NUPOWER RESOURCES LTD
ABN: 91 120 787 859

AILERON PROJECT
EL 24741 WOODFORDE

2012 RELINQUISHMENT REPORT, OCTOBER 2012
Operator: NuPower Resources Ltd & Arafura Resources Ltd

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Map
1:100,000 Ti Tree 5553
1:100,000 Woolla 5653
1:100,000 Bushy Park 5652
1:100,000 Aileron 5552
1:250,000 NAPPERBY SF53-11
1:250,000 ALCOOTA SF53-10
GDA94, Zone 53

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Department of Resources
NuPower Resources Ltd Sydney office
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SUMMARY

Woodforde (EL24741) was granted on 21 April 2006 and transferred to NuPower Resources Ltd on 14 March 2007 as a result of the demerger of Arafura’s uranium assets into the newly formed company focussed on uranium.

There are only two known mineral prospects in the area; an occurrence of copper at Mt Airy and of tin at White Yard Hill, both in the northwest. Rare earths are reported from the Mt Finnis area immediately west of the northernmost part of the area and the Nolan’s Bore polymetallic deposit lies south of the central part.

The area was selected by Arafura Resources NL because of the potential for secondary uranium mineralisation, derived from the erosion of adjacent uraniumiferous basement granites and gneisses, and hosted by unconsolidated Cainozoic basin sediments of the Ti-Tree Basin.

The Woodforde region is underlain by rocks of the Arunta Region, a complex basement inlier in central Australia that has undergone a prolonged history of sedimentation, magmatism and tectonism extending from the Palaeoproterozoic to the Palaeozoic that is subdivided into three, largely fault bounded terranes with distinct geological histories; the Aileron, Warumpi and Irindina Provinces. The basement geology of Woodforde comprises units of the Aileron Province consisting of greenschist to granulite facies metamorphic rocks with protolith ages in the range 1865-1710 Ma. It forms part of the North Australian Craton and is geologically continuous with the gold-bearing Tanami and Tennant Regions to the north.

Because of the high grade of metamorphism and the paucity of continuous outcrop across the Arunta Province, a reliable stratigraphy has not yet been constructed for the metasedimentary sequences and instead, the Early–Mid Proterozoic metamorphosed rocks have been subdivided into three Divisions, intruded by granites, on the basis of broad lithological correlations, in which Division 1 is regarded as the oldest and Division 3 as the youngest.

Division 1 rocks comprise mafic and felsic granulites and minor metapsammite and calcareous lithologies that are typified by granulite facies metamorphic mineral assemblages. They are faulted against rocks of Division 2 or form enclaves surrounded by granite, orthogneiss or granitic gneiss. In the Woodforde area they include the Tyson Creek Granulite, Weldon Metamorphics and Possum Creek Charnockite confined to the north-western corner and Aileron Metamorphics in the central western part of the area.

Division 2 comprises mostly metamorphosed pelitic, calcareous, or psammitic rocks and minor mafic-intermediate meta-igneous rocks. They range from low greenschist to low granulite facies and are usually faulted against Division 1 and overlap with an angular unconformity by Division 3. Units of Division 2 are confined to the headwaters of Woodforde River in the north-western part of the area although rocks of this Division are the most extensive of the three divisions in the Reynolds Ranges region. Subdivided into 6 units they all appear to be lithological facies of one enormous flood of terrigenous detritus. Represented here by two lithologies of the Lander Rock Beds they comprise highly folded pelitic and impure metasediments ranging in grade from high amphibolite to low granulite facies that appear to have originated from a granitic terrain.

Division 3 consists of a basal conglomerate or arkose overlain by a mature quartzite followed by metamorphosed pelitic and calcareous rocks. Similar to Division 2 they grade from low greenschist to low granulite. This Division is represented here by rocks of the Reynolds Range Group, a conformable sequence of quartzite, shale and carbonate.

Eleven intrusive granitic units, Mid Proterozoic in age, have been mapped in the Reynolds Ranges region, grouped into 7 older granitic gneisses and orthogneisses dated at 1500-1600m.y and three younger gneisses and unmetamorphosed porphyritic granite dated at 1350-1400m.y. Five of the older granitic rocks, the Anmatjira, Boothby, Yaningidjara, and Aooloya Orthogneisses and an un-named gneiss are represented here. The Anmatjira and Aooloya Gneisses, and the un-named gneiss intrude Tyson Creek Granulite and Weldon Metamorphics in the Mt Weldon-Mt Finnis area in the northwest corner of the license where the Anmatjira Gneiss contains a small occurrence of rare earths near Mt Finnis. Boothby Gneiss outcrops in the headwaters of Woodforde River in the central-eastern part of the area and is associated with the Nolan’s Bore rare earths deposit. Yaningidjara Gneiss underlies the Yaningidjara Hills in the northwest part of the area. The Orthogneisses are granitic in composition, contain xenoliths of the surrounding metamorphic rocks, locally send dykes into the surrounding country rocks and are therefore interpreted as pre-syn tectonic granites.
The Arunta Block is traversed by a series of WNE-NW trending faults that locally widen into extensive zones of shearing and retrogression comprising muscovite-quartz schist with extensive quartz veins and epidote-bearing rocks. One of these, the Aileron Shear, passes through the southwestern corner of the tenement.

The southern NT forms a ‘basin and range’ province in which Proterozoic and Palaeozoic rocks form prominent ranges separated by broad valleys in which at least twenty major Cainozoic sedimentary basins have developed of which the Ti Tree Basin underlies the eastern half of the Woodforde area. The stratigraphy of these basins is generally poorly known due to a lack of outcrop, strong weathering overprints, the paucity of drillholes and a lack of attention paid to the ‘cover’ overlying crystalline basement. Limited stratigraphic drilling by both the BMR and the NTGS during the 1960’s and 1970’s provides much of the regional stratigraphic information of the Cainozoic Basins.

During the late 1970’s and early 1980’s the Hale Basin southeast of Woodforde was explored extensively for coal and sedimentary uranium and has therefore become the best known Cainozoic Basin in the NT and although the succession is relatively thin it is considered to represent a generalised Tertiary stratigraphy for the region. Here a broad two-fold stratigraphic subdivision comprises a restricted, fluvial palaeochannel dominated Palaeogene succession (Hale Formation) overlain by a more widespread, dominantly lacustrine Neogene succession (Waite Formation). Although the Cainozoic stratigraphic units were initially defined in separate, small and isolated Tertiary Basins, these units are now recognised as components of a much larger Tertiary palaeodrainage system, the extent and size of which has until now been vastly underappreciated.

