Cameco Australia Pty Ltd

ARNHEM LAND WEST JV

EXPLORATION LICENCE EL5891
KING RIVER PROJECT
NORTHERN TERRITORY

ANNUAL REPORT 2001 FIELD SEASON

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SUMMARY

This report describes exploration work undertaken within Exploration Licence 5891 (EL5891) during the sixth year of tenure ending 12 May 2002. The licence area is located in north western Arnhem Land and was granted in May 1996.

The exploration program was managed by Cameco Australia Pty Ltd on behalf of the Warrga Joint Venture partners, Cameco Australia Pty Ltd, PNC Exploration (Australia) Pty Ltd and the Warrga Aboriginal Corporation.

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

The current years exploration program concentrated principally on further core drilling of the Aurari North mineralised zone. The drilling was directed at evaluating the ground to the east of the discovery holes where thick intervals of low grade uranium mineralisation were intersected in 2000. Airborne and ground geophysical surveys were focused on the Aurari North prospect environs and consisted of an airborne electromagnetic survey (TEMPEST), a detailed airborne magnetics, radiometric and DTM (Digital Terrain Model) survey and a ground-based gravity survey. Structural mapping along the western edge of the sandstone outliers, which borders the Aurari Fault Zone, was commenced.

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INTRODUCTION

This report describes program activities carried out during the 2001 field season on behalf of the Warrga Joint Venture, a joint venture between Cameco Australia Pty Ltd (Cameco), PNC Exploration (Australia) Pty Ltd (PNC) and the Warrga Aboriginal Corporation. EL5891 forms part of the King River Project which was included within the Cameco / PNC joint venture agreement termed the 'Arnhem Land West Joint Venture' (AWJV). Exploration on this licence is presently being conducted simultaneously with that on the adjoining King River tenements, EL734 and EL5890. Since the Exploration Licences are located on Aboriginal Land the exploration program was carried out under the terms of consent documentation as agreed with the Northern Land Council pursuant to the Aboriginal Land Rights (Northern Territory) Act and dated 1 March 1996.

Commencing 2002, PNC Australia Pty Ltd has no further interest in the exploration tenements that once constituted the Arnhem Land West Joint Venture. Cameco Australia Pty Ltd has assumed full control by purchasing all interests once held by PNC.

Clearance for the program was given by the Northern Land Council following the Exploration Committee Meeting held on April 23 at Warruwi (South Goulburn Island).

Fieldwork commenced after re-establishment of the base camp in early July. With the completion of core drilling the camp was demobilised on October 10.

Diamond core drilling constituted the major portion of the work program. Geophysical surveys, including fixed wing magnetics-radiometrics, TEMPEST (EM) and ground gravity were concentrated along the Aurari Fault Zone, specifically over the area of interest at Aurari North. Structural mapping along the western edge of the adjacent sandstone outliers was initiated to determine the effects of faulting and dolerite intrusion and to pinpoint possible targets for future drilling.

Location and Access

The tenement is located in western Arnhem Land to the north-east of the Aboriginal settlement of Gunbalanya and is wholly within Aboriginal Land. The settlement of Warruwi on South Goulburn Island lies offshore to the north of the tenement. The Ranger uranium mine is situated approximately 100km to the south-west and the rehabilitated Nabarlek site is within tenements immediately south of the project area. Access from Darwin is via the Arnhem Highway to Jabiru then north to Gunbalanya. The Gurig National Park road traverses the western edge of the licence area. Two pre-existing tracks, the Waminari and King River roads provide good access to the more remote sections.

Off-road access is variable. The country ranges from flat lying woodland, river estuary, coastal mangroves and swamps to heavily dissected sandstone plateau. Where flat lying, the country is easily traversed by four-wheel drive vehicle.

Location Plan

Tenure

EL5891 was granted on 13 May 1996 for an initial period of six years. On granting, the total area under licence was 957.5 square kilometres of which 234 square kilometres (15%) was excluded from exploration by the Northern Land Council. The current total area is 355 square kilometres.

Under the Mining Act a reduction in area is required on each anniversary commencing 13th May 1998 unless a waiver is obtained from the Department of Mines and Energy. A partial waiver for 2001 / 2002 (Year 6) was granted by the NTDME where an insufficient number of blocks was relinquished to meet the statutory requirement. The number of blocks was reduced from 125 to 106 for Year 6.

Physiography

The tenement contains some remnant areas of dissected sandstone plateau, which form the eastern extension of the Wellington Range. The remainder consists predominantly of gently undulating plains covered by savannah woodland. The northern boundary is coastline with tidal flats, mangroves and sandy beaches divided by low discontinuous Cretaceous cliffs. Thin remnants of lateritised Cretaceous sediments form tablelands in the north-eastern and eastern parts of the tenement. The main drainage systems are King River and Marligur, Angarlban and Angularli creeks.

