kombolgie Subgroup and overlying Katherine River Group rocks.

The Marlgowa Sandstone of the Kombolgie Subgroup is the dominant rock type within the Deaf Adder Project. In the hyperspectral data, this is easily recognised as the reflective, resistant, well-exposed signature throughout most of the region. This is stratigraphically overlain in the southern part of the project by the less resistant, and more ferruginous McKay Sandstone. The stratigraphic contact between these two formations is rarely exposed because of the widespread presence of Cenozoic sands on the plateau.

The Gilruth Volcanic Member, which lies between the Gumarrirnbang and Marlgowa Sandstones, is rarely exposed, however its position can be inferred by a low scarp slope littered with ferruginous claystone with relict volcanic textures. Despite this lack of exposure, it can be easily recognised by the associated ferruginisation on remotely sensed images. In the northernmost portions of the survey area, the underlying Gumarrirnbang Sandstone is exposed.

Endmember processing identified twelve clay and rock types within the project area. The abundances of these endmembers are displayed as greyscale images within the following figures.

*Illlite*

The endmember identified as illite is present in some of the sandstone outcrops of almost all of the flight lines. The highest values are present within the northern part of the project area, in the middle portions of the Marlgowa Sandstone. While illite appears widespread on the sandstone outcrop surface in the north, this abruptly terminates at the Stretch Fault. It is present south of this fault only along the western edge of the project boundary.

Illite MTMF

*Long Wavelength Muscovite*

Distinct from the illite is an illite/muscovite phase featuring a broader and longer wavelength absorption feature. This is within the range more typical of illite or muscovite and for the purposes of this study have been named a long wavelength muscovite because of the slightly better developed secondary AlOH absorption features at 2425 nm. It is most prominent in the Kombolgie Sandstone at the northern ends of the flight lines although it is not present in the northeastern portion of the survey area and appears to often form mixtures with illite, suggesting that these phases may represent differing degrees of crystallinity. Alternatively, this may indicate difficulties of distinguishing the sub-pixel proportions of illite group clays within mixed spectra.

Long Wavelength Muscovite MTMF

*Muscovite 2 Sandstone*

Muscovite 2 is present in several of the flightlines. These spectra exhibit relatively high reflectance and a relatively broad, well-developed absorption feature from 2192 to 2209 nm, broader than either the illite or long wavelength muscovite endmembers. This endmember are located in the northern parts of the survey area, within a stratigraphic interval of the Kombolgie Sandstone above but relatively near to the Gilruth Volcanic Member.

Muscovite2 MTMF

*Illite2/Chlorite*

This endmember features a weak absorption feature at 2210 nm and a second weak feature near 2365 nm. While this latter feature is too shallow to be diagnostic, its depth relative to the 2210 nm feature is sufficiently great that it is probably related to MgOH bond vibrations rather than secondary AlOH features. This is most likely indicative of Mg-bearing chlorites but could possibly represent high Mg content illite. This endmember are most often found in outcrop exposures of the McKay Formation, especially in the southernmost areas. The continuum shape of this spectrum suggests that it is likely a rock type rather than a discrete mineral phase. Although it is possible that the chlorite is restricted to these units, it is also possible that it is more widespread within the McKay Formation but is only visible in the cleaner sandstone units because they form better outcrops.

Illite2/Chlorite MTMF

*Dickite*

In Deaf Adder these endmember spectra are found near the northern ends (stratigraphically lowest) of the flightlines. It is characterized by a broad absorption feature from 2175 to 2210 nm that is interpreted as a poorly developed absorption doublet. This doublet is only rarely observed, most likely because it nears the spectral resolution of the AMS scanner but possibly also because it represents mixtures with small amounts of illitic clays or illite/kaosmectite weathering products. It is interpreted as dickite because of the deeper, better-developed absorption feature than the kaolinite endmember. Field evaluations identified that sandstones with these characteristics were well cemented (silicified) units, with the high-grade diagenetic signature preserved. The strong dickite responses are mostly found at the northern ends of the flight lines corresponding to the stratigraphically lowest units in the area, the upper parts of the Gumarrirnbang Sandstone and the bottom units of the Marlgowa Sandstone.