Elsewhere historic and recent drilling results indicate that the basins may contain very thick sedimentary packages. The Cainozoic fill of the Burt Basin exceeds 200m and the Sixteen-Mile Basin contains at least 180m of sediment. Similarly, the Whitcherry Basin and Waite Basins are known to exceed 250m in thickness in some locations, whilst minor tributaries feeding the Ti-Tree basin contain up to 140m of sediments. The maximum thickness of the Cainozoic sediments in the Ti-Tree Basin is not currently known as exploration drillholes to date by NuPower after drilling through a minimum of 320m of sediment, have locally failed to penetrate to basement and thicknesses of 400-500m of sediments are considered to be likely in the deeper portions of the basin.

Deposition of Cainozoic sediments was episodic and punctuated by hiatuses during which prolonged periods of weathering resulted in the formation of well-developed weathered profiles (palaeosols and duricrusts). Deep weathering was an ongoing process during the Tertiary but was enhanced at particular times during this time by the combination of periods of warm, humid climates, non-deposition and surface exposure. Three Palaeogene weathering events affecting the Arunta igneous and metamorphic basement rocks and the overlying Tertiary successions and two weathering events affecting the overlying Neogene successions have been recognised.

Overlying these sediments are unconsolidated Quaternary sediments including quartz sands, silts, red earths and clayey and sandy soils that record a complex history of deposition, erosion and redeposition due to climate changes and gentle tilting. The formation of calcretes, particularly within drainage channels overlying the Waite Formation, was also widespread during the Quaternary.

The only work done (2008 and 2010) on the area relinquished has been reconnaissance mapping and rock sampling of radiometric anomalies. These anomalies were found to be due to elevated (but considerably less than economic) levels of uranium and especially thorium in meta-felsic volcanics and in pegmatites. Elevated levels of rare earths occur in the same rocks, however they do not approach economic concentrations.
INTRODUCTION

BACKGROUND

Basement rocks of the Reynolds and Anmatjira Ranges contain elevated background levels of uranium and thorium and have been explored for gold, base metals, rare earth elements and uranium. Exploration success came with the discovery of elevated levels of rare earth elements hosted by massive fluorapatite in the Nolan’s Bore area by PNC Exploration (Australia) Pty Ltd in 1995 (Thevissen, 1995). This occurred during follow-up of an airborne radiometric anomaly as part of that company’s uranium exploration program along the Reynolds Range.

As far back as 1972 it was recognised that while these uraniferous crystalline basement rocks may host primary deposits of uranium, they also provided a potential source of uranium for secondary uranium mineralisation derived from weathering and dissolution of the uranium by meteoric groundwaters. The products of the weathering and erosion of the crystalline basement throughout the Cainozoic have accumulated as thick sequences of unconsolidated material in flanking Cainozoic depocentres where they have the potential to host sedimentary uranium mineralisation.

Recognising this potential, Arafura Resources applied for and was granted a number of exploration licenses here, including Woodforde (EL24741) that covers part of the Cainozoic Ti-Tree Basin.

LOCATION AND ACCESS

The Woodforde Exploration Licence is located approximately 140 kilometres north from Alice Springs along the Stuart Highway (Figure 1). The Stuart Highway and the Amadeus Basin – Darwin gas pipeline pass through the tenement, whilst the Adelaide – Darwin Railway lies approximately 20km to the east.

The tenement covers portions of the Aileron and Pine Hill pastoral leases. Pine Hill Station homestead lies in the far west of the tenement, whilst that of Aileron station is situated in the far south of the tenement.

The tenement is situated approximately 40km south of the Ti-Tree Roadhouse, whilst the Aileron Roadhouse is situated within the tenement boundaries. Accommodation and fuel are available at both these locations.

Access to the tenement is via the Stuart Highway and from there via the network of station roads and tracks linking the water bores. It is also possible for light vehicles to access the tenement via the service road alongside the NT Gas pipeline, however a permit must be obtained from NT Gas before using this road.

A major unsealed road, linking the Stuart Highway to Yuendumu (via Pine Hill Homestead) facilitates access to the west of the tenement. This road continues eastwards over the Stuart Highway where it continues to the Territory Grape Farm. The turnoff to this road is well sign posted and lies approximately 16km north of Aileron and 44km south of Ti-Tree.
CLIMATE AND VEGETATION

The region has a semi-arid continental climate, characterised by long hot summers when temperatures regularly exceed 40°C, and short mild winters. Average annual rainfall for the Woodforde region taken from the Territory Grape Farm Bureau of Meteorology weather station is 305.4mm, most of which falls in the November to February period. Average minimum and maximum temperatures in summer are 21.7°C and 37.6°C while the corresponding winter average temperatures are 4.9°C amd 22.3°C.

Vegetation in the eastern and northern parts of the license area comprises hummocky spinifex grassland with tall sparse acacia shrubland overstorey in the north passing to tall open mulga shrubland with open woolybutter grassland understory. Isolated thickets of mulga occur along the Stuart Highway north of Aileron. In the western part of the tenement, the Reynolds Range area is covered by hummocky grasslands of weeping spinifex with a low open mixed species woodland overstorey, (Wilson et. al. 1991). Thick, impenetrable stands of mulga occur along drainage lines west of the Stuart Highway.

TOPOGRAPHY AND DRAINAGE

The Woodforde tenement is situated in a ‘basin and range’ province where the Ti-Tree Basin to the northeast is separated from the Reynolds & Anmatjira Ranges to the southwest by the NW-SE trending Ti-Tree Fault.

In the southwestern and western areas of the tenement the Reynolds and Anmatjira Ranges attain elevations ranging from 650m to over 800m. Northeast of the Ti-Tree Fault, the landscape over the Ti-Tree Basin consists of a flat, featureless sand-plain that slopes gently away from the ranges at elevations of around 575m to 605m ASL.

The sand plain is mostly devoid of drainage except for minor tributaries of Allungra Creek in the southeast corner of the tenement. The western part of the tenement is dominated by the headwaters of Woodforde and Hanson Rivers draining north-eastwards from the Reynolds Range. Both rivers form wide braided channels on reaching the sandy plains and continue to the northeast past Ti-Tree.
Figure 1 - Woodforde (EL24741) Location.
LOGISTICS

Alice Springs (pop. 27,000) is serviced daily by jet aircraft from several Australian capital cities (Sydney, Adelaide, Perth and Darwin) and less regularly from Brisbane, Cairns and Broome. Because of its location mid-way between Adelaide and Darwin the town is also well serviced by road transport and interstate bus services.