Tenement Geology

Paleoproterozoic rocks, which have been intersected in drill holes along the Aurari Fault zone, have been equated with the Myra Falls Metamorphics (MFM). The MFM are considered to be the higher metamorphic grade equivalents of the Cahill Formation (the host rocks to the Alligator Rivers uranium deposits) and consist broadly of quartzofeldspathic±garnet gneiss, quartz-mica-amphibole-garnet schist and amphibolite. No carbonates have as yet been identified but possible calc-silicate lithotypes are present as amphibole-rich schists and ?para-amphibolite.

The Myra Falls Metamorphics abut the granulite facies Nimbuwah Complex, which consist of gneiss and migmatite and various granitic intrusives. The most recent age determinations place the Nimbuwah within 1870-1850 Ma. The ‘complex’ has an I-type granite origin and is considered to be, in part, intrusive into the paleoproterozoic metasediments (Carson and others 1999). An anomalously magnetic unit marks the inferred contact with the MFM. It is a finely banded, fine grained quartz feldspar rock containing magnetite and almandine garnet and may be a transitional (contact) phase between the MFM and the Nimbuwah Complex. There appears to be a rapid regional progression of metamorphic grade increasing from west to east. Outcrop tends to be slightly more extensive in comparison to the MFM. Good exposures of both gneissic rocks and the intrusive granitic variants occur throughout.

The basement rocks are overlain by the Kombolgie Subgroup (formerly Kombolgie Formation), which form the base of the early Proterozoic Katherine River Group. The Mamadawerre Sandstone, the fluviatile basal unit of the Kombolgie, outcrops as the characteristic escarpment country of the Arnhem Land plateau. The sandstone outcrops as a series of east-west aligned

outliers throughout the central parts of the tenement, which form heavily dissected low relief plateaus. In the vicinity of the Aurari Fault zone, the Kombolgie has been intersected to depths of several hundred metres. The age of the Mamadawerre has been constrained between 1822 and 1720 Ma and is probably closer to 1800 Ma (Sweet and others 1999).

Remnants of the Cretaceous outcrop in various parts of the tenement usually along the erosional fringes of lateritised tablelands. The Aurari Fault marks the approximate eastern limit of a localized north-south trending basinal structure which has been infilled with up to 120 metres of Cretaceous sandstone, siltstone and mudstone of the Marligur and Wangarlu mudstone members (Needham 1988). Marine fossils and some carbonaceous plant material has been noted in drill core. Outcrops of more resistant siltstone and sandstone are present several kilometres to the west and in cliff outcrops along the coastline. The Cretaceous overlies both the MFM and Nimbuwah Complex rocks.

The Oenpelli dolerite is present throughout the tenement as an extensive network of mostly east-west trending intrusions. There is an apparent relationship between the dolerite orientation and the sandstone outcrop pattern. Drill hole intersections of dolerite show that they have exerted little effect on the intruded rocks apart from localized silicification and some chloritisation of the sandstone. Contacts tend to be sharp where preserved and have variable orientations. Chilled margins are generally only centimetres wide with much of the remaining dolerite having a homogeneous grain size. Several intersections, considered to approximate true width, show thicknesses ranging up to 250 metres.

Regional Geology and Major Structures Plan

Structure and Geological History

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

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

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

The King River region occupies the north-western extension of the Arnhem Shelf in the northern McArthur Basin. Deposition of the Mamadawerre Sandstone took place in an

environment of extension and local basin formation with probable fault-controlled sedimentation. Rapid thickening and thinning of the sequence imply this.

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

Exploration Target

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

Previous Exploration

Union Carbide Exploration Corporation

During the period 1970-1972 Union Carbide Exploration Corporation undertook substantial exploration, principally for uranium. This work comprised airborne magnetics and radiometrics with follow-up geochemical surveys and geological mapping. Core and deep auger drilling was undertaken at the Black Rock prospect, which included Schist and Laterite anomalies. Significant, but subeconomic uranium mineralisation was intersected in schistose quartz-feldspar gneiss at Schist anomaly. Minor uranium mineralisation in saprolitic gneiss was located by auger drilling at the nearby Laterite Anomaly. Several other radiometric anomalies were investigated.

