NT Uranium Licence
Preliminary Technical Review

Pacific Exploration Pty Ltd

Pacific Exploration Preliminary Uranium Review

MWP01121AA
14 May 2013

Pacific Exploration Pty Ltd
146 Clarendon Drive
KEYSBOROUGH VIC 3173

Attention: Junjie

Dear Junjie

RE: NT Uranium Licence Preliminary Technical Review

Please find attached our report on the Northern Territory Preliminary Technical Review of tenements EL 29202, EL 29205 and EL 29221.

We trust that this information meets your requirements. Should you require clarification of any information, please do not hesitate to contact us.

For and on behalf of Coffey.

Ron Uken
Associate Geologist
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EXECUTIVE SUMMARY

Pacific Exploration Pty Ltd ("Pacific") acquired three uranium tenements in southwestern Northern Territory (EL 29202, EL 29205, EL 29221) and contracted Coffey International Ltd ("Coffey") to investigate the uranium prospectivity. Coffey has completed a desktop study of the geology, historical uranium exploration activity in the area and the uranium potential of the licences.

Tenements EL 29202, EL 29205 and EL 29221 lie within the foothills of the Reynolds Range, to the northeast, east and southeast of Yuendumu. The regional geology comprises the polymetamorphic Palaeoproterozoic Arunta Block and the Neoproterozoic to Carboniferous Ngalia Basin. Although the tenements, lie outside the Ngalia Basin, and are therefore not prospective for sandstone–hosted mineralisation, they may potentially host metasomatite and surficial type uranium mineralisation.

A total of 24 historical tenements were reviewed with an emphasis on uranium exploration. Historical tenements were also granted to explore for; gold, base metals, tungsten and diamonds. The main focus of sampling and drilling was predominantly in the Reynolds Range to the north east of the tenements of interest. Of the three tenements, EL 29202 has had the most sampling and drilling undertaken, mainly during the 1970s, EL 29221 has had limited stream sediment sampling and no sampling or drilling was conducted on EL 29205.

Many companies identified uranium anomalies in stream sediment samples and radiometric surveys but generally the samples collected showed the source rocks had high background values but no economic mineralisation was identified. Significant historical anomalies are the Corrigan tin and tungsten anomaly (ANZECO, EL 1316) and the Napperby Creek U prospect (PNC Exploration, EL 8411).

Tenement EL 29202 comprises rocks of the Lander Rock beds and Wangala Granite. The Wangala Granite has an elevated U\(^2\)/Th radiometric response and elsewhere vein-style uranium mineralisation and Sn-W-Ta pegmatites have been reported. The Lander Rock beds are known to host metasomatite type fluor-apatite mineralisation as found at Nolans Bore. Surficial material in the tenement has not generated any radiometric anomalies.

Tenement EL 29205 is mostly covered by surficial material. Calcrete is developed in the Warburton Creek drainage system and may be prospective for surficial style calcrete uranium mineralisation with a small elevated U\(^2\)/Th radiometric response reported in the northeastern portion of the tenement and a more significant response on the southwestern border of the tenement.

Tenement EL 29221 is mostly covered by surficial material. Although no calcrete is reported, the U\(^2\)/Th radiometrics indicates a number of anomalies within the surficial material. An elevated U\(^2\)/Th response is also found within the Napperby Gneiss, along the southwestern border of the tenement, probably of vein/metasomatite style mineralisation investigated by PNC Exploration.
This study has indicated that all three tenements (EL 29202, EL 29205 and EL 29221) do not have any significant historical sampling coverage and no useful baseline geochemical data are available for uranium. Given the poor to non-existent geochemical sample coverage it is recommended that a baseline geochemical sampling and geological mapping be initiated along the drainage systems within the tenements. Tenements EL 29205 and EL 29221, are most prospective for surficial-style and calcrete uranium mineralisation, given the significant surficial cover developed and the radiometric U²/Th radiometric anomalies identified. Although tenement EL 29202 did not report any U²/Th radiometric anomalies, the surficial material is still considered prospective given its proximity to uranium enriched granitoid sources. In addition vein/metasomatite style mineralisation in tenement EL 29221 requires investigation along the southwestern boundary bordering the historic Napperby Creek anomaly.
INTRODUCTION

Pacific Exploration Pty Ltd (“Pacific”) acquired three uranium tenements in southwestern Northern Territory (EL 29202, EL 29205, EL 29221) and contracted Coffey to investigate the uranium prospectivity. Coffey has completed a desktop study of the geology, historical uranium exploration activity in the area and the uranium potential of the licences.