Dickite MTMF

*Kaolinite*

This endmember is observed in Kombolgie Sandstone outcrops on the plateau. It features a similar broad absorption feature from about 2175 to 2225 nm like the dickite endmember, but is usually a shallower feature. The absorption feature shows evidence of a weakly developed doublet with a greater depth for the longer wavelength feature. Kaolinite is widespread through the survey area in low to moderate amounts. It is most commonly found within the upper parts of the Marlgowa Sandstone and locally in some McKay Sandstone outcrops.

Kaolinite MTMF

*Goethitic Sands or Sandstone*

Two endmember are present in most of the flight lines, in both the clay-poor sandstones and in recent sands on the sandstone plateau. They have been tentatively termed goethitic sands or sandstone because it gives a relatively consistent, albeit only fair, match to goethite from the spectral library. The endmembers correspond to pisolithic sand cover and ferruginous on the plateau. Some pixels appear associated with the ferruginous zone close to the Gilruth Volcanic Member and other areas are also present throughout the Marlgowa and McKay Formations. Since both the McKay Formation and the top of the Marlgowa are glauconitic, these may become ferruginous when weathered.

Goethitic Sand/Sandstone MTMF

Goethite 2 Sandstone MTMF

*Kaolinite/Halloysite Sand*

This endmember bears some similarity to the general shape of the goethitic sand/sandstone endmember and is mainly confined to reflective, surficial sediments on the sandstone plateau. It is interpreted as representing poorly consolidated, mixed sediments containing low crystallinity kaolinite because of the lack of sharpness in the absorption feature and its apparent tendency to form mixtures with goethitic sand

Kaolinite/Halloysite Sand MTMF

*McKay Sandstone (illitic? kaolinitic?)*

This endmember features a broad, poorly defined, asymmetric absorption feature from about 2150 to 2210 nm. Considerable variation in the shape and position of this feature suggest variable amounts of kaolinitic and illitic clays. Most of the endmember pixels identified were situated within the area underlain by McKay Sandstone. The McKay Sandstone endmember is interpreted as containing significant kaolinite and/or illite. Although most high responses are located in the McKay Sandstone, the highest values appear to be in the northeastern portion of the study area, in the upper portions of the Marlgowa Sandstone. This may be explained by the poor outcrop exposure of the McKay Sandstone creating difficulties in generating coherent endmember images within this unit. In contrast, the Marlgowa Sandstone is much better exposed. Another explanation may be that the top of the Marlgowa Sandstone is glauconitic and may interfinger with the McKay Fm. This endmember signature may indicate a gradational contact. This endmember is not a pure mineral phase, it is interpreted as a rock containing a mixture of illite and kaolinitic clays. It is quite possible that this mixture occurs in both stratigraphic units.

McKay Sandstone MTMF

### AMS Discussion

The Gumarrirnbang Sandstone is dominated by the long wavelength muscovite and dickite endmembers. The lower part of the Marlgowa also appears to contain significant dickite. Higher within the sequence, the abundance of the muscovite 2 clay appears to increase while the dickite decreases. This unit is overlain by illite- and kaolinite-bearing units, although these two clays do not appear to occur together. Within the upper parts of the Marlgowa Sandstone, these clays appear to occur together in a less distinct mixture, as the McKay Sandstone illite/kaolinite endmember. These are also present within some units of the McKay Sandstone, while others are dominantly kaolinitic. The illite/chlorite endmember appears to be restricted to the southern parts of the project area. The transition from dickite at lower stratigraphic levels in the north (Gumarrirbang and Lowermost Marlgowa) to kaolinite at higher levels in the south (Marlgowa and McKay Sandstone) may indicate variations in peak diagenetic grade; that the dickite-kaolinite transition occurred somewhere within the middle of the Marlgowa Sandstone in this part of the Kombolgie Basin.

