Cameco Australia Pty Ltd

Exploration Licences 9928, 9929, 22368, 22369, 22447, 22825, 22827, 23247 and 24780

Plateau Project – Northern Territory

Annual Report for Period 20 July 2006 to 19 July 2007

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SUMMARY

The Plateau project consists of nine exploration licenses (ELs 9928, 9929, 22368, 22369, 22447, 22825, 22827, 23247 and 24780) with a total area of 229.1 km². The project is located in western Arnhem Land, approximately 250 km east of Darwin. The ELs were granted to Cameco Australia Pty Ltd on July 20 2005 for a period of six years.

During the 2006 field season Cameco conducted exploration for unconformity-style uranium mineralisation. The exploration program included a single helicopter supported diamond drill hole of 674.4 m, an airborne EM (TEMPEST) survey, an airborne hyperspectral (HyMap) survey and a small geological reconnaissance and outcrop sampling program. A summary of exploration activities is provided in *Table 1* and *Figure 1*.

Table 1 - Summary of 2006 exploration activities

Activity	Quantity	Location
Helicopter-supported diamond drilling	1 hole, 674.4 meters 128 geochemical samples 12 petrographic samples	Anomaly B PLD001
Geological sampling and reconnaissance	20 geochemical samples 5 mapping locations 18 petrographic samples	Project-wide
HyMap airborne SWIR survey	10 lines; 175.6 line km; 2000 m spacing; 2500 m height	Project-wide
TEMPEST airborne EM survey	55 lines; 1210.5 line km 200 m spacing; 120 m height	Project-wide
	750 m spacing;	

Total eligible expenditure for the exploration program was $561 000.

Drill hole PLD001 was drilled at –65° towards 156 (true) to test a NNE trending fault (Fault T). Previous sandstone and stream sediment sampling along this fault has identified anomalous geochemistry (elevated U, P_2O_5 and REEs) and associated elevated radioactivity. Historic GEOTEM and DIGHEM surveys identified a resistivity low along this structure, whilst magnetic data suggests the presence of a mafic dyke. Unfortunately, the rugged topography prevented the drill hole from being sited in the optimal location, and it was unable to test the resistivity low. PLD001 intersected Gummarirnbang Sandstone from surface to 259.4 m, amygdular mafic volcanic flows of the Nungbalgarri Volcanics to 420.80 m, silicified Mamadawerre Sandstone to 498.0 m and Oenpelli Dolerite to EOH at 674.4 m, meaning the drill hole failed to intersect the unconformity. Geochemical sampling returned a best uranium value of 24.29 ppm U_3O_8 at the upper margin of the Nungbalgarri Volcanics. No alteration indicative of uranium mineralisation or unconformity-related processes was observed.

The HyMap hyperspectral survey data was processed to produce a classified mineral end-member image consisting of six mineral species (chlorite, iron oxide, dickite, illite 2190 nm, illite 2220 nm and illite 2229 nm). End-member distributions appear to be controlled by sandstone stratigraphy, Nungbalgarri Volcanics and associated regolith, and Oenpelli Dolerite and associated regolith and alteration. No features indicative of unconformity-style uranium mineralisation were observed.

Conductivity Depth Images were produced from the TEMPEST data with the aim of identifying new structural targets via obvious offset of the conductive unconformity. Unfortunately, no new faults were identified, though offset was observed on the Beatrice Fault, the Caramal Fault and a parallel structure approximately 1 km north of the Caramal Fault. TEMPEST was unable to identify increases in conductivity associated with hematite-sericite alteration in the NW Grid area, despite earlier (and presumably inferior) geophysical techniques including DIGHEM, GEOTEM and PROTEM 47 identifying such conductivity increases, suggesting a comparison of TEMPEST and other EM systems is warranted.

Outcrop sampling and geologic reconnaissance identified previously unmapped Myra Falls Metamorphics in the Caramal Inlier, in an area previously mapped as Nimbuwah Complex. This enhances the prospectivity of the Caramal Inlier, as correlates of the Cahill Formation are considered more prospective for uranium mineralisation than rocks of the Nimbuwah Complex. Sampling and reconnaissance elsewhere failed to produce targets warranting further investigation.

Results from the 2006 exploration program can be considered disappointing. PLD001 was not sited to optimally test the resistivity low, and failed to intersect basement. Geology intersected suggests that depth to unconformity in this area is 530-580 m, and the 150 m thickness of Nungbalgarri Volcanics suggest that surface geochemical prospecting is unlikely to identify signals related to unconformity-related mineralisation processes. This is consistent with the hyperspectral mineral classification, which suggests stratigraphy is by far the dominant control on clay mineral distribution, and historic lithogeochemical studies that failed to identify hydrothermal alteration in sandstone. Combined, these results downgrade the prospectivity of sandstone-covered areas of the project. The positive result from the 2006 program was the identification of Myra Falls Metamorphics in the Caramal Inlier. This observation upgrades the prospectivity of the Caramal Inlier.

As no high priority targets were generated from the 2006 program, the 2007 program will be geared towards target generation and reconnaissance. Planned activity is restricted to geologic reconnaissance focussing on the Caramal Inlier, as well as follow-up of the TEMPEST feature in EL 22447, follow-up hyperspectral anomalies, and any outstanding historical geochemical or radiometric anomalies.

A breakdown of estimated expenditure per EL is shown in *Table 2*.

Table 2 - Covenant expenditure for 2007

EL	**Covenant**	**Status**
EL9928	$40,000	Retained
EL9929	-	Relinquished
EL22368	$35,000	Retained
EL22369	$10,000	Retained
EL22447	$20,000	Retained
EL22825	$10,000	Retained
EL22827	$25,000	Retained
EL23247	$15,000	Retained
EL24780	-	Relinquished
Total	$155,000	

Figure 1 – Summary of 2006 field season activities

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INTRODUCTION

This report describes exploration activities conducted by Cameco Australia Pty Ltd (Cameco) in the Plateau Project during the 2006 field season. The tenements (ELs 9928, 9929, 22368, 22369, 22447, 22825, 22827, 23247 and 24780) were granted on 20 July 2005 for a period of six years and cover an area of 225 sq km (70 blocks). The exploration project is located entirely on Aboriginal land, and as such the work program was carried out under the terms of consent documentation agreed with the Northern Land Council, pursuant to the Aboriginal Land Rights (Northern Territory) Act.

Location and Access

The tenements are located in western Arnhem Land, on the 1:250 000 Alligator Rivers (SD-5301) and the 1:100 000 Oenpelli (5573) and Howship (5572) map sheets. The project area also falls within the Gagudju (5572-1) and Spencer Range (5573-2) 1:50 000 topographic map sheets. The Ranger uranium mine is situated approximately 50 km to the west and the rehabilitated Nabarlek mine site is 45 km to the northwest. Access to the project area is via the sealed Arnhem Highway from Darwin to Jabiru, and then northeast to Cahill's Crossing. From Cahill's Crossing, the Oenpelli-Maningrida road is taken to 'Three Ways', where the Nabarlek road is followed for approximately 14 km to the Myra Camp turnoff. Myra Camp is approximately 25 km south of the turnoff. The Plateau group of tenements is located to the southeast of the camp. Access within the tenements is by helicopter only. The location of the Plateau project area with respect to major roads, towns and mines is shown in *Figure 2.*

A vehicular track in the northern part of EL 22825 was constructed and maintained by Uranerz between 1987 and 1991 to permit access from Myra Camp to the former EL 3419, located to the east of the Plateau project area. This track is currently in disrepair and is inaccessible to vehicles. At this stage Cameco Australia has no plans to refurbish the track.

Tenure

The nine exploration licences were granted to Cameco on June 3 2005 for an initial period of six years. The areas now covered by ELs 9928 and 9929 were formerly covered by ELs 3597 and 4015 respectively, held by PNC Exploration (Australia) Pty Ltd (PNC) between 1990 and 1996. Cameco lodged applications for this ground on July 21 1997 following relinquishment by PNC.

The areas covered by ELs 22368, 22369, 22447, 23247, 22825, 22827, 24780 were formerly covered by relinquished portions of ELs 2506 and 2507 which had been under tenure to AFmeco Mining and EXploration Pty Ltd (AFMEX) as operator in joint venture with SAE Australia Pty Ltd and Cameco. EL 24780 is additional to the original applications. This modification from the original applications was necessary due to a 'No-Go' zone (i.e. deemed by the Justice Department as non 'consent' land), which divided EL22447 into two separate portions. The northern portion was retained as EL 22447 with the southern portion split off into a separate application and issued with a new number EL 24780. The area that was refused consent in EL 9928 has been issued with a new number ELA 24789 and placed in moratorium from 10 November 2004 for five years until 10 November 2009. This application does not form part of the present Plateau project, which is the subject of this report. On grant, the total area under licence is 225 km^2 (70 blocks).

Figure 2 – Project Location and Historic EL boundaries

GEOLOGIC SETTING

The Plateau project area, located within the eastern margin of the Pine Creek Inlier (PCI), covers portions of Arnhem Land Plateau, and the Caramal Inlier, where basement rocks of the Nimbuwah complex, Oenpelli and Zamu Dolerites are exposed (Needham and Stuart-Smith 1980; Needham 1988).