TENEMENTS

2.1 Location

The three uranium exploration tenements (EL 29202, EL 29205, EL 29221) lie within the foothills of the Reynolds Range, to the northeast, east and southeast of Yuendumu (Figure 2.1_1), extending from the vicinity of Mount Denison homestead in the northwest to Napperby homestead in the southeast. The geology is illustrated by the NAPPERBY 1:250,000 geological mapsheet.
2.2 Tenure

Tenements EL 29202, EL 29205 and EL 29221 were granted to Pacific Exploration Pty Ltd to explore for uranium. The schedule of rent and expenditure for each of the tenements is summarised in Table 2.2_1.

<table>
<thead>
<tr>
<th>Tenement ID</th>
<th>Granted</th>
<th>Expires</th>
<th>Area km²</th>
<th>1st Year Rent</th>
<th>1st Year Expenditure</th>
<th>2nd Year Expenditure</th>
</tr>
</thead>
<tbody>
<tr>
<td>EL 29202</td>
<td>4/07/2012</td>
<td>3/07/2018</td>
<td>339.9</td>
<td>$3,520</td>
<td>$26,500</td>
<td>$37,500</td>
</tr>
<tr>
<td>EL 29205</td>
<td>4/07/2012</td>
<td>3/07/2018</td>
<td>44.51</td>
<td>$448</td>
<td>$13,000</td>
<td>$24,000</td>
</tr>
<tr>
<td>EL 29221</td>
<td>14/08/2012</td>
<td>13/08/2018</td>
<td>114.28</td>
<td>$1,152</td>
<td>$19,000</td>
<td>$20000</td>
</tr>
</tbody>
</table>

3 GEOLOGY

3.1 Regional Geology

The crustal architecture of the region can be broadly subdivided into the Palaeo- to Mesoproterozoic Arunta Block and the Neoproterozoic to Carboniferous Ngalia Basin (Figure 3.1_1). The Arunta Block represents a complex amalgamated orogenic terrane that is represented by three shear bounded tectonic provinces, The Northern, Central and Southern Provinces (Stewart, Shaw and Black, 1984 and Shaw, Stewart and Black, 1984). The Southern Province is an amphibolite facies terrane comprising granitic gneiss. The Central Province is a granulite facies terrane dominated by felsic granulite. The Northern Province comprises low grade supracrustal metasediments of amphibolite and greenschist facies. Both the Northern and Southern Province are intruded by voluminous granite whereas the Central Province is relatively granite free.

The stratigraphy has been subdivided into three major divisions. Division One, the oldest, comprises a bimodal metavolcanic mafic and felsic granulite assemblage, interlayered with minor metasediments dominating the Central Province. Division Two, mainly consists of immature metasediments of turbiditic origin, covering extensive areas of the Northern Province. Division Three includes platform-style sediments comprising arenaceous, argillaceous and carbonate successions unconformably overlying the two older divisions and assigned to the Reynolds Range Group (Table 3.1). The Reynolds Range Group records a complex tectono-thermal history with four cycles recognised (Hand and Buick, 2001). The first two cycles, the Stafford Tectonic Event (c. 1820Ma), and the Strangways Orogeny (c. 1770–1780Ma), were associated with regional low-pressure high-temperature metamorphism up to granulite grade that was coeval with the emplacement of voluminous sheet-like granites. The subsequent Chewings Orogeny (c 590–1570Ma) was long-lived and produced regional low-pressure greenschist to granulite facies metamorphism without notable magmatism. Finally the Devonian to Carboniferous Alice Springs Orogeny (c 400–300Ma) dissected the area with sub-greenschist to mid-amphibolite facies shear zones.
The Ngalia Basin forms an elongate structural basin within the Palaeo- to Mesoproterozoic Arunta Block, preserving a Neoproterozoic to Carboniferous sedimentary sequence with a cumulative thickness of about 5000m. The Neoproterozoic comprises continental and fluvioglacial marine sedimentary rocks (Table 3.1). These are unconformably overlain by a Cambrian and Ordovician, shallow-marine clastic and carbonate sequence which is unconformably overlain by Devonian to Carboniferous fluvial sandstone, mudstone, conglomerate and greywacke deposited in response to the Alice Springs Orogeny (Table 3.1). The northern margin of the basin is bounded north-dipping thrust faults whereas the southern margin is formed by a gently north dipping unconformity.
## Table 3.1.1
Regional Stratigraphy of the Arunta Block and Ngalia Basin