The Adelaide-Darwin transcontinental railway, passing through Alice Springs, passes to within 20km of the east of the license.

The natural gas pipeline from the Amadeus Basin (west of Alice Springs) to Darwin bisects the area near Aileron.

The nearest service station and accommodation are at the Aileron Roadhouse in the southern part of the tenement on the Stuart Highway. The small township of Ti-Tree lies 60 km north by road from Aileron where there is a medical centre, school and police station.

The nearest station homesteads are Aileron adjacent to the Aileron Roadhouse and Pine Hill located just to the west of the area.

The nearest medical facilities are located at Ti-Tree and Alice Springs.

TENURE

Exploration Licence 24741 (Woodforde), which currently comprises 261 graticular blocks covering 828.0km$^2$ (Figure 2), was granted to Arafura Resources NL (ABN 22 080 933 455) on 21 April, 2006 for a period of 6 years. It was transferred to NuPower Resources Ltd (ABN 91 120 787 859) on 14 March 2007 as a result of the demerger of the uranium assets from Arafura to NuPower.

The license was subject to area reduction at the end of Year 2. As a result of the lack of exploration work during the demerger process in Year 1, and delays with the airborne survey and data processing it was not possible to identify any areas for relinquishment. A waiver of the reduction was requested and granted on 29th July 2008. The results of the airborne survey now show substantial thicknesses of unconsolidated sediments in a Tertiary trough throughout the northern part of the licence and that basement lies at shallow depth beneath cover throughout the southern part of the area. Preliminary scout drilling has demonstrated the prospectivity of the Tertiary trough for secondary uranium and reconnaissance of radiometric anomalies in the southern part is incomplete. It was therefore not possible to identify areas for relinquishment during the current reporting period. A request of waiver of reduction was granted on 21st April 2009. No blocks have been relinquished and all 261 blocks have been renewed for the fourth year of the license.

A request to waive reduction for the end of Year 4, was requested 30th April 2010 which was approved 25th May 2010. A further request to waive reduction was also made at the end of Year 5 which was also ultimately approved.

A relinquishment of 15 blocks, the subject of this report, was made in 2012 (Figure 4). The license occupies the following perpetual pastoral leases (Figure 3):

- NT Portion 703 Aileron Station.
- NT Portion 725 Pine Hill Station
Figure 2 - Woodforde (EL24741) Application Area
Figure 3 - Pastoral Leases on Woodforde.
Figure 4 Area relinquished in 2012
NATIVE TITLE

An inspection of the Aboriginal Areas Protection Authority Register of Sacred Sites identified a series of sites located mostly in the headwaters of Hanson and Woodforde rivers in the western part of the tenement. Exploration activities were planned to avoid these areas.

There are no registered native title applications or determinations over any portion of the Woodforde tenement. A registered Indigenous Land Use Agreement, DI2006/003, registered in the name of the Department of Planning and Infrastructure, called Pine Hill CLA ILUA, on 16/11/2007, covers the central part of the license.

An Exploration Agreement between the Central Land Council and NuPower Resources that includes the Woodforde tenement has been negotiated.
GEOLOGY

REGIONAL SETTING

The Woodforde tenement is situated in the Aileron Province of the Arunta Region in the southern part of the Northern Territory (Figure 5).

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Figure 5 - Geological Regions of the Northern Territory and EL24741.
Deformed and metamorphosed Palaeoproterozoic orogenic rocks older than 1800 million years outcrop as major tectonic units surrounded by younger rocks and essentially form the recognisable and inferred basement to the North Australian Craton. These Palaeoproterozoic rocks form the Pine Creek Orogen, Tanami Region, northern Arunta Province, and Tennant, Murphy and Arnhem Inliers. They include remnants of Archaean rocks, which have been dated at 2500 million years.

To the south, the rocks of the North Australian Craton pass into the Central Australian Mobile Belts of the Proterozoic Orogens of the Arunta Region and Musgrave Block, consisting of granulite and amphibolite facies, metamorphosed sediments and mafic volcanics intruded by granitoids. In the southern Arunta Province, episodic igneous activity took place between 1880-1050 million years and deformation included a series of major tectonic events, including retrogressive metamorphism in the Proterozoic and Palaeozoic. These basement rocks are exposed in the northwest corner of the license and along the southern boundary of the licence.

In central Australia, the geographically isolated Ngalia and Amadeus Basins (along with the Officer Basin in SA & WA) represent the fragmented remnants of the ‘Centralian Superbasin’, and together with the Georgina Basin in the east, form part of the North Australian Platform Cover. Unconformably overlying the Proterozoic Orogenic Belts, their predominantly sedimentary successions are mildly deformed and largely unmetamorphosed. The Woodforde tenement lies to the north of the Ngalia Basin over crystalline Proterozoic rocks.

A system of major WNW-ENE trending and north-northeast dipping thrust and reverse faults and shear zones affects the Arunta Region and northern margin of the Ngalia Basin. The associated shear zones can be up to hundreds of meters in width and extend for several kilometres, and are thought to have formed during the 400-300 Ma Alice Springs Orogeny (Cartwright et al., 1999). A major fault, informally referred to as the Ti-Tree Fault, runs along the northern boundary of the Reynolds Range (and it's continuation to the southeast) and forms part of this set of structures.

Cainozoic palaeodrainage systems are interpreted to be the remnants of the Mesozoic drainage system that once flowed into the Eromanga Basin in the southeast of the Northern Territory. Whilst the modern drainage flows north off the Reynolds Range, geological evidence strongly suggests that the Cainozoic palaeodrainage systems generally flowed towards the south and southeast. Evidence suggests a significant reactivation of structures created during Alice Springs Orogeny occurred during the early Tertiary and acted to deepen and create and rejuvenate the Cainozoic palaeodrainage systems. Southwards flowing palaeodrainage systems appear to have been dammed, diverted (generally to the the east) and even reversed by this neotectonic event that also affected the MacDonnell Ranges to the south. This event is also interpreted to have been responsible for incision of meandering drainage systems through the MacDonnell (and other) Ranges. Similar drainage incision in response to early Tertiary neotectonism is also found in the Neoproterozoic Flinders Ranges (South Australia). In the Ti-Tree region, the creation of a minimum of 320m of structural relief (accommodation space) is indicated by the thickness of the preserved Cainozoic sedimentary package within the Ti-Tree Basin.

