Cameco Australia Pty Ltd

Exploration Licence EL 23462

KUKALAK PROJECT – NORTHERN TERRITORY

2001 - 2003 ANNUAL REPORT

CONFIDENTIAL

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Authors:	**G Otto, Geologist II** **T O'Connor, P. Geo., Project Geologist** **G Zaluski, Geoscientist** **G Beckitt , Geophysicist III**
Copies:	**Cameco Australia Pty Ltd, Master File (1)** **Northern Territory Department of Mines & Energy (1)** **Cameco Corporation (1)** **Northern Land Council (1)**

SUMMARY

The Kukalak project is a uranium exploration project in northwestern Arnhem Land, which is managed and operated by Cameco Australia Pty Ltd (Cameco). In the past this project has be managed and operated jointly with the Myra project and comprises of EL 23461 (Myra) and EL 23462 (Kukalak).

During 2001, the Northern Land Council (NLC), on the assumption that granting of the original licence applications by the Department of Business Industry and Resource Development, Mines and Energy (NTDME) would be imminent, accepted approval for reconnaissance exploration. Cameco conducted a helicopter supported sampling program during September 2001. At this time Cameco was informed by the NTDME that granting of the licences could not be approved as the application process contained irregularities. The original exploration licences were the not granted by the NTDME due to the Attorney General's decision that the process had contravened sections of the NT Aboriginal Land Rights Act (1976) in spite of both deemed and actual consent from both NLC and the ATSIC Minister.

In order for the application process to proceed, Cameco were advised to relinquish and re-apply for the licences. The relinquishment and re-application of the licences was completed in December 2001 with the application process "fast tracked" by the NLC and NTDME. EL23462 was granted on 25 July 2002. This report represents work completed prior to and within the actual first year of grant.

The exploration activities planned for 2001 and 2002 were designed to determine the uranium potential of the project over the next several years. This consisted of outcrop sampling, preliminary mapping and airborne geophysical surveys to enable future drill hole targeting. A helicopter was utilised to aid with personnel movement on the project area.

The field based exploration activities commenced on 17 August 2002 with demobilisation on 16 October 2002. The Afmeco operated Myra Falls Camp was utilised as the base camp for exploration activities during 2002. In total 158 outcrop samples were collected from the Kukalak tenement and 234 samples on the entire project area during 2001 to 2002.

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INTRODUCTION

The Myra Kukalak project is a uranium exploration project and jointly comprises exploration licences EL23462 (Kukalak) and EL23461 (Myra). The project is managed and operated by Cameco Australia Pty Ltd (Cameco). This report details exploration work completed by Cameco on exploration licences EL23462 (Kukalak) during 2002, the first year of tenure. Further to this, work completed by Cameco during 2001 at such time that the NLC approved pre-grant exploration access to the licences.

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

The project lands are underlain by favourable lower Cahill Formation basement rocks, which are known to host the significant uranium deposits of the Alligator Rivers Region. The Kombolgie Subgroup sandstone and volcanic members outcrop extensively throughout the area. Favourable structures and hydrothermal alteration occur in the region. Several uranium occurrences have been identified in the project area, an indication of a favourable mineralising and alteration event.

The exploration activities planned for 2001 and 2002 were designed to determine the uranium potential of the exploration licence over the next several years. Work was aimed at targeting future drill holes and consisted of outcrop sampling, preliminary mapping and airborne geophysical surveys. A helicopter was utilised to transport field personnel for outcrop sampling and movement on the project.

The field based exploration activities commenced on 17 August 2002 with demobilisation on 16 October 2002. The Afmeco operated Myra Falls Camp was utilised as the base camp for exploration activities during 2002.

Exploration activities in 2001 were based out of a temporary field camp close to Tin Camp Creek at the end of the Two Rocks track. Work commenced on 2 September with helicopter-assisted sampling temporarily based out of Cameco's King River Camp until the field camp was established. The temporary field camp was established 4 September and operated for approximately three weeks with demobilisation to Darwin on 22 September 2001. Field activities were terminated prematurely due to the Attorney Generals decision to decline the granting of the tenements.

The objectives of the work completed by Cameco during the 1st year (2001 and 2002) of the Exploration Licence were:

- To evaluate anomalous areas delineated by previous exploration;
- To commence and generate regional datasets of outcrop samples with regional and detailed geological mapping and prospecting;
- To use remote sensing techniques such as the HYMAP Mark I survey to delineate surface features structure, lithology, alteration etc.
- To delineate further areas requiring investigation by drilling.

Location and Access

EL23462 is located in Western Arnhem Land, Northern Territory on the Alligator Rivers (SD-5301) and Millingimbi (SD-5302) 1:250,000 scale topographic map sheets and the Oenpelli (5573), Goomadeer (5673), Howship (5572) and Liverpool (5672) 1:100,000 scale topographic map sheets.

Project Location Map

The Kukalak licence is located approximately 20km further to the southeast of the Myra licence. Access to the Kukalak licence is currently by helicopter only. Previous exploration on the Kukalak licence have utilised tracks to Devils Elbow and Dog Leg prospects, however these tracks have not been used or maintained since exploration ceased during the early 1990's.

The Afmeco Myra Falls camp was utilised as the base camp for field exploration activities during 2002. This camp was built by Uranerz in 1987 and has been utilised as an exploration base camp more recently by Afmeco. A rental agreement was negotiated with Afmeco for the use of the camp and facilities. The camp consists of four air-conditioned demountable buildings; a kitchen, ablution and two offices, and two permanent corrugated iron sheds. A purpose built caravan was used for logging drill core. A 35-kVa diesel powered Yanmah generator supplied electric power for the camp. Water was sourced from Tin Camp Creek and pumped by an electric pump to a 10000-litre water tank. Field personal slept in canvas tents. The drilling contractors utilised an air-conditioned sleeping caravan for the night shift personal.

Four-wheel-drive Toyota Land Cruiser vehicles were used for personnel movements between Darwin and the camp, and for provisions obtained from Oenpelli and Darwin. Regular food supplies were picked up from Oenpelli, which were freighted from Darwin. A 7-tonne Isuzu four-wheel drive truck was used to deliver 200 litre fuel drums and mobilise and demobilise camp equipment.

The rugged nature of the sandstone, which overlies most of the licence, means that access is only possible by helicopter or by foot. As such, 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.

Tenure

The Kukalak project Exploration Licence (EL2346) located in western Arnhem Land covers an area of 417.4 km^2, comprising 125 blocks. The exploration licence was ratified at NLC Full Council in late May 2002 and formally granted by DBIRD Mines and Energy on 25 July 2002.

The original exploration licence application was the not granted by the NTDME in 2001 due to the Attorney General's decision that the process had contravened sections of the NT Aboriginal Land Rights Act (1976) in spite of both deemed and actual consent from both the NLC representing the Traditional Owners and the ATSIC Minister. Under advise from NTDME and the NLC, the exploration licence application was relinquished and re-applied for in December 2001. As the exploration agreement and work proposal had been negotiated, the exploration licence was "fast tracked" by NLC and DBIRD.

The Kukalak licence contains two classes of areas, which are sensitive or have cultural and/or social significance to the Traditional Owners of the areas. The most important of these areas are the No Go Areas, which are absolutely excluded from exploration access. The other class areas are restricted access, in that permission from the Traditional Owners must be sought before conducting exploration within the designated areas.

Terms of Exploration by Cameco

It is assumed that exploration will be carried out over a period of six years, or longer, as permitted by extensions to the period and re-issue of the exploration licence under the Mining Act. A 50 percent relinquishment of the exploration tenements is required after three years. An extension or waiver of surrender can be granted from the NTDME, however this is at the discretion of the NTDME. All exploration activities and results must be reported one month after the grant date anniversary.

Geological Setting

The project area lies in the western portion of the Pine Creek Geosyncline, roughly on the boundary of the so-called East Alligator and Nimbuwah structural domains. The region is structurally complex with Paleoproterozoic basement lithologies having undergone at least three recognisable phases of deformation. The region also marks the rapid transition in metamorphic grade from lower amphibolite to granulite facies within the basement rocks. Metamorphism of basement lithologies on EL23462 metamorphism has reached upper amphibolite to granulite facies.

The basement lithologies have been unconformably blanketed by Meso-Palaeoproterozoic sedimentary and volcanic members assigned to the Kombolgie Subgroup. Late stage orogenic granite assigned to Tin Camp Creek Granite intrude and is exposed to the northwest of the Kukalak area.

EL23462 (Kukalak) Local Geology

Kukalak Geology Map

Kukalak lies at the eastern extremity of the Myra Falls Inlier and at the northeastern extremity of the Caramal Inlier. Lower Kombolgie Subgroup rocks overlie the majority of the tenement, with minor exposed basement rocks where the Caramal Inlier and Myra Falls Inlier encroach onto the tenement. The incised curvilinear Goomadeer Thrust, orientated northwest to southeast, which in part traces the Goomadeer River, is the dominant feature of the Kukalak tenement.