### NGALIA BASIN

<table>
<thead>
<tr>
<th>Formation/Formation Group</th>
<th>Time Period</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mount Eclipse Sandstone Formation</td>
<td>Late Devonian – Carboniferous (~350 – 300Ma)</td>
<td>Arkosic sandstone and conglomeratic sandstone, greywacke, plant and trace fossils.</td>
</tr>
<tr>
<td>Kerridy Sandstone Formation</td>
<td>Devonian Period (419-358Ma)</td>
<td>Red-brown sandstone, minor mudstone.</td>
</tr>
<tr>
<td>Central Mount Stuart Formation</td>
<td>Late Neoproterozoic (635-542Ma)</td>
<td>Arkosic and quartzitic arenite, white, purple and red-brown; siltstone, dolostone, minor basal conglomerate.</td>
</tr>
<tr>
<td>Naburula Formation</td>
<td>Neoproterozoic</td>
<td>Dark grey shale, minor siltstone and dololutile, basal tillsite.</td>
</tr>
</tbody>
</table>

### ARUNTA BLOCK

<table>
<thead>
<tr>
<th>Group</th>
<th>Time Period</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arunta block granite gneiss</td>
<td>Middle Proterozoic</td>
<td>Porphyritic granite, microgranite, rapakiwi granite Orthogniesses, augen gneiss.</td>
</tr>
<tr>
<td>Reynolds Range Group</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Woodeforde River beds</td>
<td>1820-1780Ma</td>
<td>Meta sandstone, siltstone, pelitic schist, minor calcareous rocks and metabasalt.</td>
</tr>
<tr>
<td>Pine Hill Formation</td>
<td>1820-1780Ma</td>
<td>Quartzite, pelitic and psammite andalusite schist, minor calc-silicate and basalt.</td>
</tr>
<tr>
<td>Algamba Dolostone Member</td>
<td></td>
<td>Dolomite with manganiferous laterite pods.</td>
</tr>
<tr>
<td>Mount Thomas Quartzite</td>
<td>1773-1779Ma</td>
<td>White to grey fine- to medium-grained quartz sandstone; silica cemented, well-sorted, basal conglomerate.</td>
</tr>
<tr>
<td>Mount Stafford Member</td>
<td>2050-1800Ma</td>
<td>Cordierite hornfels, andalusite- sillimanite fels, quartzite, muscovite schist, sillimanite gneiss, muscovite-biotite schist, retrograde metamorphism.</td>
</tr>
<tr>
<td>Lander Rock Formation</td>
<td>1840-799Ma</td>
<td>Interlayered pelitic schist and psammite, melagreywacke; gneiss; meta-banded iron-formation, metavolcanics, greenschist to granulite facies metamorphism.</td>
</tr>
<tr>
<td>Wickstead Creek beds</td>
<td></td>
<td>Calc-silicate, marble, gneiss, schist; quartzite, sillimanite gneiss, quartzofeldspathic gneiss.</td>
</tr>
<tr>
<td>Mount Dunkin schist</td>
<td></td>
<td>Sillimanite schist and gneiss, minor biotite schist; quartzite, calc-silicate.</td>
</tr>
<tr>
<td>Nolans Dam metamorphics</td>
<td></td>
<td>Cordierite gneiss, quartzofeldspathic gneiss, garnet-biotite gneiss, sillimanite gneiss.</td>
</tr>
<tr>
<td>Mount Freeling Schist</td>
<td></td>
<td>Schist, gneiss, quartzite.</td>
</tr>
<tr>
<td>Aileron Metamorphics</td>
<td></td>
<td>Felsic and mafic granulite, cordierite granulite, amphibolite, biotite-garnet- gneiss, sillimanite gneiss, quartzofeldspathic gneiss, calc-silicate, marble.</td>
</tr>
<tr>
<td>Possum Creek Charnockite</td>
<td>1774±6Ma</td>
<td>Medium-grained foliated hypersthene-quartz-andesine-sandine granite.</td>
</tr>
<tr>
<td>Weldon Metamorphics</td>
<td>1879 to 1868Ma</td>
<td>Sillimanite-garnet-orthoclase-cordierite gneiss, sillimanite-garnet-biotite-cordierite granofels, amphibolite.</td>
</tr>
<tr>
<td>Tyson Creek Granulite</td>
<td></td>
<td>Mafic granulite, felsic granulite.</td>
</tr>
</tbody>
</table>
4 MINERALISATION

4.1 Uranium Mineralisation Styles

The generation of major uranium deposits involves aqueous fluids responsible for the transport and deposition of tetravalent (U⁴⁺) and hexavalent (U⁶⁺) uranium. Fluid types include magmatic-hydrothermal, metamorphic (including fluids reacted extensively with metamorphic rocks), and hydrosphere-derived fluids (meteoric waters, lake waters, seawater, groundwaters and connate fluids) resulting in a range of uranium deposit types. As expected, in magmatic and metamorphic environments tetravalent uranium is dominant, whereas in low temperature near surface more oxidising conditions, hexavalent uranium dominates.