**LOCAL GEOLOGY**

**Pre-Cambrian-Proterozoic**

According to the web-site of the NTGS (December, 2004) basement rocks in the Aileron region comprise part of:

‘... the Arunta Region, a complex basement inlier in central Australia that has undergone a prolonged history of sedimentation, magmatism and tectonism extending from the Palaeoproterozoic to the Palaeozoic. The Arunta Region can be subdivided into the three, largely fault bounded terranes with distinct geological histories: the Aileron, Warumpi and Irindina Provinces. The Aileron Province comprises greenschist to granulite facies metamorphic rocks with protolith ages in the range 1865-1710 Ma. It forms part of the North Australian Craton and is geologically continuous with the gold-bearing Tanami and Tennant Regions to the north. The Aileron Province comprises amphibolite to granulite facies rocks with protolith ages in the range 1690-1600 Ma, and is interpreted to be an exotic terrane that accreted to the southern margin of the North Australian Craton at 1640 Ma.'
The Irindina Province in the Harts Range region comprises Neoproterozoic to Cambrian metasediments that formed in a major depocentre within the Centralian Superbasin and underwent high-grade metamorphism and deformation during Ordovician (480 - 450 Ma). 

The Woodforde tenement is underlain by basement rocks of the Aileron Province (Figure 5, Figure 6, Figure 7).

Because of the high grade of metamorphism and the relative paucity of continuous outcrop across the Arunta Province, a reliable stratigraphy has not yet been constructed for the metasedimentary sequences. Instead, the Early–Mid Proterozoic metamorphosed rocks of the area have been subdivided by Stewart (1981) into three “Divisions”, intruded by granites, on the basis of “broad lithological correlations”. Division 1 being regarded as the oldest and Division 3 as the youngest. The rock units within each division may be chronostratigraphic correlatives but there is no evidence yet to support this.

Division I rocks comprise mafic and felsic granulites and minor metapsammite and calcareous lithologies that are typified by granulite facies metamorphic mineral assemblages. They are faulted against rocks of Division 2 or form enclaves surrounded by granite, orthogneiss or granitic gneiss.

Division 1 comprises the Tyson Creek Granulite, Weldon Metamorphics and Possum Creek Charnockite confined to the north-western corner and Aileron Metamorphics in the central western part of the area.

Division 2 comprises mostly metamorphosed pelitic, calcareous, or psammitic rocks and minor mafic-intermediate meta-igneous rocks. They range from low greenschist to low granulite facies. Division 2 is usually faulted against Division 1 and overlain with an angular unconformity by Division 3.

Division 3 consists of a basal conglomerate or arkose overlain by a mature quartzite followed by metamorphosed pelitic and calcareous rocks. Similar to Division 2 they grade from low greenschist to low granulite.

Interlayered mafic and lesser felsic granulites of the Tyson Creek Granulite, dated at 1650 Ma, outcrop on the southeast flank of the Anmatjira Range, representing mafic flows or sills. The Weldon Metamorphics abut Tyson Creek Granulite comprising coarse-grained sillimanite-garnet-biotite-cordierite-orthoclase-oligoclase-quartz migmatitic gneiss, felsic granulite and quartzose granulite and a small lens of hornblende labradorite amphibolite. They probably represent interbedded shales, shaley sandstones and greywackes and minor mafic igneous rocks.

A small mass of Possum Creek Charnockite, consisting of strongly gneissic hypersthene-quartz-andesine-sanidine granite and known to intrude the Tyson Creek Granulite elsewhere, is in fault contact with Anmatjira Orthogneiss. It appears to be a high temperature granite intruded when the adjacent Tyson Creek Granulite and Weldon Metamorphics were metamorphosed to granulite facies.

The Aileron Metamorphics comprises a diverse assemblage of lithologies outcropping as enclaves entirely surrounded by granitic rocks. Felsic granulite is most abundant, accompanied by mafic granulite and subsidiary cordierite gneiss, garnet-biotite gneiss, cal-silicate rock and marble, sillimanite gneiss, quartz-rich metasediments and quartzo-feldspathic gneiss. They have been dated at 1670 and 1650 m.y. and probably represent acid and basic volcanics and pelitic, calcareous and quartzose sediments.

Division 2 rocks here are confined to the headwaters of Woodforde River in the north-western part of the area although rocks of this Division are the most extensive of the three divisions in the Reynolds Ranges region. Subdivided into 6 units they all appear to be lithological facies of one enormous flood of terrigenous detritus. Represented here by two lithologies of the Lander Rock Beds they comprise highly folded pelitic and impure metasediments ranging in grade from high amphibolite to low granulite facies. Rocks include cordierite-quartz and cordierite-orthoclase granofelses with accessory sillimanite, garnet, tourmaline and biotite and rare sapphireine. They appear to have originated from a granitic terrain.

Division 3 is represented here by rocks of the Reynolds Range Group, a conformable sequence of quartzite, shale and carbonate. Outcropping in the headwaters of Woodforde River units of the Pine Hill Formation comprise coarse-grained quartz-cordierite-microcline-biotite-sillimanite granofels.
Figure 6 - Geology of the Aileron Region.
Eleven intrusive granitic units, Mid Proterozoic in age, have been mapped in the Reynolds Ranges region, grouped into 7 older granitic gneisses and orthogneisses dated at 1500-1600m.y and three younger gneisses and unmetamorphosed porphyritic granite dated at 1350-1400m.y. Five of the older granitic rocks, the Anmatjira, Boothby, Yaningidjara, and Aloolya Orthogneisses and un-named gneiss are represented here.

The Anmatjira and Aloolya Gneisses, and the un-named gneiss intrude Tyson Creek Granulite and Weldon Metamorphics in the Mt Weldon-Mt Finniss area in the northwest corner of the license where the Anmatjira Gneiss contains a small occurrence of REE near Mt Finniss. Boothby Gneiss outcrops in the headwaters of Woodforde River in the central-eastern part of the area and is associated with the Nolans Bore REE deposit. Yaningidjara Gneiss underlies the Yaningidjara Hills in the northwest part of the area.

The Orthogneisses are granitic in composition, contain xenoliths of the surrounding metamorphic rocks, locally send dykes into the surrounding country rocks and are therefore interpreted as pre-syn tectonic granites.

The Arunta Block is traversed by a series of WNE-NW trending faults that locally widen out into extensive zones of shearing and retrogression comprising muscovite-quartz schist with extensive quartz veins and epidote-bearing rocks. One of these, the Aileron Shear, passes through the southwestern corner of the tenement.