The Caramal and Myra Falls Inliers are the only locations of exposed basement rocks on the Kukalak tenement. Mapping within the on-property area of the Caramal East Re-entrant identified porphyritic quartzofelspathic gneissic rocks assigned to the Nimbuwah Metamorphic Complex; mica rich, biotite rich and quartz rich feldspar gneisses and schists which are tentatively correlated to the Cahill Formation (Ꝑc); minor amphibolites tentatively correlated to the Zamu Dolerite (Ꝑdz) and Oenpelli Dolerite (Ꝑdo). The lack of clear marker horizons, such as the Kudjumarndi Quartzite, makes correlations difficult, but on the basis of comparison, the lithologies appear consistent to Cahill Formation and Mount Howship lithologies seen on the nearby Myra exploration licence. Tin Camp Creek Granites are exposed immediately to the west of the property boundary within the Caramal Inlier, and are exposed in the on-property portion of the Myra Inlier.

ROCK UNIT	THICKNESS	GEOLOGICAL AGE
Residual sand cover and laterite on tableland, silt and alluvium in valleys	a few metres	Quaternary-Tertiary
Undifferentiated Cretaceous- sandstone, siltsone and pebble conglomerate	Remnant outliers 10-50 m	Cretaceous
Oenpellie Dolerite – intrusive sills and dykes	Up to 200 m	Mesoproterozoic
Tin Camp Creek Granite – altered granites and trondhjemites		Mesoproterozoic
Gumarrinbang Sandstone – quartz arenite with minor pebble conglomerate	Up to 130 m	Mesoproterozoic
Nungbalgarri Volcanic Member – vesicular and amygdaloidal basalt	Up to 130 m	Mesoproterozoic
Mamadawerre Sandstone – quartz arenite, quartzite and conglomerate	Greater than 150m	Mesoproterozoic
Zamu Dolerite– metamorphosed foliated dolerite and gabbro instrusive bodies, dykes and sills	Variable to 10's of m	Paleoproterozoic
Lower Cahill Formation – banded biotie, mica-quartz-feldspar gneiss and schist		Paleoproterozoic
Mount Howship Gneiss - quartz feldspar gneiss, biotite gneiss		Paleoproterozoic
Nimbuwah Metamorphic Complex – foliated granite and granodiorites migmatites		Paleoproterozoic

Summary of Rocks units exposed on EL23462 (Kukalak)

The Paleoproterozoic sedimentary and volcanic members of the Kombolgie Subgroup predominantly overlie the Kukalak tenement. The Mamadawerre Sandstone (Ꝑhe), the oldest formation of the Kombolgie Subgroup overlies most of the western portion of the tenement. The sandstone forms the plateau surface on the western portion of the tenement and is exposed as gully dissected bare rock and areas of shallow sandy soil supporting spinifiex and scrub. Plateau escarpments are developed surrounding the Caramal and Myra basement inliers.

The Ꝑhe sandstone is unconformably overlain by the Nungbalgarri Volcanic Member (Ꝑhn), of the Kombolgie Subgroup. The unconformable contact is expressed locally as dome and basins, with the upper sandstone surface interpreted to represent the palaeotopographic surface of aeolian sand dunes with the volcanic draped over the top. It may also represent large dewatering structures formed as a result of hot volcanic rocks draped over water-saturated sediments, which were deposited in estuarine conditions.

The Nungbalgarri Volcanic Member consists of multiple vesicular and amygdaloidal basaltic flows. Regionally, the stratigraphic thickness of the volcanic units is quite variable between 50m and up to 200m thick. In the Kukalak area, the stratigraphic thickness of the Ꝑhn is approximately 50m.

The Gumarrirnbang Sandstone (Ꝑhr) unconformably overlies the Ꝑhn. The sandstone is comprised of fine to coarse grained quartz arenite with scattered pebbly units. Sedimentary structures include planar and trough cross-stratified, rippled and horizontally stratified units suggesting a proximal to distal fluvial braided stream and estuarine depositional environment.

Oenpelli Dolerite intrudes the Kombolgie Subgroup sedimentary and volcanic members as sills and dykes. Significant exposure of dolerite occurs as a curvilinear intrusive, which may be partly fault controlled, along the Goomadeer Thrust.

Undifferentiated Cretaceous rocks have been mapped, on the Milingimbi (SD 5302) 1:250000 map sheet, in the south of the tenement. The rocks are exposed weathered outcrops of lateritic sandstones and siltstones forming resistant mesa-like ridges.

Previous Exploration

Early Exploration - 1970's

Exploration in the area began after the discovery of the Ranger and Nabarlek orebodies in 1969 and 1970 respectively. Esso Minerals (Esso) and Queensland Mines Pty Ltd (QMPL) carried out exploration work over the tenement in the early 1970's until exploration was banned in the Alligator Rivers area in early 1973 by a federal government imposed moratorium on exploration, pending a resolution on the issue of Aboriginal Land Rights.

QMPL conducted an airborne radiometric and magnetic survey over the Kukalak area during 1972. No further work is documented on the Kukalak tenement.

No exploration work was conducted from 1973 until Uranerz Australia Pty Ltd (Uranerz) negotiated rights to explore the Kukalak tenement and began exploration in August 1986 and September 1987 respectively.

Recent Exploration 1986 - 1994

Uranerz conducted detailed exploration over the Kukalak area from 1986 until the company departed Australia in June 1991. Afmeco (part of the Cogema Group), in 1991, continued detailed exploration over the Kukalak area through a joint venture arrangement (Afmeco 50%, Uranerz 25%, Kumagai 25%). Afmeco subsequently quit the joint venture and relinquished EL 3421 (Kukalak) in September 1993.

Uranium Australia N.L (UAL), a subsidiary of the Seracen Minerals, lodged application for exploration on the Myra Kukalak project. Cameco Australia recently acquired all UAL interests in Arnhem Land, including the Kukalak tenement.

Exploration work conducted by Uranerz and Afmeco is summarised in the following tables. The previous exploration work is compiled and in some cases copied from Uranerz and Afmeco Annual and company reports.

EL 3421 (Kukalak) Previous Exploration Work Summary

Kukalak Exploration Work

A variety of exploration methods were utilised during the term of exploration by Uranerz; these methods include mapping, extensive sandstone geochemistry sampling, soil and water sampling, stream sediment sampling, radon gas surveys, ground prospecting in conjunction with airborne and ground geophysics, including airborne magnetic, radiometric, and electromagnetic input surveys; ground magnetic and electromagnetic surveys; helicopter supported and ground gravity surveys; heliborne radiometry; trenching and RAB, RC and diamond core drilling.

Uranerz initially carried out follow up of radiometric anomalies identified from the airborne radiometric and magnetic survey. Some 54 anomalies were identified. After ground prospecting of these anomalies it was found that the fixed wing airborne radiometric flight lines did not pick up some of the major prospects containing uranium secondaries eg Ferricrete Anomaly. A helicopter borne spectrometer was used to survey along geological contacts and sandstone escarpment edges.

The intensive exploration programs conducted during the first two years of tenure generated a number of possible targets in several areas. The best of these targets is the Devils Elbow and Ferricrete Anomaly where U secondary mineralisation has been discovered. Other targets, which could not be substantiated, were the Leichhardt Plateau, Whaleback Anticline, Nicks Anomaly, and Dog Leg.

Leichhardt Plateau

The Leichhardt Plateau area was classified as the most amenable for the search for blind U targets; ground accessibility problems to the plateau are minimal as plateau is covered by relatively flat sandstone outcrop and sandy plains; the cover rocks are below the effects of the Nungbalgarri Volcanic Member which makes the use of sandstone geochemical and radon surveys more applicable; and from gravity interpretation, the area is a gravity low.

Four deep diamond drill holes were drilled in the area to test the thickness of the sandstone and to investigate the source of the gravity low and determine the basement rock types. In the first hole, KLD001, an unexpected intersection of Oenpelli Dolerite rather than metamorphic lithologies led to a reappraisal of the magnetic interpretation. Basement lithologies in the other drilling consisted of non-foliated granitoid and foliated granodiorites and adamellites, which are interpreted as Tin Camp Creek Granite and Nimbuwah Complex granitoids respectively. The gravity interpretation suggests that these rock types probably underlie most of the Leichhardt Plateau and extend to the northeast below the Whale Back Anticline. No alteration or U mineralisation was encountered in either the sandstone or basement lithologies in any of the deep drilling.

Twenty five shallow RC drill holes traversed the Leichhardt Plateau to test the depth of weathering in the sandstone; test the geochemical variations in surface sandstone sampling and shallow drill samples in order to use the one set of mixed geochemical data; and to characterise the geochemical variations between lithological variations in the sandstone. The conclusion drawn from Uranerz's work suggests that the differences between the drill and surface samples are negligible.

The lack of favourable basement host lithologies and alteration from drilling and surface samples downgraded the area, and no further work was performed.