The Bureau of Mineral Resources (BMR) conducted reconnaissance mapping of the PCI in 1946, with more detailed work in the 1950s and 1960s following the discovery of uranium at Rum Jungle. The Alligator Rivers region was systematically mapped by the BMR between 1972 and 1983, resulting in the publication of two 1:250 000 scale geological and metallogenic maps (Needham et al. 1983; Needham 1990) and a detailed report (Needham 1988). Cobourg Peninsula to the north was also mapped at this time (Hughes 1973). Relevant 1:100 000 scale compilation maps were published in colour and/or black and white format. Related publications are numerous (Hughes 1978; Stuart-Smith and Ferguson 1978; Needham *et al.* 1980; Stuart-Smith and Needham 1982, 1984; Needham and Stuart-Smith 1985; Warren and Kamprad 1990). In more recent years, the Northern Territory Geological Survey (NTGS) has remapped the central parts of the PCI and the Milingimbi sheet (Ahmad 1998; Carson *et al.* 1999; Ferenczi and Sweet 2004). It has also begun focused geochronological studies aimed at developing a better stratigraphic framework, in collaboration with Geoscience Australia (GA) (Worden et al. 2004).

The 2500 Ma (late Archaean) Nanambu Complex represents the oldest rocks in the Alligators River region. Nanambu Complex rocks outcrop sparsely in Kakadu National Park and include paragneiss, orthogneiss, migmatite, granite and schist (Needham 1988). The Archaean complexes form structural domes that are unconformably overlain by metasediments and minor metavolcanics of the Palaeoproterozoic Pine Creek Succession or Supergroup (PCS), which constitutes the Pine Creek Orogen tectonic unit (formerly the Pine Creek Geosyncline). In the Alligator Rivers region, the PCS initiates with meta-psammitic and quartzose rocks of the Mount Howship Gneiss and Kudjumarndi Quartzite (both Kakadu Group). These are laterally equivalent to the Mount Basedow Gneiss and Munmarlary Quartzite respectively (Ferenczi et al. 2005). The Kakadu Group appears to onlap the Archaean basement highs, but gneissic variants are also reported to be transitional into paragneiss of the Nanambu Complex (Needham 1988).

The Cahill Formation and Masson Formation of the Namoona Group (Ferenczi et al. 2005) conformably overlie the Munmarlary Quartzite, the Cahill Formation being informally mapped as two sub units or members (Needham 1988). The Lower Cahill Formation hosts the main uranium ore bodies in the region (e.g. Nabarlek, Ranger and Jabiluka) and consists of a basal calcareous marble and calc-silicate gneiss unit that is overlain by pyritic, garnetiferous and carbonaceous schist (meta-pelite), quartz-feldspar-mica gneiss (meta-arkose) and minor amphibolite. The Upper Cahill Formation is more psammitic, comprising feldspar-quartz schist (meta-arkose) and quartzite, lesser mica-feldspar-quartz-magnetite schist (meta-pelite), and minor conglomerate and amphibolite. It also contains the mafic to intermediate Stag Creek Volcanics, which have a SHRIMP U-Pb age of 2048±13 (Ferenczi et al. 2005). The Cahill Formation is notably magnetic, in particular the base of the upper psammitic unit (also known as 'hanging wall sequence'), due the presence of mafic sills and/or magnetite, providing a means of spatially distinguishing it from underlying and overlying less magnetic formations (Kendall 1990). The Masson Formation is generally considered to be the lower grade metamorphic equivalent of the Cahill Formation.

The unconformably overlying Nourlangie Schist is a monotonous succession of argillaceous to quartzose phyllite and quartz-mica schist that locally contains garnet and staurolite. Nourlangie Schist is interpreted to be the eastern temporal correlative of the combined interval – Mundogie Sandstone and Wildman Siltstone (Mount Partridge Group), and Koolpin Formation, Gerowie Tuff and Mount Bonnie Formation (all South Alligator Group) (Needham 1988). Some authors argue that temporal equivalents of the Mundogie Sandstone are absent east of the South Alligator River (Ferenczi et al. 2005), but it may not be possible to distinguish facies variants at the Cahill Formation-Nourlangie Schist level. Wildman Siltstone is characteristically composed of silty carbonaceous phyllite, sandy ferruginous siltstone and shale, consistent as a possible Nourlangie Schist 'protolith'.

The age of the Nourlangie Schist has previously only been constrained by its inferred correlatives, with the Wildman Siltstone being about 2025 Ma and the Gerowie Tuff dated at 1863±2 Ma, from SHRIMP U-Pb zircon dating (Worden et al. 2004). However, recent geochronology sponsored by Cameco has produced a date of 1955 ±16 Ma for the Nourlangie schist sampled in the Alligator Rivers region, though the U/Pb reproducibility was lower than expected, leading to the suggestion that this date be treated with caution. Nevertheless, this date is in contrast with another date for the Nourlangie Schist sampled from the South Alligator-Kakadu zone that returned ~2025 Ma—a good match for the Wildman Siltstone. This date suggests that the unit defined as the Nourlangie Schist east of the East Alligator River actually encompasses younger units possibly including the South Alligator Group.

Mafic sills and dykes including the Goodparla and Zamu Dolerites intrude the PCS, with the former common in the upper Cahill Formation and the latter abundant in the South Alligator Group (Warren and Kamprad 1990). Lower metamorphic grade rocks have typical dolerite textures, but in the Alligator Rivers region, they are generally amphibolite *sensu stricto*. Regardless, these dykes impart a magnetic signature to their respective hosts where they contain residual magnetic phases.

The sedimentary and igneous rocks of the PCS are structurally complex, having undergone at least three recognisable phases of deformation (Thomas 2002) related to Top End Orogeny (1880 to 1780 Ma). They have also undergone high-temperature low-pressure prograde metamorphism, including local migmatisation and remobilisation during the ~1850-1860 Ma Nimbuwah Event of the Barramundi Orogeny (Page and Williams 1988). The intensity of metamorphism and deformation varies across the region, with the western and eastern margins of the Pine Creek Inlier (Litchfield Province and Nimbuwah Domain respectively) showing the most pronounced effects. In the Nimbuwah Domain or Alligator Rivers region, there is a broad trend of increasing grade from southwest to northeast. This gradient clearly reflects synchronous emplacement of the 1865 Ma Nimbuwah Complex granitoids in that area. Distinctions based on metamorphic grade and protolith type have been made on regional maps (Needham 1988) and are summarised below.

Greenschist to amphibolite facies metasedimentary rocks in the southwest can generally be distinguished stratigraphically and are assigned to specific formations and groups.

- Amphibolite to granulite facies metasedimentary rocks that lie between the Nimbuwah Complex in the northeast and the areas of better-defined stratigraphy in the southwest are mapped as Myra Falls Metamorphics. They incorporate outcrop that cannot be distinguished from the Zamu Dolerite and Kakadu, Mount Partridge, Namoona or South Alligator Groups, but where a sedimentary precursor can be demonstrated (Needham 1988). Rocks with a likely felsic igneous protolith are assigned to the Nimbuwah Complex (see below).

- Magmatic rocks (mostly I type granodiorite) and felsic to intermediate migmatite and granulite in the northeast are distinguished as the Nimbuwah Complex. These rocks have a relatively simple isotopic character (Page and Williams 1988) that suggests an entirely igneous protolith. However, there is some doubt about this distinction, as much of the mapped Nimbuwah Complex around King River appears to have a sedimentary protolith (e.g. lit par lit zones). Metamorphic, igneous and sedimentary rocks of the PCS have been intruded by later Palaeoproterozoic 'post-orogenic' granites of the Cullen Batholith, including the Jim Jim and Mount Bundey Granites (Jagodzinski and Wyborn 1997).

The PCS and Cullen Batholith are locally overlain by felsic volcanic rocks belonging to the Edith River and El Sherana Groups, which are comagmatic with the Cullen Batholith (Jagodzinski 1992). These units are thickest in the south in the South Alligator Fault Zone and are generally absent in the Alligator River region due to Palaeoproterozoic erosion.

The various basement units are unconformably overlain by the Kombolgie Subgroup, the basal unit of the late Palaeoproterozoic Katherine River Group, McArthur Basin (Sweet, Brakel and Carson 1999). The subgroup consists of a series of sandstone formations (Mamadawerre, Gumarrirnbang and Marlgowa Sandstones), which are divided by two basaltic units (Nungbalgarri and Gilruth Volcanics). The minimum age of the Mamadawerre Sandstone is 1725 Ma based on geochronology of the Oenpelli Dolerite (see below). Detrital zircon SHRIMP data from the GA OZCHRON database constrain the maximum age as ~1810 Ma. The true age is probably closer to 1800 Ma (Rawlings 2002). The sandstones form a flat-lying or shallow southeast-dipping strongly-jointed platform, called the Arnhem Land Plateau. The eroded edge of the Mamadawerre Sandstone forms the characteristic Arnhem Land escarpment and the isolated sandstone mesas and ranges on the coastal plain. The middle to upper part of the Katherine River Group is exposed ~50 km further to the southeast near Mount Marumba (Sweet, Brakel, Rawlings *et al.* 1999).