Mixtures of kandite and illite clays are not identified in the Deaf Adder study area. This is not believed to be due to a scale of resolution but rather, when both clays are present within a unit; they exist in separate beds with sharp boundaries between the zones. It is proposed that these clay type differences represent different fluid flow events recorded by the paleoaquifers and paleoaquitards. The kandite units record an earlier diagenetic fluid flow event (dickite) but were subsequently cemented by silica, protecting them from later fluid events. Illitic units remained open to fluid flow for much longer time periods, resulting in later diagenetic alteration to sericite group clays.

The location of the Stretch Fault is clearly shown by the clay distributions as shown in Illite MTMF. While illite and long wavelength muscovite are abundant to the north of the fault, they are notably absent on the south side. These clays are present on the south side of the fault only near the western edge of the property. Since the long wavelength muscovite is present mainly in the lower parts of the Marlgowa Sandstone, it is predicted that the sense of displacement along the Stretch Fault is north side up.

Several known uranium occurrences exist within the Deaf Adder project. These locations were compared with the mineral endmember images produced from the AMS data to determine if any alteration halos could be identified. No strong evidence of hydrothermal alteration was noted around any of the occurrences. In most cases, no strong clay signatures were present. Although the Flying Ghost occurrence is located in a zone with a good, long wavelength muscovite response, this appears to be a stratigraphic feature associated with the top of the Gumarrirnbang Sandstone. Similarly, the muscovite 2 endmember mapped in the Casper/Banshee area appears to be stratigraphic.

The lack of any correspondence between the clay distributions and the uranium occurrences may in some cases reflect poor outcrop exposure in the area. However, many of the occurrences appear to be related to stratigraphic units rather than associated with a deep-seated hydrothermal process. Some of the occurrences (for example, Flying Ghost, Phantom, Casper, and Banshee) appear to be associated with the ferricrete adjacent to the Gilruth Volcanic Member. Any alteration would likewise be expected to be associated with this zone. Writer is interpreted as a geochemical anomaly associated with phosphates within a stromatolytic unit of the McKay Formation and likewise would not be expected to exhibit a significant hydrothermal alteration halo.

The comparison with the AMS survey results and the outcrop collected PIMA results are very good. In comparing the results, it must be considered that the AMS survey is nominally five metre pixels, while outcrop samples are from a point. If two or more clays are within the pixel area, the result would be a mixed clay, and this is what may be observed in the Mackay Sandstone clay endmember. The AMS data gives a total continuous coverage of an area. Outcrop collected PIMA measurements is point data collected from sampled stations, and some interpolation between stations is required. The advantage of the AMS survey is that it can identify areas of possible alteration, which require follow-up sampling and ground verification.

## ROAD REHABILITATION

Prior to the 2000 field season, a temporary track was built to facilitate access to the drill hole DAD-0008 on the western portion of EL 5062. This track branched off the main Bat Guyangguyang Road, 20km south of the Cameco Mann River Camp and continued 45km to the west, crossing several small creeks and the Katherine River. At the conclusion of the drilling program, Wildman River Stock Contractors (WRSC) graded all windrows back over the track and pulled back and re–contoured the creek crossings. Minor re-vegetation was completed on areas of the creek banks, where soil disturbance had occurred, to minimise erosion during the wet season. Small earthen bunds and fallen tree trunks (where available) were placed across the recovered track surface to minimise the possibility of wet season run-off using the rehabilitated track as a water channel pathway and cause considerable soil erosion.

The Traditional Owners have indicated that they wanted the main access track to the Mann River camp to remain after Cameco had concluded exploration work in the area. At the conclusion of the 2001 exploration work the main Bat Guyangguyang track was prepared for the wet season as usual with additional permanent traversable bund establishment from the camp to 40 km south. Where possible the windrows were pulled back into the centre of the main track along its entire length. In 2002 Cameco Australia assisted the Traditional Owners with $11,000 contribution towards road rehabilitation and weed control programs. This has effectively terminated any liability to Cameco Australia for the main access track.