Whale Back Anticline

This area was highlighted as a distinct magnetic high, and one drill hole was placed to determine the cause of the anomaly. The drill hole (KLD018) was sited on the eastern flank of the anticline, and intersected 9m of Nungbalgarri Volcanic Member, 180m of Mamadawerre Sandstone Member and passed into magnetic bearing granodiorite. No U anomalism or alteration was encountered in the hole.

Soil sampling results showed some weak and spotty Au anomalism was associated with remnant laterite caps on the Nungbalgarri Volcanic Member, however further work did not enhance any of these anomalies and no further work was performed.

Nicks Anomaly

This U anomaly is found in a small thrust zone parallel to interlayered quartz rich muscovite-biotite-feldspar gneiss and mica-quartz-feldspar schists, which are tentatively assigned to Cahill Formation within the Caramal East Inlier. The thrust strikes at 100° and dips at 30°to the south and extends some 25m across a creek bed before disappearing under cover. Trenching and geochemical sampling of the thrust returned assay values of up to 410ppm U and up to 120ppb Au.

Nicks Anomaly Drill Section

Associated alteration with the thrust zone is a pervasive chlorite and sericite replacement and in the immediate vicinity of the thrust, alteration has destroyed the original rock fabric. Alteration extends up to 100m in the hanging wall and 50 m in the footwall. Intense chlorite and sericite alteration is found in rocks up to 200m northwest of the anomaly, although no anomalism is associated with these altered rocks.

A number of thorium anomalies are found in the area, with one sample containing up to 20% apatite in a highly sericite altered quartz-rich gneiss, however these are often small and restricted in size. One zone, up to 500m in length, of thorium anomalism was found along the eastern sandstone escarpment in strongly haematitic sandstone with associated intense drusy quartz veining. The thorium enrichment in this area was reported up to ten times background.

Two drill holes tested the anomaly at depth, KLR009 and KLR010. Drilling tested the shear zone at depth, and showed that the anomalism is restricted, and possibly due to U enriched fluids released during emplacement of the granitic intrusion. The gneissic and schistose rocks assigned to the Cahill Formation are underlain by Tin Camp Granite and pegmatites to the south and Oenpelli Dolerite to the north of the anomaly. No further work was recommended for the area.

Dog Leg

Dog Leg lies east of the Caramal East Re-entrant and is entirely covered by outcropping Mamadawerre Sandstone Member. The area was initially recognised by the presence of several anomalies generated by regional sandstone geochemical surveys and radon gas surveys. It was considered favourable due to it's proximity to the Caramal East Re-entrant where basement schists and gneisses similar to the Lower Cahill Formation had been observed and were interpreted to extend under the thin capping of sandstone.

Results from the initial geochemical sampling showed that the anomalies generated were due to lithological variations in the sandstone; the coarse basal unit has a higher clay proportion leading to higher background signatures in all elements than the overlying finer grained unit. Subsequent statistics on the lithological separated geochemical data highlighted two areas, which were considered anomalous.

Dog Leg Sandstone Geochemistry Anomalies

The small southern anomalous area was not considered prospective as it was underlain by interpreted granitoids of the Nimbuwah Complex. The broader northern area is located on a small sandstone plateau of coarse grained basal sandstone. Mapping along the sandstone unconformity suggested that Lower Cahill Formation rock equivalents underlie the anomalous area. The northern area is cut by numerous east trending to northeast trending faults, and bounded to the west by a major north-west trending fault. Thorium anomalism, in a zone of up to 500m in length, is detected along the major west bounding fault, to the east of Nicks Anomaly. This anomalism is also discussed within the section on Nicks Anomaly. Faults have extensive drusy quartz associated within and adjacent to the structures and extensive bleaching of the sandstone is recognised adjacent to the faults. Radon gas surveys defined zones of anomalism centred on the east-west trending faults in the northern area.

Drilling in the Dog Leg area was sited using the initial sandstone geochemical data, prior to lithological separated statistics. The discrepancy in the location of the drilling and the anomalous areas defined by outcrop sampling is due to the unavailability of the follow up sampling geochemical results. The drill hole locations are shown in the Sandstone Geochemistry Anomaly Figure above.

A total of seven holes were drilled in the Dog Leg area, and define a north-south section and an east-west section.

Dog Leg East-West Drill Profile

Drill holes KLD011, KLD012, KLD013 and KLD014 were drilled on an east-west profile and intersected 30 to 80m of Mamadawerre Sandstone before passing into granitoid (hornblende-feldspar-quartz-biotite ± garnet) of the Nimbuwah Metamorphic Complex. The granitoids range from quartz-monzonite to granite, with granodiorite being more common, with grain sizes ranging from massive coarse grained to fine grained gneissic rocks. An intrusive body of varied gabbroic to basic composition is intersected in hole KLD012. The 64m intersection of intrusive rock is cut by numerous steep fractures, which are generally infilled with quartz and carbonate with trace pyrite and chalcopyrite. Minor gamma responses were reported in all drill holes and related to thin breccias or pegmatite zones. No significant alteration or U anomalism was found in any of the holes.

Drill holes KLD015, KLD016, and KLD013 define a north-south profile across the southern area of the Dog Leg prospect. Hole KLD015 intersected approximately 100m of Mamadawerre Sandstone and passed into a variable sequence of leucocratic quartz-feldspar ± hornblende ± garnet granitoids and gneisses. Uranerz interpreted these rocks as being a more felsic variety of Nimbuwah Complex granitoids. Hole KLD016 intersected approximately 80m of Mamadawerre Sandstone and passed into Nimbuwah granitoids compositionally similar to the granodioritic varieties intersected in holes KLD011 to KLD014.

From information gained from drilling on the lithological sequences, and compilation with the mapping within the Caramal Re-entrant, it was interpreted that the Nimbuwah granitoids were thrusted over the Cahill like lithologies, which from mapping should have underlain the drilling area. The reinterpretation suggested that a northeast trending southeast dipping thrust structure, thrusted the Nimbuwah granitoids over the lower grade Cahill like lithologies. KLD017 was positioned to drill through the structure and determine its prospectivity.

KLD017 encountered a thin cover of Mamadawerre Sandstone and passed through Nimbuwah Complex granitoids and then into Cahill like interlayered psammitic and pelitic meta-sedimentary schists. The Nimbuwah – Cahill contact was highly deformed and sheared up to 60m below the contact, with retrograde alteration within the deformation zone. Alteration consisted of quartz and chlorite after garnet. Pegmatites and numerous thin dykes of

Oenpelli Dolerite intrude the meta-sedimentary sequences. Minor gamma responses were defined in the radiometric logs and were associated with the thin intrusive pegmatite bodies. The drill hole did not encounter any U anomalism or pervasive alteration.

A small drill program was planned for the northern anomalous area, but due to access problems, this was never completed. No further work was performed in the area.

Devil's Elbow Area

The area was recognised as anomalous from airborne radiometric surveys and subsequent follow-up geochemical sampling of the volcanic and ferricrete rocks. The zone extends 900m along the Goomadeer River and straddles in part the Ranger Fault.

Devils Elbow Geological Compilation

Uranerz discovered U mineralisation within narrow fractures and breccias hosted in the Nungbalgarri Volcanic Member and highly anomalous U within ferricrete samples. Three main areas were the focus of Uranerz exploration in the Devils Elbow area, Terrace anomaly, Ferricrete anomaly and the trench anomalies located within the Goomadeer River.

The Terrace anomaly is located at the northern end of the Devils Elbow area, and is characterised by elevated radiometrics over an area of rubbly volcanic and ferricrete material on the eastern slope of the main Goomadeer Valley. One sample of float ferricrete / ironstone material returned values of 3.7% U3O8, 45ppb Th, 2250ppm Pb and 36ppb Au. The area is underlain by weathered and lateritised volcanics with low-grade U mineralisation of up to 70ppm U3O8 recorded from a one-metre trench sample. Significantly, approximately 20 boulders of ferruginous sandstone float were identified as anomalous in U, with one boulder being highly anomalous, containing 0.21% U3O8. The boulders are located near a major southeast trending lineament. No sandstone anomalism was discovered in the insitu adjacent outcrop indicating to Uranerz that hydrothermal fluid movement responsible for the anomalism in the volcanics also passed through the sandstone in discrete post-sandstone structures that have since been eroded.

One diamond cored drill hole, KLD020, (refer Devils Elbow Drill Profile), was designed to test the U anomalism at the Terrace Anomaly. The hole intersected 1m of Gumarrirnbang Sandstone, considered to be insitu, 8m of lateritic clays and passing into relatively fresh Nungbalgarri Volcanic Member. The lateritic clays contained identified U secondary mineralisation (3m at 482ppm U_3O_8 from 2m) and trace supergene copper. No further U anomalism was observed within the drill hole.