Economic and sub-economic uranium deposits in the Northern Territory are classified into the following types (Lally and Bajwah, 2006) with the most likely mineralising fluid types after Skirrow et al (2009):

1. Vein type (magmatic, metamorphic fluids)
2. Metasomatite and intrusive type (magmatic, metamorphic fluids)
3. Unconformity-related type (basinal connate and groundwater fluids)
4. Westmoreland-Murphy type (basinal connate and groundwater fluids)
5. Sandstone-hosted type (basinal connate and groundwater fluids)
6. Surficial type and calcrete hosted (groundwater and meteoric fluids)

Of particular relevance to the Pacific uranium tenements and surrounding region are the sandstone-hosted, surficial and the metasomatite mineralisation styles. These occurrences fall within the zone of regional uranium potential in the Northern Territory (Lally and Bajwah, 2006) (Figure 4.1_1).
4.1.1 Sandstone-hosted Type

Sandstone-hosted deposits constitute some 30% of the annual world production, mostly by in situ leach (ISL) mining, from deposits in western USA, Niger and Kazakhstan. Deposits are typically low to medium grade (0.05 to 0.4% U\textsubscript{3}O\textsubscript{8}) with individual orebodies attaining 50,000t U\textsubscript{3}O\textsubscript{8} dominated by uraninite and coffinite mineralogy. Australian sandstone type deposits account for some 7% of the total uranium production and are derived from operations in South Australia at the Beverly Mine and the newly established Honeymoon Mine (World Nuclear Association, March 2013).

In the Northern Territory, sandstone-hosted type uranium mineralisation is reported from the Carboniferous Mount Eclipse Sandstone and Kerridy Sandstone Formations (Table 3.1_1) of the Ngalia and Amadeus Basins (Figure 4.1_1). Mineralisation in the Ngalia Basin is associated with detrital organic matter, whereas the Amadeus Basin mineralisation is more akin to roll-front deposits, where uranium was deposited across a redox gradient (Lally and Bajwah, 2006). The host sandstone is typically medium to coarse-grained, deposited in a continental fluvial or marginal marine environment, with impermeable argillaceous units in the hangingwall and footwall.

Uranium is precipitated when oxidised uranium bearing fluids are reduced. This is promoted mainly by fluid interaction with carbonaceous material (plant detriti, amorphous humate, algae, hydrocarbons) and bacteria as a catalyst, but also by sulphides (pyrite, H\textsubscript{2}S) and interbedded basic volcanics with abundant ferro-magnesian minerals (chlorite) (Spirakis, 1996).
Sandstone-type uranium deposits are further subdivided into three types: rollfront deposits, tabular deposits and tectonic deposits. Rollfront deposits form arcuate bodies of mineralisation that crosscuts sandstone bedding. Tabular deposits form irregular, elongate lenticular bodies parallel to the depositional trend, commonly in palaeochannels and tectonic deposits occur in sandstones adjacent to a permeable fault zone.

Sandstone-hosted Uranium in the Ngalia Basin Area

Some 20 sandstone style occurrences are known from within the Ngalia Basin (Figure 4.1.1_1) with significant uranium mineralisation reported at Bigrlyi (7.5Mt at 0.13% U₃O₈, 0.12% V₂O₅) and Walbiri (0.423Mt at 0.16% U₃O₈), and at Angela in the adjacent Amadeus Basin (10.7Mt at 0.13% U₃O₈) (Northern Territory Government Report, March 2013). Recent exploration activity in the Ngalia Basin intersected 5m at 1.33% U₃O₈ at Camel Flat (Energy Metals Ltd), and 7m at 0.14% U₃O₈ at Afghan Swan (Thundelarra Exploration Ltd) (Northern Territory Government Report, March 2013).

Sedimentary rocks of the Ngalia Basin were derived from, and deposited on felsic granite gneiss and schist of the Arunta Block which are significantly enriched in uranium. The Yulyupunya Granite Gneiss (1780Ma) and the Southwark Granite Suite for example, contain up to 22.5ppm uranium (Young et al. 1995). Early shallow marine conditions were followed by continental conditions culminating in the Mount Eclipse Sandstone which was deposited in response to tectonic uplift and erosion of the Arunta Block at 350Ma to 370Ma. Importantly as uranium reductant, carbonaceous material is also common with a 7m thick unit of lignite reported (Spark, 1975).
**Bigrlyi** is located on the northern margin of the Ngalia Basin where uranium mineralisation is confined to a narrow horizon within the lower Mount Eclipse Sandstone (Fidler, Pope and Ivanac, 1990). The uranium potential was first recognised in the early 1970’s with the discovery of carnotite (hydrated potassium uranium vanadium oxide) resulting in a basin-wide ground radiometric survey targeting the Mount Eclipse Sandstone. A number of radiometric anomalies related to near surface carnotite mineralisation were identified. Drilling defined stratiform tabular bodies offset by faults, the largest 370m long, 150m wide and 3.8m thick. Uraninite and montroseite (V, Fe oxide) are dominant with carnotite defining the weathered zone. Uraninite grains are typically 1mm in size forming 10mm sized aggregates (Lally and Bajwah, 2006).