Neoproterozoic-Palaeozoic

Outliers of sediments of the Ngalia and Georgina Basins are mapped northeast of the tenement, represented by minor outcrops of Late Proterozoic cobble conglomerate overlain by silicified sandstones of the Vaughan Springs Quartzite and silicified sandstone, tillite, varved shale, pyritic siltstone and conglomerate of the Central Mount Stuart Formation, respectively. Their presence overlying Arunta Block within the tenement is unconfirmed.
The Ngalia Basin is an under-explored greenfields basin with significant sandstone hosted uranium potential. The largest known uranium deposit is at Bigrlyi, where a uranium-vanadium resource has been defined within steeply dipping carbonaceous sandstone of the Palaeozoic Mount Eclipse Sandstone. The mineralisation is stratiform and tabular, and is likely to be controlled by the presence of reducing organic matter in the sandstone.

The Georgina Basin comprises basal quartz sandstones, quartzites and conglomerates that elsewhere include phosphatic units with trace amounts of uranium mineralisation. This is overlain by transitional marine/continental and glacial red and white sandstones and siltstones, quartzite, arkose, shale, conglomerate with basal tillites, boulder beds and ferruginous pebbly sandstones of the Central Mount Stuart Formation, noted north of here.

**Cainozoic Regional Geology**

The southern NT forms a ‘basin and range’ province with Proterozoic and Palaeozoic rocks forming prominent ranges separated by broad valleys. Cainozoic sedimentary basins are widespread and well-developed within these intervening topographic depressions with at least twenty major basins known (Senior et al., 1995). The Woodforde tenement covers portions of the eastern half of the Ti-Tree Basin (Figure 8).

The stratigraphy of the intermontane Cainozoic basins of the southern NT region is generally poorly known. This is attributed to a lack of outcrop, strong weathering overprints, the paucity of drillholes and a lack of attention paid to the ‘cover’ overlying crystalline basement. Knowledge of the distribution and extent of the Cainozoic has been largely gained through accidental intersections in water bores or in drillholes seeking mineralisation under cover.

Water bores throughout the Alice Springs region provide only limited stratigraphic information on the upper parts of the Cainozoic as they rarely exceed 100m in depth and are typically <50m deep. Limited stratigraphic drilling was undertaken in the southern NT region by both the BMR (now Geoscience Australia) and the NTGS during the 1960’s and 1970’s. These programs were summarised in Senior et al., (1994) from which a single paper (Senior et al., 1995) was published. These sources provide almost all of the stratigraphic information on the Cainozoic Basins.

In 1972, CRA Exploration completed a traverse of six drillholes in the western part of the Ti-Tree Basin, one of which (TT6) was located on Woodforde (EL24741). CRA’s work indicated that, in places, the Ti-Tree Basin is in excess of 300m deep. Limited stratigraphic drilling was undertaken in the southern NT region by both the BMR (now Geoscience Australia) and the NTGS during the 1960’s and 1970’s. These programs were summarised in Senior et al., (1994) from which a single paper (Senior et al., 1995) was published. These sources provide almost all of the stratigraphic information on the Cainozoic Basins.

During the late 1970’s and early 1980’s the relatively small Hale Basin (Figure 8) was explored extensively for coal (lignite) and sedimentary uranium and can therefore be considered to be the best known Cainozoic basin in the NT. The stratigraphy of the Hale Basin is summarised in Figure 9 and although the succession in the Hale Basin is relatively thin (<100m), it can considered to represent a generalised Tertiary stratigraphy for the southern NT.

Based upon drilling in the Hale Basin, Senior et al. (1994) defined a broad two-fold stratigraphic subdivision that corresponds well with the observed pattern of Cainozoic sedimentation elsewhere in southern Australia. It comprises a restricted, fluvial palaeochannel dominated Palaeogene succession (Hale Formation) overlain by a more widespread, dominantly lacustrine Neogene succession (Waite Formation). An additional stratigraphic unit, the Napperby Formation (Higgins, 2009) has since been recognised as overlying the Waite Formation and represents the development of prograding alluvial fans shed from the ranges flanking the Cainozoic Basins.

Strong affinities with Eocene palaeochannel sediments in southern Australia (Higgins, 2009) suggest that the Hale Formation should be further subdivided into a Upper subdivision (Late Eocene), comprising the Tug Sandstone Member and representing development of a widespread ‘sand sheet’; and a Lower subdivision (Early-Middle Eocene) recording a fining upwards trend from the fluvial Ambalindum Sandstone Member to the paludal Claraville Mudstone and Ulgnamba Lignite Members.

Whilst Senior et al.’s (1994) Cainozoic stratigraphic units were initially defined in separate, small and isolated Tertiary Basins, these units are now recognised as components of a much larger Tertiary palaeodrainage system, the extent and size of which has until now been vastly underappreciated (Higgins, 2009).
Both historic and recent drilling results indicate that the apparently isolated Tertiary Basins contain very thick sedimentary packages. The Cainozoic fill of the Burt Basin exceeds 200m and the Sixteen-Mile Basin contains at least 180m of sediment. Similarly, the Whitcherry Basin and Waite Basins are known to exceed 250m in thickness in some locations, whilst minor tributaries feeding the Ti-Tree basin contain up to 140m of sediments. The maximum thickness of the Cainozoic sediments in the Ti-Tree Basin is not currently known as exploration drillholes to date in the centre of the basin, after drilling through a minimum of 320m of sediment, have failed to penetrate to basement. Thicknesses of 400-500m of sediments are considered to be likely in the deeper portions of the basin.
Figure 8 - Tertiary Basins in The Woodforde – Alice Springs Area.
Deposition and Weathering
Deposition of Cainozoic sediments was episodic and punctuated by hiatuses during which prolonged periods of weathering resulted in the formation of well-developed weathered profiles (paleosols and duricrusts). Deep weathering was an ongoing process during the Tertiary but was enhanced at particular times during the time by the combination of periods of warm, humid climates, non-deposition and surface exposure. Senior et al. (1995) defined three Palaeogene weathering events which affected Arunta igneous and metamorphic basement rocks.
and the overlying Tertiary succession. An additional two weathering events have been recognised from the overlying Neogene succession and appear to correlate with similar periods of weathering and exposure evident in southern Australia.