A number of zones of highly anomalous radioactivity with uranium mineralisation were identified within the floor of the main Goomadeer River valley. The zones occur in clean scoured outcrops of amygdaloidal volcanic, forming rock bars within the river and on the banks. U anomalism was found to be preferential to shallow to steeply east dipping structures sub-parallel to the river (330º). Trenching across these narrow high-grade zones returned a maximum assay of up to 5.8% U_3O_8 and 28ppm Pd from Trench 2, where mineralisation is associated with brecciated amygdaloidal volcanic. Brecciation consists of chloritised and sericitised volcanic clasts within a network of purple to specular haematite, chlorite and chalcedonic quartz veins and veinlets. Trench 6, the most anomalous in terms of surface radioactivity, was trenched to two metres with very little subsurface radioactivity found. Trenches 3, 4, and 5 did not contain any primary U mineralisation, though anomalous radioactivity and minor U secondary minerals were observed in association with haematite and within and adjacent to vertical, approximately north trending, dilatational quartz veinlets. Chlorite and sericite alteration of the wall rocks surrounding the veins and breccias is limited, extending up to two cm into the wall rock. The outer interface of alteration with the volcanic host rock often contains blebs of specular haematite.

U mineralisation found in the trenches consists of, from Uranerz X-ray diffraction work, uraninite, minor coffinite, and unidentified uranium secondary minerals, plus minor galena and pyrite. Petrography of the high-grade mineralisation in Trench 2 identified two distinct generations of uraninite; apatite; native gold; chalcopyrite being replaced by chalcocite, covellite and pyrite; goethite and haematite.

The paragenetic sequence determined by Uranerz petrographic work, is listed in chronological order:

- -Original volcanic rock
- -Chlorite and sericite replacement
- -Quartz veining
- -Anisotropic uraninite
- -Higher oxidised uraninite
    - -Pyrite
    - -Chalcopyrite
    - -Marcasite
    - -Galena
- -Goethite and native gold
- -Haematite

A drill profile was completed in the region of Trench 2 in order to test for depth extent of the identified U mineralisation and also to determine if mineralisation is present at the fault contact of the Nungbalgarri Volcanic Member with the Oenpelli Dolerite. Drill holes KLD005 and KLD006 defined the faulted contact between the Nungbalgarri Volcanic Member and overlying Oenpelli Dolerite and verified the Goomadeer Thrust dips at 40-45º towards the west. No mineralisation was discovered in these holes.

Devils Elbow Drill Profile

KLD007 was drilled to intersect mineralisation below Trench 2 and intersected significant U anomalism (3m at 1233ppm U_3O_8 from 117m) at the lower contact of the Nungbalgarri Volcanic Member with the upper contact of the Mamadawerre Sandstone. The down-hole radiometric readings suggest higher values (4m at 2900ppm eU_3O_8 from 115m). KLD007 was percussion drilled, with samples composited over 1m. The discrepancy in depths and anomalous values may be attributable to poor drilling conditions ie, excess water, broken ground and poor sample return. The down-hole radiometric data suggests the interval consists of a number of narrow high-grade zones within an envelope of higher background radioactivity. The anomalism identified in this hole is not thought to relate to the mineralisation in the trench.

KLD0019 was collared on the eastern side of the river and drilled to the west, again to test mineralisation below Trench 2. The drill hole intersected narrow mineralised structures with the best intersection of 0.1m at 844ppm U_3O_8 and 230ppb Au from 36.68m. The mineralised structures within the Nungbalgarri Volcanic Member were interpreted to be continuous from surface, but were too narrow to be of economic importance.

The Ferricrete anomaly is located to the southeast of the Devils Elbow area, within a deeply incised east-northeast trending fault splay of the Ranger Fault. The U anomalism is contained in partially ferruginised clays on the valley floor over a lateral expression of approximately 150m, with enriched U levels contained within ferricrete / ironstone float material. Uranerz interpreted the U enriched clays to represent deeply weathered Nungbalgarri Volcanic Member subcropping within part of the Ranger Fault system with rubbly ferricrete forming over parts of the volcanic and now preserved within colluvium. Assays from ferricrete / ironstone samples returned up to 0.35% U_3O_8. Trenching across the valley floor returned assay results of up 0.44% U_3O_8 and enriched gold associated with lateritic clays. Due to access difficulties, this area was not drill tested by Uranerz.

Exploration in the area was reduced after it was demonstrated that U mineralisation was concentrated in small narrow NNW trending structures or localised within residual laterite. The Ferricrete Anomaly was not followed up with drilling and remains an exploration target.

CAMECO EXPLORATION WORK – 2001 AND 2002

Exploration on EL23462 during the 1st year of licence consisted of reconnaissance outcrop sampling, ground proofing of previous geological mapping and general familiarisation of the tenements in context with the regional scale of the area.

The work included in this report was completed over a period of two field seasons, beginning in 2001 and continuing into 2002. The work completed during 2001 was not previously reported due to the tenement grant complications outlined in the introduction of this report.

The Afmeco Myra Falls Camp was utilised as the base camp for field operations during the work program. The exploration activities commenced on 17 August 2002 and were on going until demobilisation on the 16 October 2002.

The following tables outline the work completed and expenditures on the project. All digital data, which has been acquired by Cameco has been submitted on CD and DVD with this report. In some cases data over culturally sensitive "nogo" zones has been excised from figures and data in accordance with requests by Traditional Owners.

Kukalak Work Summary 2002

Myra Kukalak Annual Expenditure

Myra Kukalak Annual Assessment

Outcrop Sampling

The outcrop sampling program was designed to provide a semi-regional lithogeochemical and clay mineralogy dataset. This data set would be used as a basis for definition of alteration systems and anomalous areas that may be associated with unconformity-style U mineralisation.

Uranerz conducted extensive regional scale sampling and detailed sampling of the Kombolgie Subgroup sandstone cover sequence during their term of exploration. The level of sampling coverage should have discovered any obvious U mineralisation on the project. The Uranerz geochemical detection limits, by today's modern standards are high, and subtle geochemical anomalies, if they exist, may have been missed or were below the level of detection.

Cameco selected areas of investigation based on a model that any mineralisation requires a post-Kombolgie structural element in order to focus and provide a pathway for basinal fluids to interact with basement fluids and form a deposit. Therefore sampling was concentrated within and proximal to identified lineaments from remote sensing imagery, as these areas may be the surficial expression of structural elements, where alteration fluids may have interacted with the wall rocks.

Kukalak - Sample Outcrop Location Map

Kukalak – Fracture Samples Location Map

Myra & Kukalak Outcrop Locations and Description

Myra & Kukalak Lithology and Physical Properties

Myra & Kukalak Alteration and Structural Measurements

Outcrop Sample Procedures

Outcrop samples collected are used to create regional background signatures for lithological, spectral and geochemical parameters at each location. Geomorphological, geological and radiometric parameters are recorded, and a digital photograph at each site is taken. The samples are systematically processed in the field camp. Lithological textures, alteration colours (Munsell), grain-size variations, petrophysical parameters (magnetic susceptibility) are routinely recorded.

All samples are taken using a hammer, and sometimes a chisel, in order to collect only the targeted vein or fracture. Fracture samples consist of small broken pieces of rock, which are placed into a 100ml vial. The fracture sample physical shape and size characteristics are not favourable for PIMA spectral measurements. Sampling from breccia and veins provides a medium which can be subjected to low level detection geochemical techniques, and may display geochemical anomalies indicative of alteration, and leakage of uranium or indicator element from an otherwise blind uranium deposit at the unconformity. This type of sampling is referred to as fracture sampling and the samples are subjected to the G950 geochemical method, which provides ultra-low detection limits.

Sampling Technique

Samples are routinely halved using a core saw. One half is described (grain-size, Munsell colour, and magnetic susceptibility). The same sample is measured for spectral parameters using the PIMA II spectrometer. These samples are retained within the Cameco storage facility in Darwin. The other half of the sample is used for litho-geochemical analysis. A segment of each sample is also sent for petrographic thin section processing.

Codes for Competency Friability & Grain Size

Codes for Munsell Colours

Geochemical Processing

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

G400 Analytical Procedures

G950 Analytical Procedures

The following appendices list the geochemical results for the outcrop and fracture samples collected.

Myra & Kukalak Geochemistry for Outcrop Samples

Myra & Kukalak Geochemistry for Fracture Samples (G950)

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.

All outcrop samples were processed using PIMA, with results in the following appendices and figures.

Myra & Kukalak Outcrop Samples TSA Analysis (Identified Mineral Species)

Kukalak – Outcrop PIMA TSA Clay Distribution Map

Myra & Kukalak Outcrop Samples Minspec Analysis

Kukalak – Outcrop PIMA Minspec Clay Distribution Map

Outcrop Sampling

In total 130 outcrop samples and 71 fracture samples were collected on the Kukalak tenement. A number of samples were collected from the Nungbalgarri Volcanic Member, Oenpelli Dolerite, and basement rocks, with the bulk of the samples collected from the exposed sandstone units; Mamadawerre Sandstone and Gumarrirnbang Sandstone, of the Kombolgie Subgroup.

Fracture samples collected during 2001 from the Kukalak projects appear to elevated in a number of elements. The cause of these elevated values is unclear, as the laboratory re-ran the samples through ICPMS, with similar results. It may be speculated that the original samples became contaminated by unknown causes, either at the time of collection, or during the laboratory preparation of the samples. The results for these possibly contaminated samples have been included in the related appendix.