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

Previous Joint Venture Exploration

1996 Field Season

Grant of title was given in May 1996. Initial reconnaissance work included regional and prospect scale outcrop mapping, orientation soil geochemistry over the Schist-Laterite prospects, lithogeochemical sandstone outcrop sampling and regional drainage BLEG in conjunction with diamond indicator sampling (Mackie, 1997). Airesearch Mapping carried out aerial photography. A regional fixed wing airborne survey at 200 metre line spacing was conducted and included magnetics, spectrometrics and VLF. In addition, a helicopter DIGHEM survey at 150 metre line spacing covered the Kombolgie sandstone. Both were carried out by Geoterrex (now Fugro Airborne Systems). A consultant was used to conduct the regional stream sampling program.

1997 Field Season

The 1997 program consisted of airborne anomaly follow up, further geochemistry (soil, rock, stream and BLEG), lithogeochemical sandstone sampling, geological mapping and systematic RAB drilling. A limited program of shallow diamond drilling was carried out at Marligur Pass with one traverse across the Aurari Fault Zone (immediately west of Schist anomaly) and one adjacent to sandstone anomaly MP2. In addition, two shallow holes were collared at the Schist and 46N anomalies to obtain sections of altered and mineralized core. (Melville and others 1998).

1998 Field Season

The 1998 program consisted of ongoing geological mapping and interpretation, regional RAB, BLEG and regional stream sediment sampling, evaluation of selected airborne anomalies by auger sampling and/or RAB drilling and further core drilling along the Aurari Fault Zone. Associated work included lithogeochemical sandstone sampling, petrophysics, and PIMA infrared spectrometry. (Williams et. al., 1999).

1999 Field Season

The principle activity was the continuing assessment of the Aurari Fault Zone by diamond drilling and ground magnetics. Universal Tracking Systems Pty Ltd (UTS) of Perth flew heliborne EM over an area coincident with the southward extension of the Aurari Fault Zone, where probable Lower Cahill equivalents exist.

2000 Field Season

Diamond drilling continued along the Aurari Fault Zone. A total of 9 holes was drilled. Geophysical activities included a low level, close spaced airborne magnetic-radiometric survey over the southern and central portions of the Aurari Fault Zone, and some orientation ground-based Gravity across the Aurari fault. Further sandstone outcrop sampling took place along the Wellington Range outliers to supplement earlier programs.

PROGRAM ACTIVITIES

The principal field activity comprised on-going core drilling of the Aurari North mineralised zone. In addition, fixed wing airborne magnetics-radiometrics and ground gravity was concentrated over the northern sections of the Aurari Fault Zone. Other activities included field checking of several reinterpreted airborne radiometric anomalies and finalisation of the Kombolgie Sandstone sampling program.

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

Diamond Drilling

Core drilling was undertaken during the period 17 August to 7 October with the completion of four drill holes totalling 1418.5 m. This figure comprised 1214.5 m of coring and 204 m of roller bit precollaring. The program was originally budgeted for three holes totalling approximately 1000 m of coring and 150 m of precollar, however a decision was made late in the program to drill a fourth hole.

Drilling was carried out by Century Drilling of Batchelor, Northern Territory using a truck mounted UDR 650 rig and support vehicles. The program was conducted on a double shift basis with an average drilling rate of approximately 15 metres per shift. On the last hole this figure improved to 20 metres per shift. The averaged all-up cost was $151.3 per metre, which included mob/demob, consumables, Eastman camera hire etc. This figure compares favourably with that of Wallis Drilling in 2000.

Drill Tabulation

Hole_No	Amg_E	Amg_N	Bearing	Inclination	Pre-Colar Depth (m)	Core Depth (m)	Total Depth (m)
KRD0668	304330	8693595	0	-90	**42**	**351.2**	**393.2**
KRD0669	304455	8693280	0	-90	**48**	**304.5**	**352.5**
KRD0670	304215	8693745	0	-90	**48**	**234.8**	**282.8**
KRD0671	304298	8693749	0	-90	**66**	**324**	**390**
Total					**204**	**1214.5**	**1418.5**

All holes were drilled vertically in an attempt to alleviate the effects of caving in the Cretaceous sands. At the current stage of the program where the work was concentrating on defining the dimensions of the mineralisation, it wasn't considered critical to have orientation data. Angle holes, possibly utilising triple tube drilling, are being considered for 2002.

Hole locations were originally positioned using a Trimble DGPS (Differential Global Positioning System). At the completion of the program, drill hole collar positions were re-established with the DGPS. A plaque detailing hole number and co-ordinates was set in cement at each collar.

Radiometric Logging

Natural radiation was logged down-hole by Cameco personnel using an Auslog digital down-hole logging unit. Ground conditions in most of the holes precluded open hole logging, therefore all were logged in rods.