The Oenpelli Dolerite is the most pervasive mafic intrusive suite to affect the Alligator Rivers region and is the youngest Precambrian rock unit exposed. It intrudes various levels of the stratigraphy, including the PCS and Kombolgie Subgroup, forming highly magnetic sills, dykes, lopoliths and laccoliths. Intrusions can be either concordant or discordant with Palaeoproterozoic stratigraphy. This unit is currently constrained by a SHRIMP baddeleyite date of 1723±6 Ma (Ferenczi et al. 2005), however, geochemical and geophysical data suggest several phases of intrusion throughout the region. At least one phase correlates with emplacement of the Nungbalgarri Volcanics at about 1780 Ma (Rawlings 2002). These intrusive events had a pronounced thermal effect within the Kombolgie Subgroup, with the promotion of fluid flow and aquifer/aquitard modification. Localised effects in the sandstone include silicification, desilicification and introduction of chlorite, muscovite and pyrophyllite in active aquifer systems. A characteristic mineral assemblage of prehnite-pumpellyite-epidote has formed in the quartzofeldspathic basement rocks adjacent to the intrusions.

Field evidence for the age of the Nabarlek and Tin Camp Creek Granites is inconclusive, with both pre- and post-sandstone interpretations being valid. The Tin Camp Granite has been traditionally interpreted as unconformably overlain by Mamadawerre Sandstone along Tin Camp Creek, however, common silicification and up-doming of the cover sequence above this granite is also consistent with emplacement as a sill at the basement-sandstone unconformity and subsequent thermal metamorphism of the sandstone. The pre-sandstone explanation of these observations involves long-lasting radiogenic-driven fluid flow and silicification above the granites and structural displacement of the granite (i.e. solid state diapirism).

Deformation since deposition of the Katherine River Group includes transpressional movement along steep regional-scale strike-slip faults and possibly some shallow thrusting. These regional faults follow a pattern of predominantly north, northwest, north-northwest and northeast strikes, giving rise to the characteristic linearly dissected landform pattern of the Kombolgie plateau. Another significant set trends east-west and includes both the Ranger and Beatrice Faults. The Bulman Fault Zone is a principal regional feature and is considered to represent a long-lived deep crustal structure, with a large lateral component in rocks of the PCS. However, it appears that post-Kombolgie displacements along this and other faults have not been great, because the Arnhem Land Plateau is essentially coherent and offsets along lineaments are generally minor. Field investigations of many interpreted 'faults', including those with a marked geomorphic expression, show no displacement, and are best described as joints or lineaments (Thomas 2002).

Erosional remnants of flat-lying Palaeozoic Arafura Basin and Cretaceous Carpentaria Basin are present as a veneer throughout the coastal zone of the Top End. Various regolith components are ubiquitous as cover throughout much of the region.

Figure 3 – Western Arnhem Land and Kakadu National Park Regional Geology

Geology of the Plateau Project

The Plateau project area is dominated by the Caramal Inlier in the northern tenements (ELs 22825 and 22368). Within the Caramal Inlier extensive outcrop of Tin Camp Granite and Nimbuwah Complex, as well as Zamu Dolerite and Oenpelli Dolerite are present on government maps. The regional Beatrice Fault bounds the Caramal Inlier along its western edge, and the east-west Caramal Fault bounds it on the north.

The remaining southern tenements are covered by rocks of the Kombolgie sub-group; dominantly the basal Mamadawerre Sandstone, with the stratigraphically higher Nungbalgarri Volcanics and Gumarrirnbang Sandstone occurring only in the southwest of the project area. The Nimbuwah Complex-Mamadawerre Sandstone unconformity is locally exposed along the southern boundary of the Inlier, in EL 22368, and the Tin Camp Granite-Mamadawerre Sandstone unconformity is locally exposed in EL 22825.

Previous exploration drilling on the sandstone plateau provides an indication of the depth to unconformity and nature of the underlying basement. Drilling by AFMEX (hole KPE-001) in EL 23247 places the unconformity at 244.3 m depth, with Mamadawerre Sandstone underlain by foliated granitoid rocks of the Nimbuwah Complex. In 1992 PNC drilled 5 holes (BDD-BDD5) in the northwest corner of EL 9928. The sandstone-basement unconformity was intersected between 66 (BDD4) and

110.55 m depth (BDD1). Basement here consists of Tin Camp Granite and Nimbuwah Complex gneisses variably intruded by Oenpelli Dolerite. Drilling results correspond with overall outcrop patterns, which suggest increasing depth to unconformity towards the southeast.

Oenpelli Dolerite also occurs along the inferred extension of the arcuate Kukalak Valley feature (Rawlings, 2006) in the area (off tenement) between ELs 22447, 23247, 22369 and ELs 24780, 9929. A small area of Tin Camp Granite is exposed to the north of the Ranger Fault in the southwest corner of EL 9928.

Major structures in the general Plateau project area include the east-west Ranger Fault, located in the valley/No-Go zone separating EL 9928 and ELs 22447 and 23247; the east-west trending Caramal Fault and the 340° trending Khyber Pass fault, which is present in ELs 22827 and 9928, and is inferred to extend southward into EL 23247. The Khyber Pass Fault can be traced northward towards Nabarlek.

EXPLORATION TARGET

The focus of exploration in the Plateau project area is the discovery of large-tonnage 'unconformity-style' uranium deposits. The archetype unconformity-style uranium deposits are found in the Athabasca Basin of northern Saskatchewan, Canada. A detailed summary of these deposits can be found in Jefferson *et al.* 2006. The prospective nature of the Alligator Rivers region is demonstrated by the presence of economic uranium occurrences at Ranger, Jabiluka, Koongarra and Nabarlek. In addition, significant gold, platinum and palladium resources are present at existing uranium occurrences in the Alligator Rivers Uranium Field (Ranger, Jabiluka, Koongarra and Coronation Hill/South Alligator Valley-style deposits) suggesting that economic Au and PGE (Platinum Group Element) mineralisation, associated with economic or sub-economic uranium may also be present in the project area.

Recent research into Proterozoic Westmoreland district uranium deposits, from the Northern Territory-Queensland border (Wall 2006) suggests that the same broad physiochemical processes that govern 'unconformity-style' uranium deposits also produce Westmoreland-style deposits, and indeed other basin/unconformity associated precious and base metal deposits. Thus, 'Westmoreland-style' uranium mineralisation is a legitimate exploration target in the dolerite and volcanic units of project area, although only sub-economic uranium occurrences have been discovered associated with these units in western Arnhem Land.

The most important elements of the 'unconformity-style' uranium system, in the most general sense, include: (i) a redox contrast between the overlying, oxidised sedimentary succession and reduced Fe^{2+}- bearing or carbonaceous material in or near the basement/unconformity; (ii) 'basinal' fluids sufficiently oxidised to transport U^{6+} and oxidised Au and PGE species in solution. Interaction between fluid and sulfate-bearing evaporitic rocks higher in the sedimentary succession has been suggested as the mechanism for generating oxidised fluids; (iii) a suitable 'plumbing system' involving faults or shears that cut both the sedimentary sequence and basement rocks, permitting focussing of large volumes of widely-sourced, oxidised basinal fluids into restricted structural zones in and around the unconformity/basement rocks. The relative weakness of carbonaceous schists may continently provide both suitable structure and redox contrast; (iv) uranium-enriched 'source' rocks, either in the overlying sedimentary sequence, and/or in the basement are likely required to provide the endowment necessary for world-class mineralisation.

The principal mechanism for uranium deposition is the reduction of soluble aqueous U^{6+} to the relatively insoluble U^{4+}, resulting in the precipitation of uranium minerals, typically uraninite. Coincident with the reduction of uranium will be the oxidation of reduced basement material, or fluids that have interacted with reduced material. Carbonaceous schists (e.g. lower Cahill Formation) represent the most likely reductant, either in the form of graphite, or reduced carbonic fluid species formed through fluid interaction with graphite (e.g. methane). Ferrous iron-rich rocks, such as dolerite and its metamorphic equivalent, ortho-amphibolite are also potential reductants, indeed, recent geochemical modelling seems to suggest that Fe^{2+}-bearing chlorite may also be an effective reductant for oxidised uranium (Schaubs et al. 2007). The carbonate-rich units of the lower Cahill Formation may also be significant due to their ability to alter the chemistry (i.e. pH) of saline, uranium-bearing fluids. This general model for the controls on uranium solubility is seemingly borne-out by existing uranium occurrences, which are all hosted by either lower Cahill Formation rocks (Ranger, Jabiluka, Koongarra and Caramal) or amphibolite/dolerite (Nabarlek, Caramal). All deposits are associated with structures (though not usually regional-scale) and are in the vicinity of the unconformity, although mineralisation at both Ranger and Jabiluka extends several hundred meters below the unconformity.

Thus, conceptual exploration targets for 'unconformity-style' uranium mineralisation fitting the model outlined above involve prospective basement rocks, (i.e. carbonaceous units of the lower Cahill Formation and its Myra Falls Metamorphics equivalent, or mafic Fe^{2+} bearing rocks, including Zamu Dolerite and Oenpelli Dolerite) and coincident structures cutting both basement and overlying sandstone. Due to the near-surface position of the basement-Kombolgie unconformity in the western Arnhem Land landscape, most basement exposures are in the vicinity of the unconformity.