Outcrop Sampling Results

Work on the Kukalak tenement was aimed at evaluating the regional character of the exposed Mamadawerre Sandstone and the Gumarrirnbang Sandstone, and also to locate and evaluate the prospects identified by Uranerz. During the term of exploration by Uranerz, the Mamadawerre Sandstone was rigorously explored using a variety of exploration methods. The Gumarrirnbang Sandstone did not receive much exploration attention from Uranerz, as they did not think alteration leakage from U unconformity mineralisation would penetrate the Nungbalgarri Volcanic Member.

The Ferricrete Anomaly located within a fault splay of the Ranger Fault zone was sampled in various locations and has the highest recorded U values from all samples analysed on the Kukalak tenement. Four ferricrete / ironstone samples, KL02C10026, KL02C10225 to 0227, collected within the gorge returned U values of 7620ppm, 3720ppm, 3640ppm and 3620ppm with associated elevated Au, As, Co, Ni, Pb, V, Zn. Lateritic clays lie beneath the sandy colluvium have elevated radiometrics, with the highest total counts in excess of 15500cps natural gamma, recorded with an Urtec UG130.

Ground investigation of the Devils Elbow area found radioactive volcanic boulders, up to 24100cps natural gamma total counts, using an Urtec Minispec UG130, within in the area of Trench 2 on the Goomadeer River, presumably allochthonous boulders moved during the trenching performed by Uranerz. Green and yellow U secondary minerals, predominantly metatorbiernite with subordinate autunite respectively, were found coating quartz fractures and disseminated in patches within the volcanic rock. Samples KL02C10023 and KL02C10235, taken from the radioactive volcanic boulders, assayed 1720 and 1210ppm U respectively.

The best U value from sampling within the sandstone was 16.5ppm U from an area in the northern portion of Kukalak. The sample was collected close to the basal unconformable contact of the Mamadawerre Sandstone with Tin Camp Creek Granite. The sandstone in this area is highly silicified and in one sampled outcrop, sample KL02C20234, chalcedonic quartz infilled vugs and open dissolution vugs coated with drusy quartz are prevalent. It is speculated whether interaction of fluids emanating from the granitic intrusion with basin fluids are responsible for this alteration. It would seem unlikely that the granite was emplaced after the deposition of the Mamadawerre Sandstone, although the sandstone locally does have the appearance of contact metamorphism.

Kukalak – Gridded U – Sandstone Samples

Kukalak – Gridded Metals – Sandstone Samples

The Gumarrirnbang Sandstone to the north of the Ferricrete Anomaly has one sample, KL02C10228, which contains 18ppm U. This sample was taken approximately 100m to the north of Ferricrete Anomaly gorge.

Geophysics

Historical geophysical data has been compiled in this report. Cameco has completed an array of geophysical surveys aimed at substantiate previous results and to generate new targets. The geophysics completed by Cameco includes: detailed airborne magnetics and radiometrics, airborne TEMPEST and airborne HyMap MkI.

Location Map showing Cameco Geophysics and Hyperspectral Surveys

Historical Work

The historical geophysical work undertaken at the Kukalak project is summarised in the below table. Available project scale data and maps are summarised in the below compilation figure. Rippert (1992) reviewed the geophysics and made the following conclusions:

- Magnetics is dominated by the Nungbalgarri Volcanic Member and Oenpelli Dolerite.
- These two volcanic units will probably mask any basement response.
- No conductors have been identified.
- No geophysical method (apart from the radiometrics) can be used for drill targeting.

EL 3421 (Kukalak) Previous Exploration Work Summary

Compilation Map of Historical Project Scale Geophysics

Magnetics

Barrett (1988) and Rich (1988) summarises the magnetic results.

- Kevron Geophysics Pty Ltd flew an airborne and radiometric survey over Kukalak in October 1987. The west-east flight lines were flown at 80 m with a spacing of 200 m. A 33.6 l crystal and GR-800 spectrometer were used for the radiometric acquisition.
- The most significant magnetic units in the area are the Oenpelli Dolerite and the Nungbalgarri Volcanic Member and northeast trending post Kombolgie dolerite dykes. All of these mafic units show strong remanence.
- Sheets of the Nungbalgarri Volcanic Member produces anomalies of 20 nT to 50 nT and mask any underlying responses. Limited success was achieved with upward continuation and masked filtering. Upward continuation was the recommended approach. Magnetic modelling of the Oenpelli Dolerite suggests that it dips to the south and west beneath the Leichhardt Plateau, however, there is little response observed beneath the Plateau itself.
- Few anomalies were observed in the Lower Proterozoic basement. Zone D lies east of the Concordia Valley in the Dog Leg area. Deep magnetic sources are observed in the vicinity of the Whale Back Anticline and along the eastern margin of the project.
- Ground magnetics appear to have limited usefulness in defining major regional faults, except where they are intruded by faulting.

Gravity

Barrett (1988) and Rippert (1992) summarises the gravity results.

- A regional helicopter supported gravity survey of 167 stations was conducted by UAL on a 2 km grid with an L&R Model G gravimeter (Ser. 598) and a Digibar base station altimeter. An error of approximately 0.25 mGals is equivalent to the reported altimeter error of 1.3 m. Five detailed lines were also surveyed in the regional survey over areas of interest.
- The regional gravity survey has defined gross geology beneath the Kombolgie Subgroup Sandstone. The Quarry Gravity Low in the north of the survey area is interpreted as a batholith of Tin Camp Granite at a depth of 2.5 to 4.5 km.
- To the south beneath the Leichhardt Plateau is the Leichhardt Gravity Low. This is interpreted as a post orogenic granitic intrusion similar to the Tin Camp Granite.

- In the east is a broad high called the Pandora/Hogs Back Gravity Ridge, which corresponds with a northeast to north trending regional lineament. A thickening of Lower Proterozoic metasediments is the suggested source.
- Western Arnhem Land is structurally complex and hosts recumbent folds and shallow angle thrusting. The geophysical models used in this interpretation are recognised as a gross oversimplification.
- Gravity surveys at Kukalak have encountered some acquisition and processing problems. Regional gravity can be helpful for outlining regional geological structures. However, in the present environment it was not adequate for determination of deep or small exploration targets.

Radiometrics

Rich and Faris (1988) summarise the radiometric results

- Kevron Geophysics Pty Ltd flew an airborne and radiometric survey over Kukalak in October 1987. The west-east flight lines were flown at 80 m with a spacing of 200 m. A 33.6 l crystal and GR-800 spectrometer were used for the radiometric acquisition.
- A total of 99 radiometric anomalies were picked from the preliminary data and 87 of these were followed up late in the 1987 field season. Many of these anomalies were discounted following the statistical appraisal described in the report. Several very subtle anomalies in both the Lower and Upper Kombolgie were also identified.
- A number of anomalies identified from prospecting were also identified in the statistical appraisal. This enhances the prospectivity of the Devil's Elbow / Goomadeer Valley area.

Ground Time Domain Electromagnetics

Rich (1989) summarises the results of ground EM37.

- A number of weak responses relating to known faults and fault-related magnetic lineaments.
- No responses could be related to basement conductors.

Dog Leg Summary

Barrett (1990) makes several observations about the previous geophysics.

- In 1989, eight gravity and ground magnetic traverses were surveyed at the Dog Leg area. The purpose of the survey was to identify the lithologies, which exist beneath the Lower Kombolgie Sandstone.
- The gravity and magnetic anomalies of the Dog Leg area were interpreted as variable compositions of Nimbuwah Complex rocks. It was concluded that the ground magnetics offered little improvement over the airborne data, and that the gravity and magnetic data would not assist in differentiating between rocks of the Cahill Formation and the Nimbuwah Complex.
- A review of the gravity data along the Whaleback Traverse suggested that the target contact is at significant depth and further drilling is not recommended.

Hyperspectral

The De Beers HYMAP Mark I instrument was built by Integrated Spectronics Pty. Ltd (ISPL) in 1996 and is a similar system to the Probe-1 and is a later 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 HYMAP data interpretation in Saskatoon at Cameco Corporation Head Office.

The survey data was collected over EL 8568 (Myra) and EL 9029 (Kukalak) of the Myra Kukalak project between July 9 and July 11, 2000. The scanner was operated by M. Hornibrook (Spectral Geology Pty. Ltd.) flown aboard Kevron Aviations's Cessna 404 (VH-AZU). Sixteen alternating north-south and south-north flight lines of data were collected at a ground speed of 140 knots from an altitude of approximately 2800 m, providing a ground resolution of approximately 5.6 m. Relatively constant solar illumination was maintained by collecting the data near midday (between 10:06 AM. and 3:03 PM local time) with cloud cover less than or equal to 1/8. The following figure outlines the survey area.