Weathering Event A (Senior et al. 1994, 1995) occurred during the Late Cretaceous to Early Tertiary (Palaeocene). Trizonal weathering profiles were developed in basement rocks over a widespread area of the Arunta Region and at the base of surrounding Tertiary basins. The trizonal profile consists of a basal kaolinitic zone (up to 10 meters thick) that grades into a multicoloured mottled zone (up to 10 meters thick) and is then capped by a ferruginous or (laterite/ferricrete) zone up to 8 meters thick.

Following uplift and partial truncation of the deeply weathered basement rocks, sedimentation in the surrounding Tertiary basins began in the Palaeocene with deposition of thick colluvium including fanglomerates flanking the ranges. This was followed by deposition of fluvio-lacustrine sand, silt and clay (locally carbonaceous) and lignite of the Lower Hale Formation in the Ti-Tree and Burt Basins during the Early to Middle Eocene. Locally this includes a basal lacustrine green and grey pyritic mudstone, white mudstone and siltstone, and red iron oxide stained siltstone and siltstone. Fluvial sands of the Ambalindum Sandstone Member fine upwards into the paludal Claraville Mudstone and Ulgnamba Lignite Members.

Weathering Event B, recorded in the Hale Basin, occurred prior to the Middle Eocene, although there is little evidence elsewhere for this weathering event (Senior et al., 1995). This resulted in lithification and formation of a second ferricrete profile.

Deposition of sandstones of the Upper Hale Formation took place during the Late Eocene and these sediments were subsequently overprinted by Weathering Event C marking widespread exposure and surficial weathering in response to a prolonged period of non-deposition during the Oligocene.

Climatic amelioration during the Early Miocene rejuvenated the palaeodrainage systems and led to the deposition of fluvial sands at the base of the Waite Formation. A change from fluvial to lacustrine sedimentation then followed during the Middle to Late Miocene and resulted in the accumulation of over 300 meters of fluviatile and lacustrine limestone, sands, muds, and sandy conglomerate in localised depocentres.

The upper portions of the Waite Formation are regionally extensive and consist largely of clay and dolomitic clays that reflect the widespread development of broad, shallow evaporitic lakes throughout southern Australia as the continent drifted further northwards and became progressively more arid and seasonal. Two gradational upwards cycles from clays to dolomitic clays to dolomitic limestones (often capped by chalcedonic limestones and silcretes) are commonly observed, suggesting that deposition of the Waite Formation occurred in at least two phases. Weathering Event D was responsible for the formation of the inter-Waite Formation silcrete (possibly in the Middle Miocene).

Outcrops of the Waite Formation are frequently capped by calcretised limestones and distinctive chalcedonic silcretes that form regionally widespread stratigraphic markers. Development of these more variable duricrusts occurred in response to Weathering Event E.

In proximal locations, the Waite Formation interfingers with, and is conformably overlain by a moderately thick (<60m) succession of oxidised colluvial material shed off the Woodforde and Reynolds Ranges in response to neotectonism during the (?Late) Pliocene. This material can be recognised throughout the region and represents a broadly coarsening upwards alluvial fan which can be subdivided into an Upper, Middle and Lower Members. This unit is informally referred to as the Napperby Formation and comprises a succession of oxidised and haematitic, clayey sands, sandy clays and minor conglomerates. Ferruginised, haematitic alluvial palaeosols (bearing a strong resemblance to modern soils) are a characteristic feature of the Middle Member with palaeosol development potentially corresponding to Weathering Event E (or recording another period of enhanced weathering).

Overlying these sediments are unconsolidated Quaternary sediments including quartz sands, silts, red earths and clayey and sandy soils that record a complex history of deposition, erosion and redeposition due to climate changes and gentle tilting. Large outwash fans from the northern side of the MacDonnell Ranges have formed alluvial plains and overbank deposits alongside sandy drainage channels. In more distal locations, the
development of aeolian sand plains was widespread. The formation of calcretes, particularly within drainage channels and atop the Waite Formation, was widespread during the Quaternary (Weathering Event E).
PREVIOUS EXPLORATION

Records of systematic exploration in the Reynolds Range west of the Woodforde tenement date back as early as 1948 (Thevissen, 1995) but most investigations date from about 1965 (Stewart, 1982). Base metals, tin and tungsten were mainly targeted prior to 1973 when uranium exploration gathered momentum. This commodity dominated the exploration in the next 15 years, both in the metamorphic and granitic rocks of Reynolds Range and also in the sandstones of the Ngalia Basin to the south. Since 1990, with the advent of the BLEG geochemical technique more attention has been directed towards gold exploration though some uranium exploration activity still persisted.

CRA Exploration Pty Ltd AP2617 (1970)
Exploration by CRA in this tenement was for gold, silver, base metals and uranium. A stream sediment survey revealed minor anomalies in base metals while water bores in the area yielded anomalous values for uranium. However, follow up work failed to reveal any significant mineral occurrences. Ten auger holes were drilled, varying from a few feet in depth to 105 feet. AP2617 was relinquished in 1971.

CRA Exploration Ltd EL3360 (1971)
EL3360 overlapped the middle and southeast of Woodforde and extended north and eastwards beyond the present tenement. A literature search was undertaken and the presence of anomalous analyses for uranium in local water bores was noted. Fifty-eight water bores were then sampled and 46 gamma logs were run on all open bores. Many of the bores had been idle for several years and this may have affected the analytical results. Continuous ground radiometric traverses were also run. Sediments in the valley of the Kerosene Camp Creek and Woodforde River were sampled by 46 shallow auger drill holes. Additional work was recommended, however this was the final report and the tenement was relinquished in 1972.

Tanganyika Holdings Ltd EL241 and EL242 (1972)
EL241 overlapped the north and extended northeast beyond the Woodforde tenement, while EL242 lay just to the north of Woodforde and extended to the northeast. Inspection of selected anomalies involved stream sediment sampling, radiometric work and field reconnaissance. Initial reconnaissance indicated that the area was not prospective for base metals or precious metals but that it was prospective for uranium. Investigation of the uranium potential was not followed up and the area was relinquished in 1972.

CRA Exploration Pty Ltd EL752 (1972)
EL752 just overlapped the east central boundary of Woodforde and extended eastwards. Based on earlier work in the tenement area, six rotary cored holes were drilled at 5km intervals. The sediments intersected were not considered favourable for uranium deposition due to poor permeability, fine grain size and fair to good sorting. One hole, TT6, is within Woodforde and the other five are on a line bearing northeast at N42ºE from TT6. It was recognised that palaeochannels could exist and three seismic lines were run using the reflection method. The reflection seismic method appears to have successfully indicated basement topography and a subsurface valley structure has been indicated, but the tenement was subsequently relinquished in 1973.