PREVIOUS EXPLORATION

1970-1973: Queensland Mines Pty Ltd

Initial exploration in what is now Western Arnhem Land was conducted by QML within a large landholding that encompassed the entirety of the Plateau project and many adjoining projects as well. QML focussed their exploration efforts exclusively on areas of exposed basement, avoiding areas of sandstone cover. The Northern Territory Government Open File has extremely limited information regarding exploration activities conducted during this time. As a result, no information is available regarding exploration conducted in the Caramal Inlier by QML. Following a Federal Government imposed moratorium on mineral exploration on Aboriginal Land, exploration activity halted in September 1973. No further exploration was conducted in the area until 1990.

1990-1996: PNC Australia-Arnhem Land West Joint Venture

PNC Exploration (Australia) Pty Ltd was granted Exploration Licences 3597 and 4015 on 27 August 1990 for a period of six years. PNC successfully deferred reduction of the tenement area throughout their tenure, ensuring that the original tenement area (80 and 32 sq km respectively) remained intact. Current ELs 9928 and 9929 correspond with portions of former ELs 3597 and 4015 respectively (*Figure 2*).

1990

In September 1990, Surtec Geosurveys Pty Ltd (Surtec) was engaged to undertake a reconnaissance survey consisting of ground radiometrics and stream sediment sampling along structures or lineaments evident in air photographs. Austirex International Ltd. flew an airborne magnetic and radiometric survey in early October 1990. In December 1990 Surtec conducted a follow-up sampling (soil, stream and rock chip) targeting geochemical and radiometric anomalies from the earlier surveys. Thirteen soil, sediment and rock chip samples were submitted for Pb isotope analysis. Seven anomalies (Anomaly A through Anomaly G) were identified for further investigation. An anomaly in the northwest corner of EL 3597 consisting of an elongate zone of hematite (after chlorite) alteration and intense quartz veining associated with a 340° trending structure was assigned a high priority.

<u>1991</u>

In May 1991 PNC staff conducted investigation of the seven anomalies identified the previous year. Notable results included 8.9 ppm uranium and 4 ppb Au in a clay-rich sandstone sample from Anomaly B (later part of the AB Grid), and 3 ppm U in quartz veined and hematite altered sandstone from Anomaly G, which later became the NW Grid area.

In October 1991 Surtec was contracted to establish a 50 x 50 m grid over Anomaly G, called the NW Grid. Ground-based radiometric and magnetic surveys were conducted over the NW Grid, along with rock chip sampling (n=130), of which nine samples were submitted for petrography and two for later electron microprobe analysis (EMPA).

Two SIROTEM surveys were conducted in 1991 to evaluate the effectiveness of the technique for estimating the depth of sandstone cover. An initial test survey was conducted over locations in both EL 3597 (northeast corner) and 4015 (AB Grid) as part of a larger test jointly funded by QML that included surveys over Jabiluka and Caramal. A more detailed survey was undertaken over the NW Grid (only where ground conditions were amenable) in an attempt to map alteration. The results were not conclusive, but did suggest that there may be a measurable response associated with alteration.

A test GEOTEM survey was flown over the NW Grid area in October 1991 to evaluate response over the mapped alteration zone. Results indicated that conductors could be correlated with alteration.

<u>1992</u>

A helicopter-supported diamond-drilling program was conducted in the NW Grid area during May-June 1992. Five holes (BDD-1 to BDD-5) were drilled for a total of 789 m. The highest uranium analysis was 5 m at 65 ppm U from BDD-003, at the contact between Oenpelli Dolerite and basement gneiss. All holes intersected the sub-Kombolgie unconformity between 66 and 110.55 m, with Nimbuwah Complex gneiss being the dominant basement, along with Tin Camp Granite and Oenpelli Dolerite. Rocks adjacent to the unconformity are variably clay, chlorite and hematite altered.

A PROTEM 47 ground-based EM survey was conducted over a portion of the NW Grid to test conductors identified in the 1991 GEOTEM survey. PROTEM 47 was employed as it was considered technically superior to SIROTEM for work in resistive sandstone terrain. A well-defined response was obtained over the altered structure associated with BDD-1 and good contrast was achieved between granite and gneiss. Further investigation of the PROTEM data by Encom Technologies Pty Ltd suggests that alteration in the sandstone extends 500 m outwards from the main structure.

Follow-up mapping and geochemical sampling was conducted in the southeast corner of EL 3597, the location of Anomaly A as previous stream sediment samples had produced anomalous base metal assays of 390 ppm Cu, 490 ppm Pb and 400 ppm Zn. Infill sampling and resampling failed to reproduce the elevated results, with maximum values of 17 ppm Cu, 10 ppm Pb and 40 ppm Zn.

A PIMA (Portable Infrared Mineral Analyser) study was conducted on outcrop and drill core samples in an attempt to identify alteration minerals (i.e. clays) without resorting to XRD analysis. Mineral identification was successful, and the results suggested that kaolinite is associated with alteration surrounding structures, whereas illite occurs more widely. A shift in illite absorption features was found to be associated with known alteration.

Consultants Etheridge and Henley were contracted to conduct a two-stage structural study of the project area. The first stage consisted of air photograph interpretation, followed by a second stage of structural mapping. The study reported that despite the long strike length of most faults, displacement is typically only a few metres. This was considered consistent with the structures representing major pre-Kombolgie faults with only minor post-Kombolgie movement. Structures with large post-Kombolgie movement were considered the most prospective, and it was noted that the study area contained largely low-displacement faults.

<u>1993</u>
Following a successful test the previous year, an airborne GEOTEM survey was flown over both tenements in July 1993. Five anomalies were generated by the GEOTEM survey (Anomalies 1, 2 and 3 in EL 3597; Anomalies 4 and 5 in EL 4015). Four anomalies were associated with north-northwest trending structures.

Anomaly 1 is located on the north-northwest trending fault termed 'Fault G' by PNC but also known as the Khyber Pass Fault by AFMEX. A 2 x 2 km grid of 100 m spaced east-west lines marked at 50 m intervals, known as the CS grid was pegged over Anomaly 1. Mapping and radiometric prospecting failed to identify any alteration beyond silicification of a fault breccia along the Khyber Pass Fault. No significant radiometric anomalies were detected. A PROTEM 47 survey was conducted over 15 lines of the CS Grid and failed to produce any anomaly. The similarity between PROTEM response and GEOTEM channel 3 response lead to a downgrading of GEOTEM channel 3 anomalies.

Anomalies 2 and 3 are located along the southern extension of the 340° trending Fault A, which is associated with the NW Grid to the north. Anomaly 2 is suggested to be due to strongly hematite/sericite altered Tin Camp Granite in the area.

Anomaly 3 was mapped as a southward extension of the NW Grid. A small radiometric anomaly (5 time background) was located in a few square meters of sandy soil. Soil sample analyses returned 0.6 ppm U and 1.75 ppm Th, which are not considered anomalous, leaving U and Th daughter products as likely candidates for the anomaly. A PROTEM 47 survey was conducted over the NW Grid extension. Sensitivity analysis of the resulting data identified a bell shaped conductive zone starting from a broad base at 300 m depth extending upwards to 50-60 meters. The bell shape was interpreted to represent extensive alteration in the basement becoming restricted towards the surface due to the unreactive nature of the overlying sandstone.

Anomaly 4 is an elongate anomaly correlating with the 350° trending Fault Q, though it is only present in the channel 3 data, leading to it being downgraded. Anomaly 5 is a channel 16 anomaly occurring along the 030° trending Fault T. Radiometric Anomaly B is located on the same structure 1 km to the northeast (AB Grid). No follow-up was conducted during 1993.

During 1993 the Arnhem Land West Joint Venture (ALWJV) was formed between PNC Exploration (Australia) Pty Ltd and Cameco Australia Pty Ltd, with PNC remaining the operator of the project.

<u>1994</u>
Exploration work in 1994 concentrated on follow-up of GEOTEM channel 16 anomalies. A grid was established over Anomaly 5 (AB Grid) and the NW Grid was extended south by 1.5 km. Mapping and radiometric prospecting at 1:2000 scale was conducted over both grids, in addition to ground magnetic surveys and PROTEM 47 surveys. Mapping was hampered by poor exposure in the area of Anomaly 5. The PROTEM survey produced results consistent with an unconformity depth between 85 and 100 m. Mapping of Anomaly 5 identified red hematite alteration along fractures in sandstone. The PROTEM survey identified a clear anomaly sub parallel to splays of Fault T.

Pairs of 100 m spaced traverses were marked across GEOTEM anomalies 4, 5 and 6. Mapping, and ground magnetics were conducted along all traverses, and PROTEM 47 was conducted over anomalies 6 and 7. Anomaly 7 was interpreted to be a basic dyke due to the coincidence of ground magnetics and PROTEM anomalies. Anomaly 6 was interpreted to represent a 70 m layer of basic volcanics at 160 m depth on the basis of PROTEM data.