Down-hole gamma data was converted to equivalent U_3O_8 % using the proprietary program Gamma (December, 1989) with calibration factors calculated using government test pits (to 0.92% eU_3O_8). The results have therefore been corrected for dead time, rod thickness and internal fluid content.

A graph illustrating the comparison of down hole gamma values versus chemical assay data for KRD0666 (drilled in 2000) exhibits reasonable correlation. The assay sampling was conducted over 0.5 metre intervals continuously through the main mineralised intersection.

Core Logging & Sampling Methodology

The drill core was geologically logged using Cameco's in-house UNILOG database system. The systematic logging measures lithological, structural and alteration features. Results are displayed graphically using the GDM for Windows software program. A series of strip plots are used to display all features logged and measured. The explanatory notes for GDM plots describe features represented by colours in the strip plots. The Codes for Unilog appendix lists the codes and parameters that were used during the logging process and the Unilog Drill Core Data appendix contains the entire drill hole logs.

Analytical Methods
Codes for Unilog
Unilog Drill Core Data

Routine sampling was completed in every row of core. A representative 5 cm sample was collected and halved using a core saw. One half was described (grain-size, Munsell colour, magnetic susceptibility), and density measurements were taken. The same sample was measured for spectral parameters using the PIMA II infrared spectrometer. Interpretation of the spectra was achieved utilising TSG with occasional reference to the PimaView system for comparative purposes. These samples are retained within the Cameco storage facility at the Darwin warehouse. The other half of the representative sample was used for lithogeochemical analysis. The samples were combined to form 5 metre composites for sandstone and basement, and 10 metre composites for dolerite.

TSA PIMA Majors for Diamond Drilling
TSA PIMA Exotics for Diamond Drilling
TSA PIMA for RAB Drilling
TSA PIMA for Outcrop

Analytical

Analyses were carried out by Northern Territory Environmental Laboratories (NTEL) of Darwin (formerly Chemnorth). The principal analytical procedures included G400 (ppm), G950 'WAL' or Weak Acid Leach (ppb), and Fire Assay (ppb). Elements analysed for by the G400 and G950 methods (ICPOES and ICPMS) are Ag, Al, As, Ba, Be, Bi, Ca, Ce, Co, Cu, Dy, Er, Eu, Fe, Gd, Ho, K, La, Li, Lu, Mg, Mn, Mo Na, Nb, Nd, Ni, P, Pb (Total and isotopes 204, 206, 207 and 208), Pr, Rb, S, Se, Sm, Sn, Sr, Ta, Tb, Th, Ti, Tm, U total (G400), U labile (G950), V, W, Y, Zn and Zr. In the case of Al, Ca, Fe, K, Mg, Mn, Na, P and Ti, the oxide is reported for the G400 series. Au, Pt and Pd are analysed by Fire Assay and B by G140 / ICPOES. Loss On Ignition (LOI) is determined by Gravity techniques with results in percent (%).

G400 Geochemistry for Diamond Drilling
G950 Geochemistry for Diamond Drilling
Fire Assay Geochemistry for Diamond Drilling

G400 Geochemistry for Outcrop
G950 Geochemistry for Outcrop
Fire Assay Geochemistry for Outcrop
G400 Geochemistry for RAB Drilling
G950 Geochemistry for RAB Drilling
Fire Assay Geochemistry for RAB Drilling

Drilling Targets

The current years program was designed to locate and prove-up extensions to the Aurari North mineralisation, which was discovered during the systematic drilling of the Aurari Fault Zone in 2000. During that program, significant mineralised intercepts were made in two holes approximately 300 m apart, KRD0664 and KRD0666, both of which straddle the hanging wall (east side) of the Aurari Fault Zone. The mineralisation was contained within a package of structurally disrupted sericite-chlorite altered gneiss, schist and amphibolite.

Positioning of holes for the 2001 program was based on the premise that the mineralisation was confined to a narrow zone of structural damage paralleling the strike of the Aurari Fault. This dimension was implied from the position and results of the second hole, which intersected the same zone of mineralisation. The initial indications were that the damage zone was constrained westwards by the Aurari Fault and vertically by the base of the main overlying Oenpelli dolerite intrusion. This left two obvious possibilities remaining for extensions: along strike (north and south) and eastwards beneath the dolerite. Given the interpreted dip of the dolerite, any eastward extension of the mineralised body would become progressively deeper.

Two of the three originally planned holes were sited to prove up lateral extensions to the thick mineralised intercepts located in KRD0664 and KRD0666 (KRD0668 and KRD0669 respectively). The third would check the ground north of KRD0664 for any continuation of mineralisation parallel to the Aurari Fault zone. Only one hole, KRD0668 intersected mineralisation, the others encountered thick intersections and multiple intrusions of dolerite with only minimal basement. The presence of major structures was a feature of the latter holes.