**Walbiri** is located 52km east-southeast of Bigrlyi and similarly contains carnotite in outcrops of the Mount Eclipse Sandstone. Weak mineralisation was found over a strike length of 12km in a stratigraphic interval of 150m. Mineralisation forms lenses up to 750m long, 113m wide and 2.1m thick in arkosic sandstone, which at depth becomes grey-green in colour, rich in carbonaceous matter and minor pyrite.

**Minerva/Malawiri** is a blind deposit hosted in pebbly arkose interbedded with shale of the Mount Eclipse Sandstone Formation, situated 142km east-southeast of Bigrlyi. Mineralisation is identified over a 2.7km strike length with a width of 50m-60m. Mineralisation extends to Malawiri where drilling reported intercepts of 3.3m at 7.7kg/t U₃O₈ and 2.7m at 8.5kg/t U₃O₈ (Jindalee, 2005).

**Angela** and associate Pamela are located some 25km south of Alice Springs. As in the Ngalia Basin, clastic sedimentation of Devonian to Carboniferous age represents the youngest succession in the basin. Mineralisation is hosted within the Undadita Member of the Brewer Conglomerate which overlies the Pertnjarra Group, a thick Devonian terrestrial succession deposited in response to uplift and thrusting in the Southern Arunta Province. This exposed uranium enriched source rocks of the Iwupataka Metamorphic Complex and Teapot Granite Complex. Mineralisation is associated with redox boundaries forming a number of mineralised bodies in a series of stacked horizons comprising one or more uranium roll fronts.

### 4.1.2 Surficial Uranium Deposits

Surficial uranium deposits comprise about 4% of world uranium resources, are of Tertiary to Recent age and found in sediment, soil or calcrete. Calcrete deposits are by far the most important with uranium in the form of carnotite associated with secondary cements such as calcite, gypsum, dolomite, ferric oxide, and halite. Uranium released from the deep weathering of uranium-rich basement granites becomes concentrated in valley-fill sediments along drainage channels and in playa lake sediments. Typical deposits include Yeelirrie in Western Australia, by far the world's largest, Lake Way, Centipede, Thatcher Soak, and Lake Maitland.
Butt, Mann and Horwitz, (1984) classified calcrete-hosted uranium deposits into three types: valley, playa, and terrace deposits. Valley–type deposits, such as Yeelirrie, Centipede, and Lake Way occur in calcrete associated with sediment in the central channels of major drainage systems, and in the platforms and chemical deltas where drainages enter playas. Playa–type deposits, such as Lake Maitland occur in near–surface evaporitic and alluvial sediments. Terrace deposits are less common and occur in calcrete terraces in dissected valleys, mainly in the Gascoyne Province of Western Australia.

The formation of calcrete-hosted uranium deposits involves infilling of paleovalleys with coarse-grained sediments of high permeability followed by the initiation of an active groundwater drainage system. Intensive evaporation along drainage lines and playa lakes generates calcrete near the water table. The solubility of uranium is favoured by oxidising, acid and saline conditions, typical of Australian playa lakes and groundwater. Oxidised groundwater leaches potassium and uranium from felsic rocks and vanadium from mafic volcanics and/or iron-rich metasediments. Hexavalent U$^{6+}$ is stable under these conditions forming mobile uranyl (UO$_2^{2+}$) that complexes with NO$_3^-$, F$^-$, OH$^-$, CO$_3^{2-}$, SO$_4^{2-}$ and PO$_3^{3-}$. Subsequent evaporation leads to oversaturation and precipitation or carnotite, or mixing of valley groundwater with potassium-rich saline lake water may trigger precipitation.

**Surficial Type Uranium in the Ngalia Basin Area**

Several occurrences of calcrete-hosted uranium within and to the south of the Ngalia Basin have been identified. The most significant deposit, Napperby (New Well) (Figure 3.1_1 and Figure 4.1.1_1) contain an inferred resource of 9.34Mt U$_3$O$_8$ ore at a grade of 0.036% U$_3$O$_8$ (Northern Territory Government report, March 2013). Napperby (New Well) is situated in the drainage system of Napperby River and Lake Lewis, a playa lake system (Figure 3.1_1).