A lithogeochemical study of 40 samples (14 drill core and 26 outcrop) was conducted in 1994. Samples were thin sectioned and XRD was performed on whole rock and the clay-fraction of each sample to identify clay mineralogy and for comparison with PIMA analysis. Geochemical analysis was conducted on all samples. The results suggested that the Kombolgie sandstone is relatively clay mineral poor with low Fe content. Altered feldspathic lithic fragments are the most likely source of clay minerals in the sandstone. Illite was identified as the dominant clay mineral, and the sandstone is commonly limonitic rather than hematitic, due to severe weathering. Close agreement was found between mineral estimates from PIMA II spectra and XRD analysis, underlining the usefulness of PIMA for broad, rapid screening.

Three test lines of VLF were completed across the NW Grid to test the effectiveness of the technique for looking through Kombolgie sandstone. The survey produced an anomaly coincident with previous PROTEM results, indicating VLF may be effective at mapping near surface alteration.

Two small areas in each tenement were selected to test the effectiveness of DIGHEM in mapping alteration in highly resistive terrain, and to provide detailed EM coverage of GEOTEM anomalies where terrain excluded PROTEM 47 surveys. High frequency DIGHEM channels produced anomalies that correlated well with GEOTEM channel 16 data.

In addition to uranium exploration activities, six stream gravel samples were collected for diamond indicator mineral analysis. Fourteen heavy mineral grains, identified as tourmaline with no kimberlitic affinity, were extracted by heavy mineral analysis. Three micro-diamonds were also identified in the samples.

1995

A second, more extensive diamond indicator mineral sampling program was conducted in May 1995. Fourteen stream gravel samples were collected, including repeat sampling at two of the 1994 locations. However, no diamonds or micro-diamonds were recovered from the heavy mineral fractions of the 1995 samples. Two Cr-spinel grains and a chromite grain were identified.

The promising results of the 1994 lithogeochemical study prompted and expanded sampling program in 1995. 200 samples, including 132 Mamadawerre Sandstone, 58 Gumarrirnbang Sandstone, 7 Tin Camp Granite and 3 Oenpelli Dolerite were collected. Stable isotopes (O, H) were analysed in several samples from the 1994 study, revealing that clay minerals in the Kombolgie sandstone have re-equilibrated with meteoric water at temperatures of 20-50° C.

Eighteen samples from the 1992 drilling program were submitted for petrophysical measurements, in an attempt to generate data for use in future geophysical modelling.

1996

Heavy mineral separates from diamond indicator samples were re-picked, though no new minerals were identified. EMPA of chromite grains extracted in 1995 revealed they lacked kimberlitic affinity.

An airborne VLF survey was flown using fixed-wing aircraft in August 1996 to test the effectiveness of VLF in sandstone terrain. The survey did not produce any recognisable response, possibly due to technical difficulties.

A detailed summary of ALWJV exploration activities can be found in the relinquishment report of Follington 1997) and earlier annual reports by Mackie 1991, 1992a, 1992b, 1993b, 1993a, 1994a, 1994b, 1995b, 1995a, 1996b, 1996a, 1997).

1995-2003: QMPL-AFMEX and Tin Camp Creek Joint Venture

The area covered by ELs 22368, 22369, 22447, 23247, 22825, 22827, 24780 cover land relinquished from ELs 2506 and 2507 in 1998-99 and 1999-2000. ELs 2506 and 2507 formed part of a larger area granted to QML in September 1995 (*Figure 2*). QML engaged AFMEX (AFmeco Mining and EXploration Pty Ltd) in a farm-in arrangement between 1995 and February 1998 at which point the Tin Camp Creek Joint Venture (TCCJV) comprising AFMEX (as operator) with SAE Australia Pty Ltd, Cameco and West Arnhem Land Corp. acquired the tenements from QML.

QML/AFMEX conducted a helicopter-based DIGHEM magnetic, radiometric, electromagnetic survey in July 1996, which was followed by ground follow-up of some radiometric anomalies. Weak uranium was found associated with chlorite veins in granite at the North Horn radiometric anomaly, located in northern EL 22368, although no samples were collected.

Stream sediment sampling and a limited outcrop sampling program were conducted between 1996 and 1998.

A single helicopter supported drill hole (KPE001) was drilled in EL 2507 to test for uranium mineralisation associated with the south extension of the Khyber Pass Fault. The sandstone-basement unconformity was intersected at 244.3 m depth. Basement rocks consisted of foliated granitic rocks of the Nimbuwah Complex. Elevated uranium was not present in the hole.

A summary of work conducted in areas relinquished by the Tin Camp Creek Joint Venture can be found in the relinquishment reports of Fabray 1999b, 2000), annual reports (Rowe and Thevissen 1996; Alonso and Kastellorizos 1997; Kastellorizos 1998; Fabray 1999a) and interpretation reports (Thevissen 1997; Alonso *et al.* 1998; Fabray *et al.* 1998; Wollenberg *et al.* 1999).

EXPLORATION METHODOLOGY

Sampling and data collection

Due to the high cost of exploration, the limited duration of the field season and the difficulty in altering exploration work programs after their commencement, Cameco collects a significant amount of data from each drill hole and rock chip sample in order to extract maximum value from fieldwork. In addition to geologic observations, Cameco aims to collect geochemical, short wave infrared reflectance (SWIR) spectra, magnetic susceptibility measurements and radiometric data for drill core and outcrop samples. All relevant digital data is included in the data directory of the CD containing this report.

Appendix 1 – Cameco Logging Codes

<u>Rock chip sampling</u>

At each rock chip sample location, photographs, radiometric readings from a scintillometer and geologic observations are recorded. A 1-2 kg rock chip sample is taken, which is then cut with a core saw. One half is submitted for geochemical analysis, a 1 cm slab is cut for petrography, and SWIR spectra and magnetic susceptibility measurements are taken from the remainder of the sample, before being sent to Darwin for archiving.

Diamond drilling

At the completion of each drill hole a down hole gamma profile is collected in both the downward and upward direction using an AusLog NQ (43 mm) or BQ (33 mm) gamma probe. Standard core processing methodology involves the halving of ~10cm of core in the middle of each row of core. This 10 cm section is then cut into two 5 cm half-core sections, a "PIMA piece" and a "geochem piece". Magnetic susceptibility and SWIR measurements are taken from one of the sections (PIMA piece), providing a SWIR spectra and magnetic susceptibility readings approximately every metre for each drill hole. The other 5 cm half-core section (geochem piece) is used for composite geochemical sampling. Composite samples are typically a combination of 5 consecutive "geochem pieces" representing a 5m interval, though care is taken to avoid crossing lithological boundaries.

Intervals of mineralised core may be "split" sampled by halving the core and taking 50 cm or 1-metre intervals of continuous half core for geochemical analysis.

"Spot" samples, typically 5-10 cm of half or quarter core are taken from geologically interesting features, usually in conjunction with a thin section sample, at the discretion of the geologist.

Short wave infrared reflectance spectroscopy

Reflectance spectra were collected from a dry, cut surface of each rock chip or drill core sample using a TerraSpec mineral spectrometer manufactured by Analytical Spectral Devices, Inc. Spectra cover the interval between 350 nm (visible light) and 2500 nm (short wave infrared region) at a resolution between 6 and 7 nm, and an acquisition time of 10 seconds. Features of reflectance spectra in the SWIR region typically relate to H_2O, OH, CO_3 and metal-OH (Al-OH, Fe-OH and Mg-OH) vibrations, overtones and combination modes. Many minerals possess diagnostic spectra with several features relating to vibrational modes of elements of its crystal structure located at specific wavelengths/wavenumbers. The intensity of certain features in the spectra also provides an indication as to the level of crystallinity of the mineral (e.g. kaolinite).

Following acquisition, spectral analysis software (The Spectral Geologist - TSG, AusSpec International Pty Ltd) is used to resolve spectra into mineral components using an extensive library of mineral spectra. The one or two most likely matches are then added to the database as TSG mineral species associated with that particular sample.

Geochemical Analysis

Cameco uses NTEL (Northern Territory Analyical Laboratories) exclusively for geochemical analysis. A suite of analytical methods, known internally as the Cameco standard suite, is conducted on all Cameco samples. The standard suite consists of the following analyses: the G400 multi-element suite, the G950 partial leach suite, the G140B boron analysis, LOI and fire assay.

Sample preparation at NTEL involves initial drying at 110°C. The entire sample is crushed to a nominal 2 mm in a Boyd Crusher, and then divided using a Rotary Sample Divider (RSD) to give a 300-400 g split. The split is milled in a Whisper ring mill to a nominal 75 µm. The material used on the crushing surfaces was selected to be free of contaminant trace metals (the major contaminant is iron) and this was confirmed in tests conducted by Cameco prior to submitting field samples. The Boyd Crusher is flushed with barren blue metal and the ring mills are flushed with garnet sand before and after each sample. The RSD is vacuum cleaned.