A longitudinal section utilising the data from all relevant drilling was constructed using the plane of the Aurari Fault zone as a reference. It would hopefully aid in determining the best placement of the fourth hole, KRD0767. The section illustrated what had been previously deduced, that is, that the mineralisation was restricted to a ‘wedge’ of altered basement rocks, which thinned eastwards. This wedge is constrained both vertically and apparently eastwards by intrusions of dolerite (perhaps of different ages) and to the west by the Aurari Fault.

The combined results of the holes drilled to date ie. the location of mineralised intersections, distribution of dolerite intrusions, main structures and so on, suggested an alternative trend which appeared to cross-cut the Aurari Fault, rather than one which paralleled it as originally considered. The trend could be restricted to a particular lithological horizon(s) and/or be confined by parallel structures to the north and south. Major faults and gouge zones have been intersected in several holes suggesting severe disruption and structural complexity in the area.

KRD0767 was sited and collared approximately 155 m and 474 m north of KRD0668 and KRD0666 respectively. It was planned to intersect projections of the mineralisation in both a

north and north-easterly direction from the previously drilled traverses. The presence of weak mineralised structures in KRD0667, located a further 180 m to the north-north-east of 767, represent the current known extremity of the Aurari North mineralisation.
Within KRD0767, a series of weak low grade mineralised structures and anomalous peaks were located in a reduced thickness of basement gneiss and schist. As in previously drilled holes, the basement has been constrained above and below by dolerite intrusions. From a technical viewpoint, encouraging factors include confirmation of the continuance of suitable host rocks, the presence of mineralised structures and alteration features such as hematite, chlorite and sericite.

Mineralisation

Within KRD0668 the principal zone of anomalism and mineralisation is concentrated in the basement between depths of 245 and 315 m. The host rocks includes quartz-feldspar-biotite gneiss with interlayered schistose intervals and localised sections of fine grained more mafic biotitic or amphibolitic gneiss. Dark coloured rounded chloritic 'clots' observed in the more schistose sections probably represent completely altered garnet porphyroblasts (see Pontifex petrographic report). Pervasive widespread chloritic and yellow-green, apple green and brownish sericitic alteration is present. Silicification in the form of veining, rehealing of breccia zones and as pervasive replacement of the gneiss is also present throughout. The rock is intensely fractured with some extensive zones of brecciation. The latter occur either as gouge zones with clay and chlorite or as competent strongly silicified and rehealed intervals. It is worth noting that graphite was identified on an anomalous fracture surface at 304.85m.

Mineralisation is present in various structural settings: within intervals of brecciation and fracturing that have a sub to near vertical dip, within discrete intervals of 'micro breccia' composed of dark chlorite, minor hematite and veinlet networks (?replacement along schistosity) and in strongly silicified zones consisting of breccias, quartz and pink feldspathic veining (probably adularia as described petrographically elsewhere). There are sections of high radiometric background (200 to 400 cps SPP2) present in the host rock, which don't appear to be related to structure.

Between 256 and 265 m a radiometric 'barren gap' is represented by brecciation and shearing with associated gouge and decomposed intervals. This gap separates comparatively higher grade structures adjacent to the dolerite contact from the deeper interval of generally lower grade peaks. A similar structural zone present in KRD0664 (Annual Report 2000) separates 'high' and 'low' grade intersections.

Grades of significance derived from the down-hole gamma log vary from 0.2 to 0.58 % eU_3O_8. Using a 0.1% cut-off there is 11.85 m at 0.139% eU_3O_8 and at 0.2% cut-off, 3.25 m at 0.23% U_3O_8. The small 'window' of gneiss sandwiched between the upper two intrusions is weakly mineralised with grades reaching approximately 0.08% eU_3O_8.

Best intersections are as follows: 249.3 m to 251.25m, 1.95 m at 0.2176% eU_3O_8, 253.7 m to 255.9 m, 2.2 m @ 0.2339% eU_3O_8 and 285.47 m to 287.92m, 2.45 m @ 0.0976% eU_3O_8.

KRD0767 contained more localised and lower grade mineralisation within the basement host. The zone incorporates discontinuous anomalous structures with values ranging between 150

ppm and 1409 ppm eU_3O_8. Best intersection using 0.05 and 0.1% eU_3O_8 cut-offs gave 3.25 m at 0.0964% (300.1 to 303.35m) and 1.6 m at 0.1252% (300.6 to 302.2 m) respectively.