**4.1.3 Metasomatite and Intrusive Mineralisation**

Minor uranium prospects and occurrences categorised as metasomatite and intrusive-type uranium are located within the Aileron and Irindina provinces of the Arunta Region, particularly in the Harts Range, Entia Dome and Reynolds Range areas. The region is under-explored and the possibility exists for further discoveries of these styles of uranium deposits (Lally and Bujwah, 2006).

Uranium mineralisation in the eastern and northern Arunta Region is considered to be related to metasomatism during the Alice Springs Orogeny at 400Ma to 300Ma. Uraninite-type mineralisation was derived from fluids generated during high-temperature prograde metamorphism that stripped uranium from underlying rocks (Drake-Brockman et al., 1996). Uranium and associated rare earth elements were precipitated as a result of the reaction of this fluid in shear zones with reducing lithologies, such as mafic amphibolite.
Metasomatite Mineralisation in the Ngalia Basin Area

The Nolans Bore mineralisation of fluor-apatite occurs in the southeastern part of the Reynolds Range, 13km northwest of Aileron. The deposit is considered geologically unique (Lally and Bajwah, 2006) and requires in-depth investigation to elucidate the process of ore genesis and may be associated with carbonate-rich fluids and magmatic activity (Lally and Bajwah, 2006).

Mineralisation is hosted in the Palaeoproterozoic Boothby Orthogneiss, which forms part of the Lander Rock Beds (Table 3.1). Two zones of mineralisation occur over a strike length of 1200m within deformed and altered granitic gneiss and pegmatite and minor calc-silicates. Fluor-apatite is the main ore mineral, hosting associated rare-earth elements (REE) and uranium and forms veins, bands and dykes. A resource of 47Mt at 0.02% U₃O₈ and 2.6% REO (Rare Earth Oxide) is reported (Northern Territory Government report, March 2013).

4.2 Tenement Geology

4.2.1 EL 29202

The large northwestern tenement, EL 29202 is located within the Arunta Block and comprises a diverse geology. A major arcuate shear zone separates the Wangala intrusive granite (coarse porphyritic granite and microgranite) from the northern metamorphic supracrustal lithologies. These are represented by Division Two lithologies of the Wickstead Creek Beds, Lander Rock beds and Mount Stafford beds. The Wickstead Creek beds comprise calc-silicates, marble, schist, quartzite, sillimanite gneiss and quartzofeldspathic gneiss. The Lander Rock beds comprise sillimanite biotite muscovite schist, metadolerite, andalusite hornfels, phyllite with tourmaline pods, mica-quartz sandstone, siltstone and slate. The Mount Stafford beds comprise spotted cordierite hornfels. These are intruded in places by granite and granodiorites.

The area is mostly covered by surficial deposits comprising: red earth, colluvium and aeolian sand with alluvial deposits located along the Cockatoo Creek and Western Creek drainage system.

U minerals are reported from the Wangala Granite suite, the nearest about 4km to the south occurring as veinlets and pegmatites associated with Sn-Ta-W pegmatites and similar occurrences may be present in the tenement area. The U²⁷/Th response of the Wangala Granite immediately south of the tenement confirms this (Figure 4.2.1_1).

Since the Lander Rock beds host the Nolans Bore fluor-apatite mineralisation, these units may be prospective for this style of mineralisation, although the mineralisation is most likely linked to structurally controlled fluid pathways rather than a particular host lithology.

The Ngalia Basin lies considerably further south and no Palaeozoic successions (Mount Eclipse Sandstone or Kennedy Sandstone Formation) that may host sandstone style uranium mineralisation, are represented in the EL 29202 tenement block.
4.2.2 EL 29205

Tenement EL 29205 is underlain by schistose granitic gneisses of Precambrian age intruded by Middle Proterozoic porphyritic migrogranite. These rocks are overlain to the north and east by the Central Mount Stuart Formation, a sequence of sandstone, subgreywacke, siltstone, tillite, minor arkose and shale. This succession forms part of the early Ngalia Basin sedimentary sequence and immediately underlies the sandstone uranium prospective beds of the Kerridy Sandstone and Mount Eclipse Sandstone Formation. The tenement however, falls outside the Ngalia Basin and the Palaeozoic successions sandstones that may host sandstone-hosted uranium mineralisation, are not reported in the tenement EL 29205 block.

The area is blanketed by surficial deposits. Calcrete deposits of 1km in length are reported associated with the Warburton Creek drainage. These may be prospective for calcrete uranium mineralisation with a small $\text{U}^2/\text{Th}$ radiometric response reported from near the mapped calcrete in the northeastern portion of the area and a significant response on the southwestern border of the tenement (Figure 4.2.2.1).
4.2.3 EL 29221

The EL 29221 tenement is the southeastern-most tenement. It is covered extensively by regolith and surficial material. The surrounding regional structure and geology however, indicate that the south western portion of the tenement is most likely underlain by the Napperby Gneiss, comprising medium, even layered granitic gneiss with microgranite dykes and calc-silicate rafts and xenoliths. The calc-silicate is correlated with the Wickstead Creek beds.
The northeastern portion of the tenement is underlain by the Reynolds Range Group. The most likely succession represented includes the Mount Thomas Quartzite, and the overlying Pine Hill Formation comprising muscovite schist and quartzite.