Central Pacific Minerals NL EL1384 (1976)
EL1384 overlapped the central west boundary of Woodforde and extended to the southwest onto the southeast of the NuPower Yalyirimbi tenement. Exploration was for zinc-copper-lead along Precambrian carbonate-amphibolite contacts, scheelite-copper within calc-silicate units and uranium in Precambrian vein and skarn environments. Stream sediment and rock chip samples were collected and minor ground radiometrics were measured. The geochemistry results were generally disappointing and sources of radiation were found to be small pegmatite bodies and fracture zones within the granite. The Exploration License was relinquished in 1978.

Otter Exploration NL EL1444 (1977)
Exploration was for uranium in skarn and sedimentary environments. Water bore analyses were collected and Otter Exploration had an airborne survey flown. Otter also used an earlier BMR survey and their work revealed a total 41 anomalies. Twenty-six of the anomalies were on the granite or gneissic outcrop and 15 occurred over Quaternary alluvial sand. Although all the anomalies were followed up there were no significant results and the tenement was relinquished in 1980.

BHP Minerals Limited EL2942, EL3075, EL3084 & EL3088 (1981)
EL2942 overlapped most of the northern half of Woodforde and extended to the west, slightly overlapping the southeast corner of NuPower’s Yalyirimbi license. EL3088 just overlapped Woodforde to the north and extended to the north, northwest and northeast. ELs 3075 and 3084 were northeast of Woodforde.

BHP’s primary interest in this area was for diamonds with a lesser interest in base metals. Stream sediment samples were collected, but no favourable results indicating the presence of kimberlite deposits or base metals were obtained from the sampling and the tenements were dropped.

James Weir EL3506 (1982)
EL3506 overlapped the central area of the Woodforde tenement and extended slightly to the west and south. Prospecting consisted of a ground scintillometer survey and selected rock chip sampling. One anomalous area of uranium, thorium and rare earths was located but had limited surface extent. Only one report was submitted, without conclusions. EL3506 was relinquished in 1983.

BHP Minerals Ltd EL4188 (1983)
This tenement just overlapped Woodforde at the east central boundary and extended to the north and east. Exploration was for base metals.

A combined aeromagnetic/radiometric survey was flown over the tenement in May 1983 and two gravity traverses were carried out. The resulting magnetic intensity contour map of the area revealed a “bull’s-eye” shaped anomaly, however, subsequent evaluation of the anomaly gave no significant values. One percussion hole, drilled 256m, passed through 94m of Tertiary sediments before intersecting crystalline basement. It was concluded that a unit within the Arunta Complex was the source of the anomaly and geochemical analyses of drill samples for base metals revealed no significant values.

Track Minerals Pty Ltd EL 5901 (1988)
This EL overlapped the southern quarter of Woodforde and extended to the south and slightly east. Exploration was primarily for gold. Stream sediment sampling, geological traverses and rock chip sampling failed to locate any signs of significant gold or base metals mineralisation. There was no drilling and the EL was dropped in 1989.

Tidegate Pty Ltd EL8117 (1993)
EL8117 overlapped the south end of Woodforde and extended south into the Ngalia Basin. It straddled the Stuart Highway with 80% of the tenement east of the highway.

Thirty eight BLEG samples, 38 soil samples and 17 rock chip samples were collected to investigate the presence of gold and platinum mineralisation associated with possible ultramafic rocks at Native Gap Ni-Cr Prospect, Harry’s Yard Amphibolite and in quartz veins at Aileron Gold Reefs Prospect. Results were below expectations and the EL was relinquished in 1994.

PNC Exploration (Australia) Pty Ltd EL 8411 (1994)
EL8411 just overlapped the western side of Woodforde and extended to the west, overlapping most of the eastern boundary of NuPower’s Yalyirimbi tenement.

PNC concentrated their search on identifying chemical-pelitic, meta-sedimentary sequences near the base of the Proterozoic and airborne radiometric surveys combined with ground based reconnaissance located numerous secondary uranium occurrences. One hundred and eighty radiometric anomalies were investigated of which 30 contained visible secondary uranium minerals, 22 occurring within the Napperby Gneiss.

Reconnaissance work located the Napperby Creek Uranium Prospect. Follow up included semi-detailed geological mapping, magnetics and radiometrics, rock chip sampling and petrology. Helicopter supported reconnaissance located a new uranium occurrence in metasomatised quartz-tourmaline rocks of the Wickstead Creek Beds near Mount Freeling. In addition secondary uranium mineralisation was located in the Napperby Gneiss adjacent to a major WNW shear some 5km from the Napperby Creek Prospect. The area was relinquished in 1996.

Aberfoyle Resources Ltd EL9146 (1995)
EL9146 lay between the NuPower Woodforde and Sandover tenements, slightly overlapping the east boundary of Woodforde and abutting the west boundary of Sandover. It was explored in conjunction with EL9145. Aberfoyle Resources were targeting the gold potential of the Early Proterozoic sequences present on the license and thought to host mineralisation of the type developed to the west in the Granites/Tanami Inlier.

BMR regional airborne magnetic data was acquired and processed along with results from the magnetic survey contracted to World Geoscience Corporation. The aeromagnetic surveys revealed numerous magnetic anomalies. The aerial surveys were followed up with ground magnetic surveys and 6 RAB holes (299m total drilling) drilled in two lines to determine the thickness of cover. Four holes successfully reach basement. Lithologies intersected were generally granitic and no significant geochemical values were obtained. There was no final report and the tenement was relinquished in 1999.

**Aberfoyle Resources Ltd EL9145 (1996)**

EL9145 overlapped the northern 60% of the Woodforde tenement and extended to the east, west and north. It was explored in conjunction with EL9146 for gold in the Early Proterozoic sequences, as above. World Geoscience Corporation carried out a magnetic and radiometric survey of EL9145 in 1996. This survey revealed numerous magnetic anomalies but there is no record of any follow up investigation of the anomalies. The last report was a partial relinquishment report, there was no final report and the tenement was relinquished in 1999.

**EL9672 Star Money Lenders Pty Ltd/Arafura Resources Ltd (1996)**

EL9672 overlapped the southern part of Woodforde and extended west and then northwest along the NuPower Yalyirimbi boundary. The first two years of the license involved helicopter supported stream sediment sampling and gold analyses. Limited ground follow-up was also carried out. The results were disappointing and it was concluded that it was unlikely that significant near surface gold mineralisation occurs.