These intersections are contained within a zone of pervasively hematised gneiss, described petrographically as ranging from an impure meta-psammite (meta-sandstone) to meta-pelite. Alteration features associated with the mineralisation include ubiquitous chlorite, yellow foliation-controlled sericite, hematisation and silicification. The latter is of weak to moderate intensity and is generally of a more pervasive nature, rather than occurring as zones of concentrated veining and rehealed breccias as observed in other holes. The presence of hematisation (red and brick red) is notable, occurring as disseminations, fracture coatings and in the abovementioned, mineralised interval as strong pervasive alteration. The lack of hematitic alteration associated with the Aurari North mineralisation had previously been commented upon.

Pontifex Thin Section Report

Sandstone Traverse Sampling

The sampling program was designed to complete the previous years' regional work, which was aimed at infilling areas not previously covered by PNC. Due to time constraints in 2000, the sampling was not completed. In 2001 the southernmost sandstone outlier was traversed and 14 samples were collected to complete the coverage. This now gives a regional sample density of approximately ten samples per 1 km^2 over the sandstone outliers. These samples were carefully selected to represent regional background signatures for lithological, spectral and geochemical parameters. Geomorphological, geological and radiometric observations were recorded and a digital photograph was taken at each site. Lithological textures, alteration colours (Munsell), grain-size variations and petrophysical parameters (magnetic susceptibility) were routinely recorded.

Outcrop Sample Location Plan
G400 Geochemistry for Outcrop
G950 Geochemistry for Outcrop
Fire Assay Geochemistry for Outcrop

All samples were sent to NTEL in Darwin and Pine Creek for multi-element analysis. Four separate analytical methods were used to analyse for approximately 50 elements.

Airborne Anomaly Follow Up

A review of histotical airborne data utilising more up-to-date analysis methods yielded six anomalies worthy of ground checking.

All ground radiometric readings were taken using an URTEC UG130 scintillometer.

ANG12 [318866 E 8693279 N]

This anomaly is a U/Th anomaly, classification four, and is located approximately one kilometre south-east of ANG9, an airborne potassium radiometric anomaly originally discovered by Union Carbide in the early 1970s. ANG9 corresponds to a prominent north-north-west trending ridge, which consists of coarse grained quartzofeldspathic gneiss. The gneiss has been brecciated and subsequently quartz-veined and silicified over a distance of approximately 800 m.
Traversing of ANG12 located an area of dense ferricrete with a radiometric background of 30 to 40 cps. Total count radiometrics adjacent to the ferricrete peaked at 106 cps. No outcrop was observed but it is suspected that the ferricrete is a surface expression of dolerite. No samples was taken.

MP3-0101 [336960 E 8684870 N]

Located on the western fringe of the Aurari Fault Zone and adjacent to the MP3 sandstone-hosted airborne radiometric anomaly.

This anomaly has a U >Th>>K signature. The RGB U-Th-K image is displayed as a bright orange area 200 m long and trending east-west. Magnetics indicate a dolerite intrusion along or within the nearby Aurari Fault Zone.

Ground checking located an area of weak but radiometrically elevated brown to red sandy loam averaging 70 to 80 cps decreasing to a background of 40 to 60 cps. Some pisoliths were noted but no ferricrete outcrop was observed. Immediately to the east of the anomaly a notable change occurs in the regolith with white sand becoming the dominant surficial material and having a background of 40 to 50 cps.

MP3-0201 [307680 E 8684270 N]

A U/Th anomaly with negligible K. General location as above. The RGB image illustrates the anomaly as an off-orange colour. Anomalies of a similar image spectra previously investigated were found to be due to pisolith and/or ferricrete abundance. Magnetic imaging indicated a dolerite in the vicinity although no outcrop was observed.

Inspection of the site located pisolith accumulations with slightly elevated radiometrics ranging from 85 to 106 cps. Background radiometrics away from the anomaly were 75 cps.

The proximity of this location to the MP3 sandstone illite/uranium anomaly, and it's position relative to the Aurari Fault Zone increases the importance of the area.

MP3-0301 [307840 E 8683870 N]

A U/Th anomaly with minor K. General location as above. RGB imaging exhibits an off-orange colour. Magnetic imaging does not indicate the presence of dolerite in the immediate vicinity, although the vegetation pattern on the TM image indicates possible dolerite approximately 200 m to the east.

Inspection of the site failed to locate any outcrop. The site was covered by scattered pisoliths with localised accumulations having a maximum of 85 cps. Background was 70 cps.