Myra Kukalak HYMAP Coverage

HYMAP 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 unless the lighting, atmospheric conditions, and atmospheric correction are nearly identical (Farrand, personal communication, 2001). Flight line data is also calibrated for radiance and converted to apparent reflectance using ACORN software which is a radioactive transfer based atmospheric correction program and uses the calibrated radiance data and information about the data acquisition conditions to model and remove atmospheric absorptions and scattering effects. The resultant data is then processed using ENVI to determine end members. ERMapper 6.1 was used for preparation and producing mosaics of the final images.

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.

HYMAP Results

The processing of HYMAP airborne hyperspectral scanner data over the Myra Kukalak project using standard hyperspectral processing techniques identified prominent clay patterns within the exposed Kombolgie Sandstone and nearby basement rocks.

Endmember processing identified seven clay and rock types within the project area. The abundances of these endmembers are displayed as psuedocolour images with blue being nil to low abundance and red being high abundance in the respective figures.

Illite

The endmember identified as illite is present in some of the sandstone outcrops of all of the flight lines. It is most easily identified by its narrow absorption feature near 2195 nm which suggests a paragonitic or sodium rich illite. This short wavelength position of the absorption feature of Kombolgie Sandstone illites has also been noted from PIMA spectroscopic analysis in other areas. The Na-rich composition of the illites is not supported by whole rock geochemistry of samples but it may possibly be due to Fe substitution for Al within the illites. At Cuprite, Nevada two different muscovites were identified from AVIRIS data as Na-montmorillonite and paragonite, apparently due to shifts in the position of the 2200 nm absorption band caused by variations in the Fe/Al ratio (Swayze *et al*, 1992).

Illite MTMF

The highest illite abundances are present within the Gumarrirnbang Sandstone. A significant zone of illite is present in the southeastern corner of the survey where the Ranger Fault crosses the Gumarrirnbang Sandstone. In contrast, the Mamadawerre Sandstone generally features very low illite contents, except for an area southeast of the Caramal Inlier and the basal unit exposed along the edges of the escarpment.

Significant zones of scattered illite are indicated in the lowlands near the escarpment edges. While much of this appears to be related to sandstone talus, some also appears to be basement material, exposed along the base of the escarpment. This is supported by field observations of considerable amounts of muscovite schist talus along the escarpment edge on the Myra project. In some areas it was observed that the sub-Kombolgie unconformity is located approximately 150 m above the base elevation of the Myra Falls Inlier. It may also be noted that weak illite distributions correspond to the basement ridges within the basement windows, presumably related to weathering of muscovite and feldspar bearing metamorphic rocks related to the Kudjumarndi Quartzite.

Long Wavelength Muscovite

Distinct from the illite is an illite/muscovite phase featuring a broader and longer wavelength absorption feature from 2192 to 2210 nm. This is within the range more typical of illite or muscovite and for purposes of this study has 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 and appears to often form mixtures with illite, suggesting that these phases may represent differing degrees of crystallinity or physical mixtures of the minerals. However, it is probably due, at least in part, to the difficulties of determining the sub-pixel proportions of these very similar endmembers within mixed spectra. Like the illite, this phase is most abundant in the Gumarrirnbang Sandstone and is abundant in the Kudjumarndi Quartzite basement ridges. However, unlike the illite, it is more abundant over the Tin Camp Granite in the Caramal Re-entrant area and has very low abundances in the basal portion of the Mamadawerre Sandstone.

Long Wavelength Muscovite 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. Image pixels constituting this endmember are most often found mafic volcanics but some are found within the Kombolgie Sandstone. The relatively complex continuum shape of this spectrum suggests that it is likely a rock type rather than a discrete mineral phase. It shows a strong similarity in distribution to the mafic rock endmembers and therefore likely represents an alteration product of these mafic rocks. Although it shows weak distributions within the basement rocks, the strongest responses are identified in streambeds across areas underlain by Nungbalgarri Volcanics or Oenpelli Dolerite.

Illite2/Chlorite MTMF

Dickite

This endmember is widespread in the Kombolgie Sandstone and 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 HYMAP 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 discussed below. Sandstone with this spectral signature has been verified to contain dominantly dickitic clays, identified by PIMA.

Dickite is most abundant within the Gumarrirnbang Sandstone remnants north of the Goomadeer River. Although some intermixtures with illite and/or long wavelength muscovite are present, the dickite usually occupies different sandstone units, apparently overlying the illitic unit. Dickite is present but generally exists in very minor within the Mamadawerre Sandstone.

Dickite MTMF

Kaolinite

This endmember is observed in sandstone outcrops of the Kombolgie 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, as is typical of kaolinite.

Kaolinite is present in low to moderate amounts in the Mamadawerre Sandstone. Within the Gumarrirnbang Sandstone, distributions are variable. Elevated values are observed within this unit in the eastern side of the survey area, north of the Ranger Fault. The highest values are observed in the lower sandstone along the south side of the Goomadeer River valley, proximal to the Oenpelli Dolerite intrusion. Some kaolinite is also indicated along the edges of the Cenozoic laterite overlying the Nungbalgarri Volcanics in the southeast part of the image.

Kaolinite MTMF

Goethitic Sand or Sandstone

This endmember is present in all of the flight lines, in both the clay-poor sandstones and in recent sands on the sandstone plateau. It features a high reflectance and a flat to gently concave spectral profile from about 2050 to 2250 nm. It has tentatively been termed goethitic sand or sandstone because it gives a relatively consistent, albeit only fair, match to goethite from the spectral library. Goethitic sand and sandstone is relatively widespread in the area. It includes both sandstone bedrock exposures (especially in Myra) and sand cover on the plateau (especially in Kukalak). This endmember probably represents both ferruginous sandstone and pisolithic sands on the plateau since endmember pixels appear to be indicative of both materials. Sandstone values appear to be higher in the Mamadawerre than in the Gumarrirnbang Sandstone.

Goethitic Sand/Sandstone MTMF

Kaolinite/Halloysite Sand

This endmember bears some similarity to the general shape of the goethitic sand endmember and is mainly confined to surficial sediments in the valleys both on and off the plateau. It features a broad absorption feature suggestive of an absorption doublet from 2135 to 2200 nm. The increasing depth toward longer wavelength within this feature is typical of the shape of kaolinite spectra. 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. This phase appears to represent a discrete unit from the dickite and kaolinitic sandstone phases discussed above because they consistently are mapped in separate environments, however some confusion exists in endmember unmixed products.

Kaolinite/Halloysite Sand MTMF

Kaolinite/Muscovite Sand

Pixels belonging to this class are found in present day stream beds within basement exposures. The typical spectrum features high reflectance with a well defined absorption feature suggestive of muscovite. A component of kaolinite is possibly indicated by the width of the absorption feature. Muscovite-rich sands were observed within these areas on the Myra project. The kaolinite-muscovite bearing sands shown in are a very distinctive phase, being mapped almost exclusively to sand bars along the streams in the Myra Falls Inlier. This is consistent with field observations within the Myra project.

Kaolinite-Muscovite Sand MTMF

Kaolinite2 Sand

This endmember exhibits a broad but shallow absorption feature with a generally rounded shape, suggesting a mixture of low crystallinity clays. The width and wavelength range suggest a kaolinitic composition. Pixels with this spectral signature are found in the recent ferruginous sand cover (and possibly laterite) overlying what is interpreted as Nungbalgarri Volcanics on the plateau and some Cenozoic sand cover on the sandstone plateau.

Kaolinite2 Sand MTMF

Muscovite2 Sandstone

Muscovite2 is present as an endmember in only one flightline, CC3808. Pixels constituting the endmember are located in the Kombolgie Sandstone southwest of the Horn and along the eastern side of the Caramal Re-entrant on the Kukalak project. These spectra exhibit relatively high reflectance and a relatively broad, well-developed absorption feature from 2192 to 2209 nm similar to muscovite in basement rocks. It may be a variation of the long wavelength muscovite endmember.

Muscovite2 MTMF

Muscovite-Bearing Basement

This phase exhibits a well-defined absorption band from 2192 to 2209 nm interpreted as an AlOH absorption feature with weaker features at 2344 and 2425 nm (interpreted as secondary AlOH features). This is therefore interpreted as well crystalline muscovite schist endmember within Myra Falls Metamorphics basement rocks exposed in creek bottoms and on basement ridges within the basement exposures of the western half of the study area. This endmember is mapped virtually entirely to exposed bedrock within the basement areas, with no significant values on the sandstone. This phase is therefore easier to distinguish from mixtures than either the long wavelength muscovite or the illite.

Muscovite Basement MTMF

Mafic Rock 1and Mafic Rock 2

Pixels classified as Mafic Rock1 exhibit low reflectance and a lack of strong, diagnostic absorption features. Typical spectra show a flat to gently sloping profile from 2000 to 2200 nm with a significant drop in reflectance from 2200 to 2300 nm, followed by a relatively flat profile to longer wavelengths. This drop near 2300 nm is interpreted as broad, non-selective absorptions caused by Fe and Mg rich silicate rocks. This endmember may be indicative of either mafic metamorphic basement rocks or volcanic units and dolerites on the plateau. The most prominent signatures appear to correspond to exposures of the Nungbalgarri Volcanic Member (and probably also Oenpelli Dolerite) on the plateau and in streambeds across it. Also indicated are scattered exposures on the sandstone plateau, possibly either scattered erosional remnants of weathered volcanic rock or dark, ferruginous materials.