The G400 analysis involves an 8-hour, four-acid (HF, hydrochloric, nitric and perchloric) near-total digest of pulped material, followed by double dehydration before the liquor is read on an ICP-OES (major elements) or ICP-MS (minor and trace elements). The G950 analysis involves the leaching of a large weight of pulped sample in high purity nitric acid on a mixing table for a limited period of time. After settling, the liquor is then decanted and presented to an ICP-MS for analysis of U and Pb-isotopes. For boron analysis (G140B), the pulped sample is fused with sodium peroxide, iron is precipitated and the resulting solution is read by ICP-OES. Fire assay for Au, Pt and Pd involves an appropriate charge of up to 50 g, depending on mineralogy and sample size being fused in a lead collection assay. The resulting prill is dissolved and presented to either an ICP-MS or AAS. C110 (Loss on Ignition) involves the ignition of the pulped sample at 1000°C, and followed by LOI determination via weight loss.

QA/QC

For the 2006 field season Cameco commenced routine submission of matrix-matched geochemical standards with all batches of samples.

Appendix 2 presents the G400 and G950 analytical suites, as well as detailing analysis methods, detection limits and analytical precision for each individual element.

Appendix 2 - NTEL multi-element suites, detection limits and analytical precision

HYMAP Hyperspectral survey

The HyMap is an airborne hyperspectral scanner delivering 126 bands (approx 18 nm width) of imagery over the 450 nm to 2500 nm spectral interval. Hyperspectral remote sensing is a mineral mapping technology based on spectroscopic principles. Thus, an understanding of the spectral signatures of surface materials is required for its application. In essence, each pixel of a hyperspectral image contains a spectrum, which forms the basis for determining the materials present in a scene. Surface mineralogy and other components are mapped using algorithms which either de-convolve a scene into component end-member signatures (unsupervised un-mixing) or by specifically targeting spectral signatures of known materials (supervised match filtering). A combination of these approaches is usually applied to produce the final classified mineral end-member images.

2006 EXPLORATION RESULTS AND DISCUSSION

Exploration activities during the 2006 field season are summarised in ***Table 3***.

Table 3 – Summary of 2006 exploration activities

Activity	Quantity	Location
Helicopter-supported diamond drilling	1 hole, 674.4 meters 128 geochemical samples 12 petrographic samples	Anomaly B PLD001
Geological sampling and reconnaissance	20 geochemical samples 5 mapping locations 18 petrographic samples	Tenement-wide
HyMap airborne SWIR survey	10 lines; 175.6 line km; 2000 m spacing; 2500 m height	Tenement-wide
TEMPEST airborne EM survey	55 lines; 1210.5 line km 200 m spacing; 120 m height	Tenement-wide
	750 m spacing;	

Diamond Drilling – PLD001

Drill hole PLD001 was drilled to test a combined structural, geochemical and geophysical anomaly in the south east of the project, situated within EL 9929. Surtec contractors identified Anomaly B when they encountered anomalously radioactive sediment (7 times background) during the 1990 stream sediment survey. Subsequent mapping identified 030 trending hematised fractures in sandstone upslope from the radiometric anomaly. No other alteration was present. The GEOTEM survey conducted in 1993 returned a NNE trending anomaly (Anomaly 5) in the Channel 16 dataset located to the south of Anomaly B, although it is on the same NNE trend as the Fault T, in which Anomaly B is situated. A subsequent DIGHEM survey flow in 1994 further refined Anomaly 5, particularly within the 56,000 Hz dataset. Based on the airborne and ground magnetic response associated with Fault T, PNC exploration staff inferred the presence of a basic dyke (Oenpelli Dolerite) along this structure.

The rugged topography of the area restricted the location of the drill site to the north of original anomalies. PLD001 was drilled at –65° towards 156 (true) to test Fault T. The drill collar and projection of down hole trace is shown relative to topography, geochemical samples and geophysical anomalies in *Figure 4.*

Figure 4 – PLD001 Topography, Geology, Resistivity and Total Magnetic Intensity

Results

Helicopter-supported diamond drilling was conducted by Titeline Drilling Limited, employing a Layne Christensen CS-1000 diamond drill rig. Drilling occurred between June 4 and 17, 2006, initially based out of Jabiru, and then later out of Cameco's King River Camp.

PLD001 was collared in Gummarirnbang Sandstone, a quartz-rich medium-coarse sandstone that is dominantly rippled or cross-bedded with subhorizontal bedding. Clay intraclasts and thin (<2 cm) shale beds are present down to ~80 m. An interval with increased abundance of isolated pebbles and narrow (<3 cm) pebble beds was intersected between 192 and 206 m. Bedding becomes planar and alternates between fine- and coarse- grained beds between 233 m (aeolian facies?) and the contact with the Nungbalgarri Volcanics. Sandstone exhibits diagenetic hematite in varying colours (purple, maroon) and distribution (irregular bands, blotches etc). Minor interstitial clay is present throughout most of the unit and frequent stylolites are present in the upper 160 m, either bedding parallel or crosscutting.

Conformably underlying the Gummarirnbang sandstone from 259.4 m are the Nungbalgarri Volcanics, a sequence of altered amygdular basaltic rocks with several units (flows) that grade from coarsely amygdular (5-40 mm amygdules) at the top to finely amygdular (0.5-5 mm amygdules) at the bottom. Amygdules are typically quartz + chlorite filled with occasional carbonate and hematite. Hyaloclastic breccias and silicified entrained sediment are present in some locations. The volcanics are variably hematised and chloritised, with inferred flow tops the most altered.

The Mamadawerre Sandstone sitting conformably below the contact with the Nungbalgarri Volcanics at 420.80 m is intensely bleached and silicified such that it could be termed an orthoquartzite. The upper 5 meters are very fissile with intense fracturing perpendicular to the core axis. The highest radiometric response encountered during down hole gamma logging occurred between 431.04 and 431.19 meters, with 0.0055 % eU3O8 (see below). Two closely spaced aphanitic dykes (or one irregular dyke) cut the sandstone between 462 and 466 meters. Below the dykes, the sandstone remains silicified, though is less bleached than above, as muted dark maroon diagenetic hematite and patches of green interstitial clay are present. Green interstitial clay is also present as a fracture coating throughout the Mamadawerre interval, although petrography failed to identify the green mineral. SWIR spectroscopy suggests the presence of illite and minor chlorite (*Figure 5*).

Oenpelli dolerite was intersected from 498.00 m. The margin of the Oenpelli dolerite is aphanitic, suggesting that the contact is intrusive rather than faulted. Fracturing may be due to later reactivation resulting in unknown displacement. The dolerite is weakly chloritised throughout, though alteration is slightly stronger in the upper 20 meters. There is a reddish brown tint to much of the lower portion of the dolerite, due to hematised potassium feldspar grains. There is a noticeable increase in the gamma background from the downhole log between 580 and 600 meters, with an increase from ~50 cps to ~80 cps. The dolerite is cut by frequent carbonate-quartz-prehnite-smectite, pumpellyite-carbonate and carbonate veins (Purvis 2007), that can have a selvage of up to 2-3 cm of disseminated pyrite with hematised K-feldspar and clay. Drilling terminated at 674.4 m in dolerite as the drilling contractor exhausted their supply of drill rods, and approached the pull-back capacity of the drill rig.

Drill hole PLD001 did not intersect elevated radioactivity or any indications suggesting proximity to uranium mineralisation.

Down-hole strip plots showing lithology, down-hole gamma, magnetic susceptibility, SWIR reflectance spectroscopy and geochemistry are presented in *Figure 5*. A detailed geological log can be found in *Appendix 3*, complete geochemical data can be found in *Appendix 4*, and a summary of mineral species determined from SWIR spectroscopy is provided in *Appendix 5*. A petrographic report containing descriptions of thin sections taken from PLD001 can be found in *Appendix 6*. Down hole gamma data and SWIR reflectance spectroscopy data are included in the data directory of the CD holding report.

Figure 5 – PLD001 down hole gamma, magnetic susceptibility, geochemistry and mineral species

Appendix 3 – PLD001 Detailed Diamond Drill Hole Report

Appendix 4 – PLD001 down hole geochemistry

Appendix 5 – PLD001 down hole SWIR reflectance spectroscopy mineral classification summary

Appendix 6 – Mineralogical Report 9019

Discussion

Inspection of the strip plots presented in *Figure 5* and geochemical data included in *Appendix 4* demonstrates that the geochemical anomalism present in surface samples collected at Anomaly B (i.e. PL050002 and PL060007, see *Outcrop Sampling and Reconnaissance*) is not repeated in PLD001. Elements in elevated concentrations in the outcrop samples (As, S, Se, REE, Y, Li, Pt, V, Sr, U and U/Th) remain at average values for the entire Gummarirnbang Sandstone intersection. This leads to the suggestion that the anomalous geochemistry of Anomaly B is not related to uranium mineralisation but is either a feature related to detrital heavy minerals and their subsequent diagenesis, or may be related to minor hydrothermal activity related to the emplacement of the Oenpelli Dolerite dyke.

Increased noise in the lower Gummarirnbang Sandstone gamma log was initially suggested to be due to increased interstitial clay and the corresponding increase in K content. However, subsequent inspection of the down hole geochemistry reveals an increase in Th content with depth over much of the interval, leading to the conclusion that much of the gamma signal returned by the Gummarirnbang Sandstone is related to heavy minerals. Strontium is quite variable within the Gummarirnbang Sandstone, with increased Sr typically corresponding with increased P_2O_5 and to a lesser degree S, suggesting that Sr phosphates, most likely Goyazite-group APS (aluminium phosphate-sulphate) phases are responsible.