MP3-0401 [309940 E 8683860 N]

The anomaly location comprises Kombolgie sandstone lying unconformably on clay and hematite-altered feldspar-quartz-biotite gneiss. The sandstone contains a distinct but narrow cross-bedded unit, some pebble beds and exhibits a honeycomb weathering pattern possibly indicating desilicification. There is associated fine quartz veining with a surrounding silicification zone forming what have been previously termed 'sandstone veins'. Immediately above the basement contact is a highly bleached siliceous interval with ~ 5% or less white clay matrix.

Several metres stratigraphically above the unconformity is a fine grained, sandy, red brown micaceous hematitic layer containing heavy mineral bands. A maximum total count of 940 cps was recorded on this outcrop. Analysis of one sample collected (KR01C10282) showed 32ppm total U, 24ppm Pb and 11ppb Au. Lead isotope analysis indicates that much of the lead content is of radiogenic origin. Fine silica veining traverses this layer.

Total counts of around 280 cps were common within the bleached sandstone units, with local maxima of ~ 400 cps. The basement gneiss was noted to have a high total count of 250 - 300 cps.

MP3-0501 [311010 E 8684070 N]

This area has been interpreted as thin Kombolgie Sandstone unconformably overlying basement migmatitic gneisses under a shallow alluvial sand cover. The uranium anomaly, noted from the airborne radiometric data, is of limited extent and defines a part-circular arc trending north-south. This was considered to be a change of slope feature probably due to pisolith and/or ferricrete scree being uncovered on the slope.

No notable radiometrics or outcrops were located during reconnaissance. The area is largely a change in sand type with white quartz sand (max 60 cps) merging into pink sandy loams (max 75 cps). This might indicate a basement high beneath the sand cover. Fresh material added to large anthills gave the highest reading of 100 cps.

Structural Mapping

A reconnaissance structural mapping program was conducted over the Kombolgie Sandstone outliers adjacent to the Aurari Fault Zone. The mapping was undertaken by Cameco Corporation personnel, D. Thomas and G. Zaluski.

The objective of the mapping exercise was to determine the degree (if any) "of structural disruption within the sandstone cover, which may have resulted from displacements along the Aurari Fault or volume accomodation in response to 'underplating' by dolerite intrusions". Any anomalous surficial structural feature identified in the sandstone "could assist in identifying areas at depth that may have been conducive to focusing mineralising fluids".

The final analysis and assessment of the work will hopefully point to potential subsurface targets, illustrated by surficial structural features mapped within the sandstone This program is on-going and is planned to be completed during the next field campaign.

Geophysical Surveys

Tempest

Fugro Airborne Surveys Pty Ltd flew a TEMPEST airborne time domain electromagnetic survey over Aurari North and adjacent ground. The orientation survey was aimed at testing:

- whether the Aurari North mineralisation is associated with a detectable airborne electromagnetics signature,
- if the depth to the unconformity can be approximated and
- if the Aurari Fault Zone (AFZ) could be mapped.

The survey was flown at 120m height with 200m line spacing for 6505 line kms. Proprietary software (CIN3-D) and EMFlow has been used by Fugro to produce CDI's (Conductivity Depth Images), depth slices and 3-D AVIs (Audio Video Interleave). Consequently, many different products can be used for visualising the data in 1-D, 2-D and 3-D.

Location Map - Geophysics and Hyperspectral Surveys

Logistics Report for TEMPEST 2001

Conductivity Map – RGB=150m,100m,50m
AVI Slide Show – CDI's for X-component
AVI Slide Show – Depth Slices
AVI Slide Show – Iso-surface

Unfortunately no electromagnetic signature was detected which could be directly associated with the Aurari North mineralisation. However, the TEMPEST data provides significant 3-D information about the AFZ and the unconformity geometry to a maximum depth of 300m. TEMPEST data has been shown to be able to identify the 3-D character of some structures and also alteration associated with the unconformity, which allows an estimation of the unconformity depth (i.e. depth to conductive unconformity).

Some results of the test survey are that:

- TEMPEST can resolve electromagnetic properties from 200-300m.
- A resistive host may limit resolving depth (due to low signal).
- A resistive upper layer is usually present which is due to Cretaceous sand and unaltered Kombolgie sandstone.
- A "conductive unconformity" occurs as a conductive layer within the resistive host, which:
    - Is usually due to alteration at the unconformity,
    - May be used to approximate the unconformity depth (+/- 20m),

    - May be dispersed by Cretaceous effects at the AFZ, and
    - May be enhanced by dolerite.
- Known faults such as Aurari and Black Rock are indicated along with their orientation.
- Additional faults and offsets may be inferred but care should be taken to consider conductor edge effects.
- There is no electromagnetic signature directly associated with the Aurari North mineralisation.