A fanglomerate extends downslope across the northeastern portion of the tenement overlying deeply weathered regolith. Fanglomerate deposits are overlain by alluvium and lag gravels and red earth covers the northwesetn portion of the tenement. No calcrete has been mapped in the tenement area although the U²/Th radiometrics indicate a number of small anomalies within surficial material in the tenement (Figure 4.2.3_1). These appear to be confined to areas underlain by lag gravels and colluvium.

Scattered anomalous radiometric U²/Th values are also located within the Napperby Gneiss exposed along the southwestern margin of the tenement. These relate to the uranium anomalies investigated by PNC Exploration Pty Ltd. in 1994 in the gneiss and Wickstead Creek beds.
5  HISTORICAL EXPLORATION

A review of the historical exploration conducted over EL 29202, EL 29205 and EL 29221 was completed by identifying the historical tenements that overlapped with the current tenements and obtaining the available open file company reports from the NT Department of Mines and Energy. Exploration undertaken in each of the historical tenements is summarised in the following section, with an emphasis on exploration conducted within the tenements of interest. The summaries have been separated into exploration focussed mainly on uranium and those focussed primarily on non-uranium targets. The reports reviewed are listed in Table 5_1 and Appendix A and figures of the location of the historical tenements with respect to the current tenements are shown in Appendix B.

<table>
<thead>
<tr>
<th>Historical Tenement</th>
<th>Company</th>
<th>Granted</th>
<th>Ceased</th>
<th>Area km²</th>
<th>Overlaps</th>
<th>Commodity</th>
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<td>Trans Pacific Petroleum</td>
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<tr>
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<td>Tanganyika Holdings</td>
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<td>29/09/1972</td>
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<td>30/11/1972</td>
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<td>Gold</td>
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<td>4/07/2011</td>
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<td>4/07/2011</td>
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<td>Uranium</td>
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</table>

The NT Department of Mines and Energy has collated all of the historical sampling and drilling information into a GIS. Stream sediment, soil and rockchip sampling and drill collar location datasets were used to determine which samples had been collected within the tenements of interest and the associated assay values.
5.1 Uranium Focus

5.1.1 EL 23, Central Pacific Minerals NL, 1 June 1972 to 10 July 1972

EL 23 was granted to Central Pacific Minerals (CPM) for a period of 6 months, from 1 June 1972 and was surrendered 10 July 1972. The tenement overlaps the south western portion of EL 29221. CPM was exploring for uranium and found numerous small, low order anomalies, up to 100ppm U, that are not within EL 29221. Exploration activities included; sampling water bores and wells for uranium and conducting a low level airborne radiometric survey using a Britten-Norman Islander survey plane with a 4-channel spectrometer along NS, 3km to 6km spaced flight lines at 80m to 100m elevation. A car-borne radiometric survey was conducted along roads and tracks in the area using a Scintrex BGS 1S scintillometer at 0.8km spacings. Strong increases, up to double the regional background were recorded near creeks draining granitic or gneissic terrain. The airborne anomalies were not supported by ground anomalies.

No potential outcropping host rocks for economic uranium mineralisation were identified and the tenement was recommended for surrender.

5.1.2 EL 749, Tanganyika Holdings Pty Ltd, 7 November 1972 to 6 November 1973

EL 749 was granted to Tanganyika Holdings on the 7 November 1972 to explore for Yeelirrie-style uranium. The tenement covered 604km² and overlaps a significant portion of EL 29202. Exploration by Tanganyika included a photogeological interpretation, interpretation of the BMR 1958 magnetic and radiometric airborne survey, ground traverse scintillometer readings both in car and on foot and stream sediment sampling. Tanganyika was not able to get an accurately located map of the airborne survey and had very little success at locating anomalies on the ground. Ground traverses identified high radiometric readings in shear zones interpreted as secondary enrichment.

Tanganyika noted a small gossanous quartz reef outcropping in the Denison area, assaying 200ppm Cu and 0.1dwt/ton (1dwt/ton = 1.530g/t) Au with low As and Zn values (the exact location was not confirmed).