Cameco Australia personnel, NLC personnel and Soil Conservation Science personnel from the Department of Lands Planning and Environment (DLPE) inspected the west track after the 2001/2002 wet season to ensure that the road rehabilitation works were successful. Minor channel erosion was observed where the bunds were breached or the drainage channels became blocked with sediment. Damage to the bunds was also noted where buffalo utilised the road a walking trail and the bunds were depressed at that point. A loader contracted from WRSC was used to rehabilitate sections of the track that were damaged by placing larger earthen bunds in those damaged sections than were previously built. This work was completed with direct and indirect best practice knowledge from DLPE experts, competent contractors and experienced Cameco Australia personnel.

## CAMP CLEANUP AND CORE REMOVAL

The Traditional Owners have indicated that they wished for camp facilities to remain after Cameco had concluded exploration work in the area. In 2002 the Mann River base camp was cleaned up and excess items removed in order to hand the camp facilities over to the Jawoyn Traditional Owners for their use. An 8 kVa generator and all infrastructure (ablution and office buildings, water tank and septic system, etc.) were left in place for the Traditional Owners.

During camp cleanup operations core from three complete drill holes were shipped to the NTGS drill core library facility in Darwin. The drill holes submitted included DAD-0006, and its wedged extension DAW-0006 and DAD-0008, which comprised over 2700 m of core drilling. These drill holes together represent an entire section through the McKay Formation and Kombolgie Group sediments and volcanic units as well as thick intersections of Oenpelli Dolerite. These drill holes are deemed to be stratigraphically important by NTGS, who requested the submission of this core. Cameco Australia is legislated to submit samples at the request of the NTGS upon relinquishment of Exploration Licences.

## CONCLUSIONS

After the completion of the fifth field season, it is apparent that the Kombolgie Sandstone in the areas explored so far, is very thick and potentially difficult and expensive to explore. From stratigraphic interpolation of the Nungbalgarri Volcanic unit between drill holes using the base of the volcanics in DAD-0008 as datum, and assuming that the Oenpelli Dolerite in DAW-0006 has been forcibly emplaced and spreads the Mamadawerre Sandstone by adding to the stratigraphic thickness, the unconformity in DAW-0006 could be at an approximate depth of 1700m. This depth to the unconformity at DAW-0006 has not taken into account the possible thickening of stratigraphic sequences towards the paleo-basin centre. Stratigraphic correlations to DAD-0002, on the Flying Ghost prospect, would calculate the unconformity at an approximate depth of 970m.

The roles of the two volcanic horizons is still not fully understood, however the petrographic work suggests that they may not have behaved as barriers to historical fluid flow as was previously thought. If the uranium bearing fluids have originated at depth, the volcanic horizons may still have scavenged uranium from solution thus preventing the uranium from expressing itself on the current surface.

Basement geology in DAD-0008 is encouraging with the presence of sub-vertically foliated graphitic and carbonaceous pelitic gneisses and schists. The minor healed faulting and chlorite alteration in the basal sandstone is encouraging as this indicates fluid movement and circulation through this lower fluvial horizon and possible interaction with basement fluids, in a drill area that is considered benign.

The fracture outcrop sampling program results were disappointing, however further work is warranted to fully test this methodology and it's application in defining deep uranium deposits. The results from sampling the Slimer prospect on the Katherine River indicate that possible secondary uranium mineralisation is present within small discrete fractures within the sandstone rock bars. Local breccia zones and the possibility of what appears to be weathered sulphides in some sandstone samples suggests that some amount of alteration may have utilised these structural pathways. The deep indicated (from drilling) depth to basement detracts from the prospectivity of this prospect.

The Airborne Multispectral Scanner survey completed by De Beers provides valuable clay species information covering the entire tenement, however, the lack of identifiable alteration zones surrounding prospects would suggest that the secondary uranium mineralisation at known uranium anomalies and prospects represent surficial enrichment. If these prospects represent unconformity uranium mineralisation, the associated alteration halo does not penetrate to surface and may be inhibited by the underlying volcanic horizons.

The inferred depth to basement range of in excess of one kilometre has been a major factor in the relinquishment of EL 5061 and EL 5062. Remote sensing technology needed to penetrate to this depth and through the volcanic horizon does not yet exist. The exploration and drill validation of these targets to the inferred basement would in all likelihood be prohibitively expensive and the perceived cost of extraction of any discovered ore body at these depths is believed to be uneconomic under present conditions.