Mafic Rock1 MTMF

The Mafic Rock 2 endmember features general similarities to Mafic Rock 1, with a lack of diagnostic absorption features. Its low reflectance, weak hint of a broad absorption feature near 2325 nm, and the spatial distribution of the endmember pixels within zones underlain by either mafic volcanics or basement rocks suggest that it too is a mafic rock phase. Mafic Rock 2 endmember is also present along stream valleys through the mafic volcanics and intrusives but this endmember also shows weak values in the basement exposures. These may identify mafic varieties of the Myra Falls Metamorphics, Oenpelli Dolerite, or Zamu Dolerite within the basement. In reality, these endmember spectra display considerable variability and likely also map the different mafic units quite ambiguously. Both indicated endmembers are found in both basement and sandstone areas.

Mafic Rock2 MTMF

RGB and RGBI Images

Two geo-referenced, 3 band mosaics have been created for false colour composites of the study area. The HYMAP spectral Bands 73,79,87 figure shows the 2105 nm band as red, 2210 nm as green, and 2344 nm as blue. Phases with high reflectance in these ranges will look bright in the corresponding colour band whereas those with absorption features will appear dark. Therefore, vegetation will appear as green because of the local maximum near 2210 nm while clays will appear shades of red and magenta due to the presence of an absorption feature near 2210 nm. Bare rock and clay-poor soil will appear as bright tones due to relatively high reflectance in all bands. Some lithological differences can be seen in this image, with Gumarrirnbang Sandstone and Tin Camp Granite exhibiting a slight reddish colour (identifying lower reflectance in the green and blue bands or a steeper continuum slope) than the Mamadawerre Sandstone (whitish to grey colour).

Spectral Bands 73,79,87 as RGB

The image produces similar results to a colour infrared photograph (NIR as red, red as green, and green light as blue). This is very similar to the Landsat 4,3,1 or 4,3,2 as RGB combinations which were found to be very effective for lithological and land cover differentiation in the Arnhem Land region (Zaluski, 1998). In this combination, lush vegetation will appear bright red, drying and sparse vegetation as light red, sandstone outcrop as pale to medium blue, and Fe-rich materials and soils as green. In this combination, the distributions of the Nungbalgarri Volcanic Member and its overlying soils can be identified by the Fe-rich soils (green) surrounding vegetated areas (red) on the sandstone plateau. Oenpelli Dolerite underlain areas can be identified as darker green zones within the volcanic terrain. Sand cover on the plateau is indicated as the light brown to white patches.

Spectral Bands 20,10,3 as RGB

The distributions of long wavelength muscovite, dickite, and illite (in red, green, and blue respectively) are shown simultaneously in the Musc-Dick_Ill MTMF RGB figure. This rendition clearly shows the relationships between the distributions of the clays. In this image, relatively pure endmember clays are indicated by saturated primary colours of red, green, and blue respectively. Mixtures of two clays will be indicated by the mixing of these two primary colours, for instance, long wavelength muscovite plus dickite will be yellow, dickite plus illite will be cyan, and long wavelength muscovite plus illite will be magenta. Relatively high abundances of all three clays will be indicated by pastel to white tones. Although small areas exhibit mixtures of dickite with the K-bearing clays, in general, the relatively pure greens indicate that the dickite is generally present in different portions of the sandstone. The common abundance of magenta tones indicates that the illite and long wavelength muscovite are generally found together or are difficult to discriminate within the sandstone. The Tin Camp Granite located at the top of the Horn is characterized by muscovite (red) while the illitic basal Mamadawerre Sandstone is shown as blue.

Musc-Dick-Ill MTMF RGB

While this image portrays the clay distributions very well, it lacks topographic information, particularly off the plateau or in the areas underlain by volcanics. An effective way of showing these effects is by adding the topographic information of a single band image (in this case, band 73) as an intensity layer as shown in. The addition of the topographic information is very advantageous for showing the relationships between these clay endmembers and the lithologic units based on texture and weathering habit. One disadvantage of this technique is that the addition of the topographic information as an intensity variable makes the distinction of subtle mixture variations more difficult to recognize. Therefore, both types of images are necessary for a complete interpretation.

The Musc-Dick-Kaol MTMF RGB and Musc-Dick-Kaol MTMF RGBI images show the distributions of these three clays within the sandstone. The Gumarrirnbang Sandstone shows higher contents of clays than the Mamadawerre Sandstone. The former mainly consists of dickite and long wavelength muscovite while the latter exhibits generally low clay contents with a dominance of kaolinitic clays. It is presently unknown whether this is related to surface weathering or reflects matrix clay compositions. It is noteworthy that the strongest kaolinite signatures are found adjacent to the Oenpelli Dolerite intrusions, both along the Goomadeer River Valley at Kukalak and along the western side of the Caramal Inlier. A zone of muscovite and dickite is also present within the Mamadawerre Sandstone southeast of the Horn.

<u>HYMAP Conclusions</u>

The Kombolgie Sandstone within the study area includes both the upper and lower Kombolgie units (Ᵽhk$_1$ and Ᵽhk$_2$) on the Alligator Rivers mapsheet (BMR, 1983) or using the modern nomenclature, the Mamadawerre (Phe) and Gumarrirnbang (Ᵽhr) Sandstones as shown on the Milingimbi mapsheet (Carson *et al*., 1999). Between these units lies the Nungbalgarri Volcanic Member (Ᵽhn), widely distributed in subcrop on the plateau in Myra Kukalak (as interpreted by both BMR, 1983 and Carson *et al*., 1999) however, only very locally exposed due to the extensive ferruginous sand cover overlying it.

These stratigraphic subdivisions are also shown by the endmember abundance distributions from the HYMAP survey data. In general, the Gumarrirnbang Sandstone appears to contain more clay and less Fe-oxide than the Mamadawerre Sandstone, as was interpreted from Landsat by Zaluski (1998). Although intraformational variations in clay patterns appear to be less obvious than in the Birraduk and King River areas, some laterally continuous patterns do exist. It should be noted, however, that these distributions do not necessarily reflect bulk sandstone composition; they may have been significantly modified during diagenesis and/or alteration events because of the permeability properties of the units.

The very general clay and mineral patterns within a schematic section are shown in Myra Kukalak Schematic Cross-Section. The lowermost sandstone unit, exposed locally along the edges of the escarpment is dominantly illitic. This is overlain by a clay-poor sandstone unit, which gives a goethitic sandstone signature. This unit may possibly be similar to the goethitic, clay-poor upper sandstone unit observed at Birraduk. A kaolinitic clay signature is also present, however, this may be related to surface weathering. The poorly exposed Nungbalgarri Volcanic is typified by the mafic rock endmembers or where altered, the illite2/chlorite endmember. The Gumarrirnbang Sandstone appears to contain significantly higher clay contents than the lower unit. These include apparent mixtures of illite and muscovite as well as widespread dickite. Although some intermixing of these clay types is indicated, for the most part, these occur in separate units. While these are not strictly stratigraphically controlled, in general a zone of illite/muscovite underlies the dickitic sandstone.

These general patterns outline the most obvious aspects of the distributions but the individual clays may be present in many areas in low amounts. For example, although the dickite contents of the Mamadawerre Sandstone are generally very low, some dickite is present. This is known because of the existence of good dickite endmember spectra in virtually all of the flight lines, even those showing very low abundances in the MTMF unmixed images.

The distributions of the mafic volcanic and intrusive rocks are very limited because of their limited bedrock exposure. As shown in Mafic Rock Valley Outcrops, these rocks are well defined by the MTMF process where good outcrop exposures exist, such as along the Goomadeer River valley.

Oenpelli-Related Patterns

Despite the existence of Oenpelli Dolerite within the region, no pyrophyllite endmember was identified in any of the flight lines. In contrast, pyrophyllite was identified in the sandstone near the dolerite intrusions in both Birraduk (Zaluski, 2001b) and King River (Zaluski, 2001a). Oenpelli Related Clay Patterns shows the distributions of the long wavelength muscovite, dickite, and kaolinite (as red, green, and blue respectively) in relation to the Oenpelli Dolerite intrusions. The strongest clay signature proximal to the dolerite appears to be kaolinite, both along the Goomadeer River and along the western side of the Caramal Inlier. It is unknown whether the kaolinite is a hydrothermal alteration effect related to the dolerite, a later hydrothermal alteration effect, or whether it is a weathering product of precursor alteration phases.

The dolerite itself, although only poorly exposed, is not readily distinguished spectrally from the Nungbalgarri Volcanic Member, at least in the shortwave infrared wavelength region. However, the visual distinction that can be made from both VNIR bands of HYMAP data and Landsat suggests that these may be distinguished spectrally from the VNIR wavelength region.