Down hole mineral abundances determined from SWIR data suggest that Gummarirnbang Sandstone is dominantly illite-bearing, though there are discrete zones of increased dickite abundance occurring between 156 and 234 m, with a corresponding decrease in illite abundance. This distribution is broadly consistent with the lithostratigraphy suggested by Zaluski 2007.

Geochemistry and radiometrics of the Nungbalgarri Volcanics are unremarkable. As expected there is an increase in U and U/Th at the margins of the volcanic unit, with the highest U value for the entire hole, 24.29 ppm U_3O_8, occurring in the uppermost composite sample. The lower margin is also elevated in uranium, though to a lesser degree, with a value of 6.98 ppm U_3O_8.

The high gamma peak recorded in the Mamadawerre Sandstone between 431.04 and 431.19 m is not associated with elevated uranium. Composite geochemical samples reveal that this interval exhibits elevated Th, and a corresponding depletion in U/Th ratio. Detrital heavy minerals are the most likely cause for the Th enrichment.

The most noticeable feature in the down hole gamma for the Oenpelli Dolerite interval is the stepwise increase in counts at ~585 m. Geochemistry and petrography suggest this increase in counts is related to the sericite and K-feldspar content of the rock. Whether the increased K is due to fractionation of the dolerite sill or K introduced via alteration is unclear. The upper margin of the dolerite is also slightly enriched in uranium, with a value of 1.99 ppm U_3O_8, relative to an average of 0.83 ppm. A summary of the uranium content of the different stratigraphic units intersected by PLD001 is presented in *Table 4*.

Table 4 – PLD001 Summary of uranium content by stratigraphic unit

Stratigraphic Unit		U3O8 (ppm) (4 acid digest)	U3O8 (ppm) (partial leach)	U/Th (4 acid digest)	U/Zr (4 acid digest)
Gummarirnbang Sandstone	**Average**	**0.78**	**0.13**	**0.20**	**0.05**
	S.D.	0.14	0.09	0.09	0.08
	Max.	1.14	0.71	0.51	0.44
	Min.	0.53	0.07	0.06	0.01
Nungbalgarri Volcanics	**Average**	**3.93**	**0.42**	**0.31**	**0.02**
	S.D.	3.78	0.56	0.20	0.01
	Max.	24.29	3.50	1.35	0.01
	Min.	2.41	0.18	0.20	0.01
Mamadawerre Sandstone	**Average**	**0.93**	**0.27**	**0.21**	**0.05**
	S.D.	0.37	0.19	0.07	0.05
	Max.	1.78	0.85	0.31	0.17
	Min.	0.57	0.13	0.05	0.01
Oenpelli Dolerite	**Average**	**0.83**	**0.06**	**0.25**	**0.003**
	S.D.	0.28	0.02	0.08	0.001
	Max.	1.99	0.16	0.60	0.007
	Min.	0.60	0.03	0.22	0.002

PLD001 produced disappointing results that downgrade the southern tenements of the Plateau project on the basis of depth of sandstone alone. Depth to the bottom of the Nungbalgarri Volcanics is estimated to be 380 m true depth, and 150-200 m of Mamadawerre Sandstone places the depth to unconformity in the 530-580 m range. The thickness of Nungbalgarri Volcanics in this area is ~150 m, and it is considered extremely unlikely that any geochemical signals relating to unconformity processes would transgress the volcanic unit to be expressed in the Gummarirnbang Sandstone.

PLD001 was not optimally sited to test the GEOTEM/DIGHEM resistivity low identified by PNC. However, the fact the anomaly is best expressed in the higher frequency channels (i.e. 56 000 Hz) suggests it is quite shallow, and indeed PNC staff suggested that it was likely related to a feature no deeper than the Nungbalgarri Volcanics, which seemingly precludes it from representing an unconformity-related feature.

Outcrop Sampling and Reconnaissance

Results

Reconnaissance activities in 2006 involved the area surrounding Anomaly B, the southern margin of the Caramal Inlier and areas of Tin Camp Granite around the 'North Horn' radiometric anomaly. The locations of individual samples are shown in *Figure 6* and *Figure 4*. Sample descriptions and geochemical data are included in

Appendix 7 and *Appendix 8.* A summary of mineral species determined from SWIR reflectance spectroscopy can be found in *Appendix 9*. Petrographic descriptions of many outcrop samples can be found in *Appendix 6*.

Figure 6 – Outcrop sample locations

Appendix 7 – Outcrop sample descriptions

Appendix 8 – Outcrop sample geochemistry

Appendix 9 – Outcrop sample SWIR spectroscopy mineral classification

<u>Discussion</u>
The most anomalous sample collected during the 2006 field season was PL060007, collected in the vicinity of samples 1388 and PL050002, near Anomaly B. Similar to PL050002, PL060007 is characterised by elevated REE, Y, P_2O_5, Li, As, S, Se, Pt and V. PL060007 returned REE (5481.2 ppm), Y (17 600 ppm) and P_2O_5 (20 900 ppm) contents that are even higher than PL050002. Elevated amounts of Y and REEs suggest that the mineral xenotime ($Y(REE)PO_4$) is present, whilst elevated As may reflect a minor solid solution component of chernovite ($Y(REE)AsO_4$), and elevated V may even be present due to wakefieldite ($Y(REE)VO_4$). Thus, despite an elevated U content of 49.8 ppm and a U/Th ratio of 17.9, these values are likely due to presence of anhydrous phosphates, as either detrital minerals, diagenetic phases or alteration phases relating to dolerite emplacement. Nearby drilling at PLD001 (~265 m to the NNE) failed to replicate the elevated U, P_2O_5, Y or REE suggesting this is a restricted occurrence.

Sampling in the southern portion of the Caramal Inlier targeted a minor U channel radiometric anomaly in rocks mapped as Zamu Dolerite. Sampling and subsequent petrography of the rocks marginal to the anomaly suggests that these rocks include altered granophyre (PL060022, PL060023) and altered plagioclase-porphyritic microdolerite (Purvis 2007). Despite elevated U contents, U/Th values for all these samples are all less than 0.3, suggesting they have not experienced uranium enrichment related to mineralisation, and the uranium contents may be the result of fractional crystallisation.

Reconnaissance in the vicinity of the radiometric anomaly 'North Horn' identified by AFMEX after the 1996 airborne radiometric survey identified quartz-hematite veins in granite with associated elevated radioactivity. Subsequent geochemical assay of rock chip sample (PL060002) revealed a significant Th (268 ppm) content and corresponding low U/Th ratio (0.34 U/Th; 90.4 ppm U), suggesting that the elevated radioactivity is Th related, despite the U^2/Th anomaly in the airborne radiometric dataset.

Reconnaissance in the immediate vicinity of PL060002 identified Myra Falls Metamorphics in contact with Tin Camp Granite. Government 1:100 000 scale mapping does not show any Myra Falls Metamorphics in the Caramal Inlier, although Uranerz geologists are know to have identified Myra Falls Metamorphics in the far east of the inlier (Rich and Easdown 1988; Taylor 1989, 1990, 1991; Rippert 1992). This is a significant discovery, as the prospectivity of the Caramal

Inlier can be considered higher if equivalents of the Cahill Formation stratigraphy are present in the area.

The area to the north of North Horn was traversed as this area has seen little exploration activity, and is the site of high uranium response in airborne radiometrics, most likely because the area is dominated by Tin Camp Granite. In this area the Tin Camp Granite is cut by linear silicified breccia zones and dykes of altered monzogranite (PL060011). Mamadawerre Sandstone sitting above the Tin Camp Granite in this area (PL060012) has a distinct appearance, being a very bleached white with well developed quartz overgrowths (Purvis 2007). Clay-rich samples (PL060012, PL060013, PL060014) collected from an area identified as a kaolinite+dickite±illite anomaly from the 2000 Myra-Kukalak hyperspectral survey (Zaluski 2001) were found to be entirely illite from both SWIR spectroscopy and petrography.

HyMap Airborne Hyperspectral Survey

Results

HyVista Corporation was contracted by Cameco to acquire HyMap airborne hyperspectral scanner imagery over a project area, with data acquisition occurring on the 19th August 2006. Cameco subsequently commissioned HyVista to process strips from the Plateau project area to produce mineral maps.

The HyMap data was pre-processed to produce cross track and solar illumination corrected reflectance images. GPS and INS (Intertial Navigation System) information recorded during data acquisition was used for geometric rectification. The images were then processed to produce various image maps that highlight mineralogical and geological variations.

In the project area there is abundant vegetation (both green and dry) and though this was masked out where it totally obscures the ground most of the remaining pixels will have a component of vegetation within them. This made unmixing of the data into well-segregated component mineral end-members less exact and necessitated further processing of the data.

A total of 6 minerals were mapped from the HyMap data, producing the classified mineral end-member image presented in *Figure 7*. Unclassified HyMap hyperspectral raw data is included on two DVDs submitted with this report. Details regarding the HyMap survey and initial processing of the data can be found in *Appendix 10*.

Figure 7 – HyMap hyperspectral survey classified mineral end-member image

Appendix 10 – HyMap Data Acquisition Report

Discussion

The distribution of each end-member is discussed below:

Chlorite

Chloritic pixels correspond mainly to the Nungbalgarri Volcanic Member east of the East Alligator River and the ferruginous soil that commonly develops over it.