Subsequent literature research in 1999 revealed that PNC had located significant anomalous values of REE in the Nolan’s Bore area. Exploration then shifted to this area, resulting in the Nolan’s Bore REE discovery.

**Tanami Gold NL EL22387 (2003)**

This tenement was part of a block of tenements held by Tanami Gold which overlapped Woodforde at the north and extended some distance farther to the north. Exploration was for Proterozoic hosted gold mineralisation in the basement rocks of the Napperby area. Stream sediment and rock chip samples were collected but returned no encouraging results. The tenements were relinquished in 2006.
NUPOWER EXPLORATION ACTIVITIES COMPLETED

INTRODUCTION

Several days were spent following up coincident radiometric and geochemical thorium and uranium anomalies in this tenement with 4 samples taken for assay (Figure 10). The anomalies were traversed with geological observations made and plotted on the maps below. Five samples were taken for assay. Some samples (13) were also taken from here in 2008, results from these are included in the data provided with this report.

Anomaly B

This is a very large strata-parallel radiometric anomaly in the northwestern part of the EL. In this area the following stratigraphic units have been mapped – Weldon Metamorphics (granulites), Tyson Creek Granulite, and Anmatijira Orthogneiss. A geochemical target is also present in the area; in two locations previous NuPower samples had assayed anomalous uranium and thorium.

The dominant lithologies in this area are metamorphosed granite/granodiorite (Figure 11). This is sometimes very coarsely porphyritic. There are also lesser outcrops of quartzite, quartz biotite and quartz muscovite schist (sometimes with large feldspar phenocrysts/porphyroblasts). Pegmatite sill and dyke outcrops are quite common. These are generally quite small in area, and generally only a few metres wide.
Figure 10 - Woodforde River anomaly location and airborne radiometric thorium
Figure 11 - Anomaly B geology, radiometrics, sample location
The meta-granite/granodiorite has a high radiometric background – typically 400-600cps. An example of spectrometer equivalent U and Th from this is 35ppm U, 373ppm Th. The pegmatites are commonly highly radiometrically anomalous – to >2000cps. Equivalent Th in these rocks is generally considerably higher than U – e.g. 17ppm U with 271ppm Th, 17ppm U with 895ppm Th. The previous NuPower samples were taken from pegmatites, even when described as quartz rubble – really mainly feldspar crystals in scree derived from outcropping pegmatite.

Stream beds in this area are highly radiometrically anomalous – often about 1000cps. This is obviously due to heavy minerals, probably monazite, in the sandy alluvium.

Three rock samples were taken for assay; assays for selected elements are tabulated below:

<table>
<thead>
<tr>
<th>SAMPLE</th>
<th>U  (ppm)</th>
<th>Th (ppm)</th>
<th>Ce (ppm)</th>
<th>La (ppm)</th>
<th>Nd (ppm)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>20086</td>
<td>9.1</td>
<td>406</td>
<td>468</td>
<td>215</td>
<td>137.5</td>
<td>pegm dyke/sill, flds-qtz-bi</td>
</tr>
<tr>
<td>20087</td>
<td>32.6</td>
<td>570</td>
<td>653</td>
<td>312</td>
<td>172</td>
<td>Porph fol granodiorite</td>
</tr>
<tr>
<td>20088</td>
<td>9.7</td>
<td>490</td>
<td>787</td>
<td>375</td>
<td>192.5</td>
<td>cgr flds pegm, minor bi</td>
</tr>
</tbody>
</table>

Both the pegmatite bodies and porphyritic foliated granite have elevated uranium, thorium and rare earths. However these values are much too low to be of economic interest.

The radiometric anomaly in this area is due to “hot” meta-granites, granodiorites and pegmatites. Uranium and rare earth contents in these rocks do not approach economic levels. Previous high uranium and thorium assays were also from small irregular pegmatite bodies of no economic significance.

**Anomaly C**

This is north of Anomaly B and is another large strike-parallel anomaly this time coincident with mapped Aloolya Gneiss – described as granitic gneiss with tourmaline and garnet.

Traverses in this area showed it to be underlain by variously foliated sometimes porphyritic granite and granodiorite (Figure 12). There are minor pegmatite, quartz and quartz-tourmaline veins. Just to the south of the radiometric anomaly outcrops of quartzite, schist and dolerite occur. These have been mapped as Weldon Metamorphics.

Radiometric background over the granitic rocks is 400-600cps with rarely up to 800cps. In one location equivalent U was 52ppm with 54ppm Th. Over the schist and dolerite to the south of the radiometric anomaly background was up to 300cps. One sample was taken for assay:

<table>
<thead>
<tr>
<th>SAMPLE</th>
<th>U  (ppm)</th>
<th>Th (ppm)</th>
<th>Ce (ppm)</th>
<th>La (ppm)</th>
<th>Nb (ppm)</th>
<th>Sample Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>20089</td>
<td>18.3</td>
<td>32</td>
<td>44</td>
<td>20.6</td>
<td>4.1</td>
<td>mgr non-porph wk gneissic bi granodior</td>
</tr>
</tbody>
</table>

This sample of gneissic meta-granodiorite had only weakly anomalous levels of U, Th and slightly elevated rare earths.

No signs of mineralization were found here and the radiometric anomaly is due to the relatively high U and Th in the meta-intrusives.
Figure 12 - Anomaly C, geology, radiometrics, sample location
CONCLUSIONS

- The radiometric anomalies traversed were found to be due to “hot” granites and pegmatites. These have typically up to about 50eppm U and much higher Th. There is no evidence of Rossing style mineralization here. Pegmatites can be particularly strongly enriched in U and Th, but this is extremely variable. Sometimes the abundance of biotite or tourmaline is indicative of the amount of U and Th.
- There are elevated levels of rare earths in some pegmatites and meta-granite. However these values are too low to be of economic interest. The pegmatite bodies are generally thin and discontinuous.
- There is very little difference in the composition and texture of the granites/granodiorites within each body. However the style of foliation varies a lot. Foliation is sometimes apparent only from phenocryst alignment, sometimes there is variable schistocity and sometimes a gneissocity.
- The large areas of hot granites and pegmatites here constitute a good protore for uranium mineralization, however concentrations of uranium in the granites do not approach Rossing type grades and the features of unconformity style mineralization such as graphitic schists, unconformably overlying sandstone/conglomerate (Kombolgie equivalent) etc. do not exist. No evidence for vein-style mineralization was seen.

RECOMMENDATIONS

- Further exploration for hard rock uranium does not appear to be justified.

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