Gravity

Gravity was undertaken with the aim of identifying structure and lithology at the Aurari North Prospect by extending the survey completed in the previous year by Daishsat Pty Ltd. Readings were taken along previous drill fences and a grid was read at 200m line spacing, using 50m and 100m station spacings. The survey was undertaken by Fugro and totalled 425 stations.

Location Map - Geophysics and Hyperspectral Surveys

Gravity Logistics report by Fugro Pty Ltd

Map Showing Gravity Data

A significant gravity low of up to 3mgal is evident and is attributed to increased clay content and Cretaceous cover adjacent to the AFZ. Kombolgie sandstone is also interpreted to contribute to the gravity low in some areas. Topography appears to be inversely proportional to the gravity; however, this is thought to be coincidence since the topography is likely to be controlled by surficial geo-morphological features possibly caused by the presence of the Cretaceous. The primary structure identified in the gravity is the north-south trending AFZ, however, other minor structures have also been identified. There was no response that could be related to the Black Rock Fault.

Gravity has been extremely effective at identifying the thickness of Cretaceous cover associated with the AFZ and should be used to guide future drilling of this structure. Lows have been attributed to a combination of Kombolgie sandstone and Cretaceous, which is difficult to constrain without drilling. Variations in basement types and dolerite could not be discriminated. Some structures can be postulated and may be considered for future drilling.

Detailed Airborne Geophysics

A detailed airborne magnetic, radiometric and DTM survey was undertaken with the aim of identifying structure and lithology at the Aurari North Prospect by extending the previous years survey. UTS of Perth undertook both the previous and current surveys using the same parameters so that the data could be provided already merged. Both surveys were flown at a 30m flight height with 50m stations and the present survey totaled 280 line km.

Location Map - Geophysics and Hyperspectral Surveys

Logistics Report by UTS

Map of Airborne Magnetics – Reduced to Pole with 1st Vertical Derivative (RTP with 1VD)
Map of Airborne Radiometrics – Total Counts (TC)
Map of Airborne Radiometrics – Potassium (K)
Map of Airborne Radiometrics – U
Map of Airborne Radiometrics – Thorium (Th)
Map of Airborne Radiometrics – RGB=K,U,Th
Map of Airborne DTM

The survey has allowed more accurate identification of the Oenpelli Dolerite and also some magnetic basement units, which are likely to be either magnetic migmatite or amphibolitic/mafic gneiss. Previous ground magnetics had identified an increased magnetic response bordering the south eastern extremity of the known Aurari North mineralised zone. This response was postulated to be due to alteration (pers.comm. L.Sawyer), however the airborne survey shows the magnetics in this area to be controlled by the dolerite and does not substantiate the postulated alteration relationship.

Many new lineaments have been identified, which were not observed in the previous ground magnetic survey or project scale airborne magnetic (200m line spacing). In particular a north-east structure is clearly defined, which is located mid-way between the Aurari North Prospect and Schist Anomaly. This structure coincides with a zone of demagnetisation within the Oenpelli Dolerite. To the north west of this structure there is a small 10nT anomaly, which may relate to a more magnetic unit (i.e. migmatite or amphibolitic gneiss) or a basement high. The latter would imply a north block up fault movement. A dextral movement can also be postulated although this should be considered tenuous.

No new features were identified at Aurari North, which could be related to the mineralisation.

Airborne Hyperspectral Survey

In 2000, a 488 km^2 hyperspectral survey was flown over the Kombolgie Sandstone outcrops within EL5891. The survey was conducted by De Beers Australia Exploration using their AMS (Airborne Multi-spectral Scanner) which has recently been renamed Hymap Mk1. The survey for Cameco was designed to map and identify alteration patterns in the Kombolgie sandstone that might be associated with unconformity uranium deposits. In particular, it was hoped that this system would identify and map variations in clay types such as kaolinite, illite, dickite and halloysite, as well as discriminate iron and magnesium chlorites and silicification, all of which could be attributed to the above alteration phenomena.

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

Location Map - Geophysics and Hyperspectral Survey

Logistics Report for Hyperspectral Survey

Hyperspectral Data – RGB = Bands 20,10,3

The hyperspectral data exhibit a good general correlation with PIMA with many features far more apparent due to the superior spatial resolution (1 km samples vs 5 m pixels). The data indicate that the dominant clay layers within the Kombolgie are illite and kaolinite, dickite, illite (in order from bottom to top) with pyrophyllite appearing to having a spatial association with the Oenpelli dolerite. Alteration is indicated by kaolinite and illite in a broad zone to the east of the Aurari Fault. Apparent silicification was identified along Ron's Fault, located to the north-east of Aurari North.

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