It is also present over the Oenpelli Dolerite that underlies the Goomadeer River valley, although some signatures appear to correspond to sandstone. Therefore, some occurrences may represent chloritised sandstone adjacent to the dolerite.

Fe Oxide
The Fe-oxide end member corresponds to ferruginous soils overlying the Nungbalgarri Volcanic Member and in the sandstone underlying it. In this case it may represent ferricrete. Some ferruginous sandstone zones are also found stratigraphically above the Nungbalgarri (Gumarrirnbang Sandstone).

Dickite
The dickite end member is found in the Kombolgie Sandstone in several horizons. Dickite is present in the higher stratigraphic levels of the exposed Gumarrirnbang Sandstone in the south and in a horizon of the Mamadawerre Sandstone just south of South Horn. Dickite indicates that the sandstone in this region was subjected to high-grade diagenesis (above the kaolinite-dickite transition).

Short Wavelength Illite (2190 nm)
The shortest wavelength illite (2190 nm AlOH absorption feature) is found in the Mamadawerre Sandstone south of South Horn and in the Gumarrirnbang Sandstone near the southern edge of the survey. In most areas it is present in low abundance. It is locally present in higher concentrations in incised gullies near South Horn and along the Ranger Fault. The highest concentrations are found in a small area of Gumarrirnbang Sandstone directly over the Nungbalgarri Volcanic Member between the East Alligator and Goomadeer Rivers. This zone may be stratigraphically controlled, as locally higher concentrations can be noted farther east along the Gumarrirnbang Sandstone lower contact.

Medium Wavelength Illite (2221 nm)
This end member is found only locally, most prominently in the sediments along the East Alligator River and in narrow zones near the Oenpelli Dolerite (Goomadeer River). It is also identified in exposures directly beneath (or at the base of) the laterite that is developed over Nungbalgarri volcanic rocks in the east.

Long Wavelength Illite (2229 nm)
This phase is widespread in the survey area. It is represented by weak signatures in the (lower?) Mamadawerre Sandstone north of South Horn. It is also found in ferruginous horizons of the upper Mamadawerre Sandstone where it may exhibit a stratigraphic control. Locally strong signatures are found in the well-cleaned, reflective outcrops of this upper unit in the north-central part of the survey area.

No anomalies were identified that were likely to be related to unconformity uranium deposits. Indeed, stratigraphy within the sandstone units, volcanic units and their regolith products and the Oenpelli Dolerite appear responsible for almost all of the features observed in this survey.

TEMPEST airborne EM survey

Results

In June 2006, Fugro Airborne Surveys Pty Ltd (Fugro) undertook a TEMPEST airborne electromagnetic survey over the majority of the Plateau project. The survey excluded the southeast corner of EL23247, since it is predominantly Nungbalgarri Volcanics and Gumarrirnbang Sandstone. A total of 1210.5 line kms was flown at a flying height of 120 m in a north-south direction.

Figure 8 - TEMPEST Location Map

TEMPEST is a high-powered airborne time-domain system with a broad bandwidth, which enables good resolution of variations in resistivity whilst maintaining reasonable ground penetration. In addition, the airborne platform allows electromagnetic data to be acquired over broad areas where ground geophysics is impractical due to rugged topography. The survey was flown with the aim of providing 3-D electromagnetic data to assist with the identification of basement graphite, structural offsets, alteration and to infer the depth to the unconformity below sandstone.

Appendix 11 – Fugro TEMPEST Logistics Report

Figure 9 - TEMPEST X Time Constant Map

Figure 10 - TEMPEST Z Time Constant Map

Figure 11 - TEMPEST X RGB = Ch 8,5,2

Figure 12 - TEMPEST Z RGB = Ch 8,5,2

Conductivity Depth Images (CDIs) are an important inversion product calculated by Fugro using EMFlow software (Encom Pty Ltd) and used to compare the TEMPEST with geology. Cameco has also utilised Profile Analyst software (Encom Pty Ltd) to calculate a 3D voxel, which can be used to investigate 3D features. This allows the depth to the first conductive layer to be extracted, referred to as the "conductive unconformity". The 3D voxel has also been filtered to highlight maximum conductivities greater than 50 m below the surface (likely to relate to cover and weathering rather than features within the basement). A number of these 3D aspects have also been reprojected to plan view to facilitate comparison with ancillary datasets including geology. The z-component data has been used extensively since it is less prone to noise and couples best with sub-horizontal features such as the conductive unconformity.

The "conductive unconformity" is a term adopted to describe the first sub-horizontal conductive layer, commonly depicted in TEMPEST CDIs. In areas of Mamadawerre Sandstone this layer generally relates to the sandstone-basement unconformity contact (+/- ~ 20 m) but it may also relate to shallow cover or Nungbalgarri Volcanics. Abrupt changes in the elevation of the TEMPEST conductive unconformity can sometimes be utilised to infer faulting and structure.

Figure 13 - Elevation of Conductive Unconformity from CDI's

One of the primary objectives for the TEMPEST survey is to identify conductors associated with structure, since these could relate to clays, porosity or graphite; indicative of alteration and/or fluid-rock interaction with potential to precipitate uranium. Unfortunately, conductors can be difficult to reliably identify with 1D inversions due to artefacts and tails related to edge effects. Also, the conductive unconformity response or cover (+/- dolerite) may mask the response from underlying basement. Geometry, line-to-line consistency and x/z characteristics help to increase confidence that conductors are real, especially in the context of known geology. Targets have been identified from a number of sources including individual CDIs, elevation of conductive unconformity, time constants, time channels and voxel thresholds.

Discussion

Sudden changes in the elevation of the conductive unconformity indicates fault offsets along the Beatrice Fault, part of the Caramal Fault and its parallel counterpart (1 km north). However, there are no new faults that can be recognised by offsets of the TEMPEST conductive unconformity and there is no offset associated with the Khyber Pass Fault. Major structural disruption is also indicated along the west-east Oenpelli Dolerite intrusion within EL22447. At this location warping of the conductive unconformity and a fault offset can be inferred from the TEMPEST, which is probably related to the dolerite intrusion. Mapping by PNC in the former EL 4015 to the southeast of this area confirms that the intrusion of the dolerite causes the juxtaposition of upper Mamadawerre Sandstone/lower Nungbalgarri Volcanics to the north and upper Nungbalgarri Volcanics/lower Gummarirnbang Sandstone to the south of the dolerite intrusion (Mackie 1992b). Mackie 1992b interpreted the structural offset to reflect intrusion of dolerite along a major structure.

Hallet 1995 describes how historical ground and airborne electromagnetic surveys have responded to hematite-chlorite alteration at the NW Grid, despite relatively low resistivity contrasts. However, the TEMPEST survey has failed to identify abnormal increases in conductivity at this location. This result is surprising and may warrant further investigation since the system's specifications are thought to be superior to those previously employed.

Figure 14 - Historical Geophysics Location and TEMPEST

At the CS Grid and to the north and east there appears to be a subtle increase in the conductivity of the basement, similar to that observed at the adjacent Kukalak Project. This TEMPEST response is tentatively attributed to deeper development of the palaeoregolith associated with Tin Camp Granite since:

1. Increased palaeoweathering of Tin Camp Granite has been observed previously in the area,
2. Tin Camp Granite was intersected by drill hole KLD002 just a short distance (~600 m) to the east within the Kukalak project, and
3. There is good correlation with gravity at both Kukalak and Plateau, which is also generally indicative of granite.

Unfortunately the TEMPEST survey at Plateau has failed to identify any discrete targets warranting further investigation.

EXPENDITURE

Eligible expenditure for the Plateau project in 2006-2007 was AUD$561 000. This figure is dominated by drilling and associated helicopter costs. Compensation payments made to the NLC and tenement rental paid to DPIFM do not constitute eligible exploration costs. A detailed breakdown of 2006-2007 expenditure is included in *Table 5*.

Table 5 – Schedule of eligible exploration expenditure

CONCLUSION

Results from the 2006 exploration program can be considered disappointing. PLD001 was not sited to optimally test the resistivity low, and failed to intersect basement. Geology intersected suggests that depth to unconformity in this area is 530-580 m, and the 150 m thickness of Nungbalgarri Volcanics suggest that surface geochemical prospecting is unlikely to identify signals related to unconformity-related mineralisation processes. This is consistent with the hyperspectral mineral classification, which suggests stratigraphy is by far the dominant control on clay mineral distribution, and historic lithogeochemical studies that failed to identify hydrothermal alteration in sandstone. Combined, these results downgrade the prospectivity of sandstone-covered areas of the project. The positive result from the 2006 program was the identification of Myra Falls Metamorphics in the Caramal Inlier. This observation upgrades the prospectivity of the Caramal Inlier.

As no drill targets were generated from the 2006 program, the 2007 program will be geared towards target generation. Planned activity is restricted to geologic reconnaissance and sampling focussing on the Caramal Inlier, as well as follow-up of the TEMPEST feature in EL 22447, follow-up of hyperspectral anomalies, and any outstanding historical geochemical or radiometric anomalies.

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