On the basis of the known unconformity uranium deposits in the region, the alteration phases of interest would be muscovite (or illite) and chlorite. In addition, clay patterns associated with Athabasca Basin uranium mineralization often show abrupt changes in the dominant clay proportions. Therefore, the main features of interest would be chlorite and muscovite/illite signatures, especially those that are juxtaposed against dickite or kaolinite signatures within the same lithologic unit.

Potential areas of interest within the project bounds are shown in HYMAP Targets. This is not meant to be an exhaustive list, but rather, a recognition of some of the more obvious patterns. Several of these targets encompass or lie adjacent to known uranium occurrences (discussed below). Target 1 (shown over muscovite, dickite, illite RGB) is a zone of muscovite/illite alteration along the Ranger Fault that appears to crosscut a dickite background signature

TEMPEST

In 2002, Fugro Airborne Surveys Pty Ltd (Fugro) undertook orientation TEMPEST airborne electromagnetic surveys over the Dog Leg, Devil's Elbow and Ferricrete prospects. This is a high-powered time-domain system with a broad bandwidth, which enables good resolution of variations in resistivity and penetration through relatively thick sandstone. In addition, the airborne platform allows electromagnetic data to be acquired over areas where ground geophysics is impractical due to rugged topography. The survey was flown with the aim of providing 3-D electromagnetic data to identify structure/alteration and in particular, infer the depth to the unconformity below sandstone.

The survey line spacing was 200 m and flying height was 120 m, totalling 193 line kms. EMFlow is often used by Fugro to produce various 3-D renditions, however, this processing has not been applied due to the limited coverage.

Logistics Report for TEMPEST

Example Z-component CDIs (every 6th line) with Geology

The TEMPEST system has been used in Arnhem Land over the past two years. From this experience several conclusions can be made:

- A weakly conductive semi-horizontal feature is consistently identified from line to line below the sandstone. This feature has been named the "conductive unconformity" since its position is defined by a resistivity contrast caused by alteration surrounding the unconformity and may not in fact be the location of the true unconformity.
- Generally the TEMPEST conductive unconformity is within +/- 30 m of the true unconformity. However, the presence of Oenpelli Dolerite and cover may complicate the response since both of these units may actually be conductive or resistive.
- At this stage the increased conductivity at the unconformity cannot be related to a specific type of alteration observed from drilling (i.e. clay or hematite). Instead, we can merely assume that it is due to physical property changes at the unconformity, which could for instance be due to alteration or paleo-regolith.
- It is important when interpreting the TEMPEST data to:
  - Observe the x and z component data since these couple differently (z component is generally best for horizontal features),
  - Apply linear and log colour schemes due to the large and variable range in conductivities, and
  - Confirm the consistency of features from line to line to avoid errors introduced by the inversion.

Unconformity Elevation and Structure

The Kukalak project is dominated by the Kombolgie Subgroup. Mamadawerre Sandstone is the oldest formation of the Kombolgie Subgroup and is unconformably overlain by the Nungbalgarri Volcanic Member, which in turn is unconformably overlain by the Gumarrirnbang Sandstone. Cameco's physical property measurements indicate that the Nungbalgarri Volcanic Member has a low resistivity of 312 ohmm (although there are some zones that are highly resistive), which contrasts with the highly resistive Kombolgie Subgroup sandstone (exceeds 15000 ohmm).

TEMPEST CDIs over the Gumarrirnbang Sandstone show a relative weak to moderately conductive layer (> 10 mS/m) at shallow depths, which is interpreted to be then Nungbalgarri Volcanic Member. A second (deeper) layer is not present, therefore it is apparent that the TEMPEST is unable to image the conductive unconformity when the Nungbalgarri Volcanic Member is present. CDIs over the Mamadawerre Sandstone shows the conductive unconformity depth varies from near-surface up to 250 m.

A primary aim of the TEMPEST is to indicate major structures that dissect the Kombolgie Subgroup. There are no offsets associated with the three prospects within the survey area: Dog Leg, Devil's Elbow and Ferricrete. In addition, there is no offsets indicated across the Ranger Fault or China Fault. Nevertheless, an offset is indicated 1.3 km east of the Dog Leg prospect by a 150 m change in the conductive unconformity depth over a distance of 170 m. This interpreted structure trends northerly and coincides with a strong magnetic response relating to Oenpelli Dolerite. There is no radiometric anomaly associated with this structure and the structure's extent is unknown since it is consistent on all of the east west test lines.

The CDI for the most northerly line of the Dog Leg survey shows a localised dome-like, which could represent a structural target. The dome-like conductive unconformity is 350 m wide and 75 m high. It is situated within 200 m of the China Fault, which is associated with a magnetic dyke.

The TEMPEST orientations surveys has been relatively successful at identifying structures and imaging the conductive unconformity. Consideration should be given to:

- Increasing the coverage over the remaining project area and
- Further evaluation of the two structural targets, which have been identified.

Dog Leg Area – Geophysics Compilation with Targets

Magnetics and Radiometrics

During 2001, a detailed airborne magnetic and radiometric survey was undertaken by UTS Geophysics Pty Ltd (UTS). The survey was flown at 50 m line spacing and 30 m flying height, totalled 548 line kilometres. The survey was designed to cover the areas around the Dog Leg, Devil's Elbow and Ferricrete anomalies and was aimed at further delineating the geophysical response. \

The detailed airborne magnetics has allowed more accurate identification of the Oenpelli Dolerite, Nungbalgarri Volcanics and some lineaments/structures. However, no new insights have been gained which could impact on further targeting and prospect analysis. The detailed radiometrics has successfully identified the previous radiometric anomalies including Ferricrete and Devil's Elbow. This data has been utilized to guide the evaluation and sampling programs conducted during 2002.

Airborne Geophysics Logistics Report by UTS

Devil's Elbow Airborne Magnetics – Reduced to Pole (RTP) with 1st Vertical Derivative (1VD)
Devil's Elbow Airborne Radiometrics – Total Counts (TC)
Devil's Elbow Airborne Radiometrics – Potassium (K)
Devil's Elbow Airborne Radiometrics – Uranium (U)
Devil's Elbow Airborne Radiometrics – Thorium (Th)
Devil's Elbow Airborne Radiometrics – RGB=U,Th,K
Devil's Elbow Airborne DTM – Height with NE Sun Angle

Devil's Elbow Airborne Geophysics Compilation

Dog Leg Airborne Magnetics – Reduced to Pole (RTP) with 1st Vertical Derivative (1VD)
Dog Leg Airborne Radiometrics – Total Counts (TC)
Dog Leg Airborne Radiometrics – Potassium (K)
Dog Leg Airborne Radiometrics – Uranium (U)
Dog Leg Airborne Radiometrics – Thorium (Th)
Dog Leg Airborne Radiometrics – RGB=U,Th,K
Dog Leg Airborne DTM – Height with NE Sun Angle

Dog Leg Elbow Airborne Geophysics Compilation

CONCLUSIONS

The work completed by Cameco prior to grant and during the initial year of exploration has confirmed interest in areas of previous work on the Kukalak tenement. A good regional understanding of the sandstone and basement stratigraphy and structural geology is currently being formulated. The potential for discovering unconformity uranium mineralisation is relatively good considering the early stage of Cameco's exploration effort in this area.

Areas and prospects discovered by previous workers remain poorly tested at the Ranger Fault - Ferricrete area, Devil's Elbow and in the area of the Dog Leg anomaly. The Goomadeer Thrust fault on the whole is more than likely a red herring as far as uranium mineralisation potential as all uranium anomalism to date is associated with flexures in the overall fault system to a more north-south orientation from a predominantly northwesterly trend (e.g. Dog Leg and Devil's Elbow). The Goomadeer fault zone is filled with post-Kombolgie Oenpelli dolerite intruded along this zone of weakness with only localised, low-level, elevated radioactivity along the majority of this contact.

RECOMMENDATIONS

Further work on EL 23461 should include diamond drill testing the Ranger Fault area from the sandstone plateau adjacent to the Ranger Fault to test for the existence of the fault zone and the potential mineralisation along the fault that may be responsible for the Ferricrete anomaly within the lineament valley. Additional sampling and investigations should be completed in the north western tenement area proximal to the Caramel East Inlier to the north of Dog Leg where the sandstone is quite anomalous and several intersecting structures are postulated. Drill testing of this area should also occur, as the area is previously untested due to its ruggedness, which necessitates a helicopter-assisted drill program.

WORK PROGRAM FOR 2003 - 2004 (2nd YEAR)

Work planned for the dry season of 2003 for the Kukalak tenement will include some additional follow-up investigations and sampling in a potentially wide variety of locations throughout EL 23462, including areas previously not visited by Cameco. Three to four helicopter-assisted diamond drill holes are planned for the Ranger Fault area (2 holes) and north of Dog Leg area (1 to 2 holes) to test concepts and follow-up these two anomalous areas.

The Kukalak program represents approximately half of the proposed budget for the Myra Kukalak project. It is anticipated that expenditures on EL 23462 for the next reporting period will be $250,000 to complete the proposed exploration work.

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