During 1973 Tanganyika entered into a joint venture agreement with Quest Mining and Exploration NL. Exploration during this time included analysing bore water samples for uranium, radon and vanadium, phosphorus and sulphate ions and collecting granite and calcrete rock samples for analysis of uranium only and uranium, vanadium and phosphorus respectively. Particular attention was paid to mapping the calcrete deposits and detailed spectrometer work was conducted on some. The tenement was considered prospective for secondary uranium deposits but not base or precious metals.
5.1.3 EL 1294, CSR Ltd, 7 September 1977 to 6 September 1980

EL 1294 was granted to CSR on 7 September 1977 and covered 1,270km². The tenement completely covers current tenement EL 29221, which is located to the south of EL 1294. The main exploration target was vein or disseminated uranium with other possible targets being base metals and tungsten. Exploration on the tenement was conducted by Pacminex Ptd Ltd and included; stream sediment geochemical sampling and stream sediment heavy mineral concentrate sampling (for tungsten), selective rockchip sampling, interpretation of radiometrics and traverses using a hand held scintillometer. The stream sediment geochemical samples were sieved to -120# and analysed for uranium using fluorimetry; and Cu, Pb, Zn were analysed using AAS.

None of the sampling was conducted in the area of the current EL 29221. The stream sediment sampling was focussed on the Reynolds Range to the north east of EL 29221 and rockchip sampling was conducted in the south west corner of EL 1294.

Pacminex had identified 49 radiometric anomalies across EL 1294 and after field checking 14 anomalies to the west of EL 29221 with no success, concluded that the criteria for the remaining anomalies would need to be reassessed. There is no map showing the location of the radiometric anomalies but a further 23 were downgraded with field checking as no surface radioactivity or uranium geochemistry of significance was identified. Anomalous rockchip values of 190 to 1,620ppm U\textsubscript{3}O\textsubscript{8} were recorded from areas of secondary uranium mineralisation in the south west corner of EL 1294 (outside of EL 299221). This was the only area of EL 1294 that was retained for further follow up. The ground coincident with EL 29221 formed part of a partial relinquishment in November 1979.

5.1.4 EL 1316, Yuendumu Mining Company NL and Central Pacific Minerals NL
20 April 1977 to 19 April 1980

EL 1316 was granted to Yuendumu Mining Company NL and Central Pacific Minerals NL on 20 April 1977 to explore for uranium and base metals. The tenement covers 1,273km² and completely overlaps EL 29202. In the NT GIS tenement database this tenement has been incorrectly labelled as EL 1317.

Yuendumu and Central Pacific concluded from a review of the 1976 BMR airborne radiometric and magnetic survey of the Napperby sheet that there was no significant surface uranium mineralisation within the tenement. However, they also conducted a car-borne radiometric survey over all of the station tracks within the tenement, totalling 238.4 line-kilometres. Readings were taken every 100m from a floor-mounted Scintrex BGS-IS scintillometer travelling at approximately 20km/h. No uranium mineralisation was identified. Exploration then focussed on the B.I.G. tin and tungsten Prospect in the far south east of EL 1316.
In mid-1978 Yuendumu and Central Pacific entered into an agreement with Australia and New Zealand Exploration Company (ANZECO) to allow them to explore for tungsten and uranium. A heavy mineral sampling program was conducted aimed at identifying tungsten mineralisation, 59 samples were taken from within EL 29202. The highest assay values within the current tenement were 85,000ppm Sn (8.5% Sn) and 7800ppm W, related to the Corrigan anomaly. Nine other stream sediment samples assayed >1% Sn. ANZECO identified many anomalies but follow-up observations under ultra-violet light failed to identify large concentrations of scheelite. The Corrigan Anomaly is within EL 22202 on the southern boundary 4km south east of Bean Tree Dam.

ANZECO concluded that while the rocks generally contained anomalous amounts of uranium, there was little evidence of alteration and concentrating mechanisms required to mobilise, transport and fix uranium in economic grades and quantities. Similarly, despite high background tungsten values, no prospective areas of economic mineralisation were identified.

5.1.5 EL 1317, Yuendumu Mining Company NL and Central Pacific Minerals NL
20 April 1977 to 19 April 1980

EL 1317 was granted to Yuendumu Mining Company NL and Central Pacific Minerals NL on 20 April 1977 to explore for uranium and base metals. The tenement covers 1,206km² and completely overlaps EL 29205, which is located in the eastern portion of EL 1317. In the NT tenement GIS database this tenement has been incorrectly labelled as EL 1316.

Yuendumu and Central Pacific conducted a car-borne radiometric survey over all of the station tracks within the tenement, totalling 303.4 line-kilometres. Readings were taken every 100m from a floor-mounted Scintrex BGS-IS scintillometer travelling at approximately 20km/h. No uranium mineralisation was identified. Exploration then focussed on the B.I.G. tin and tungsten Prospect in the far north east of EL 1317.

In mid-1978 Yuendumu and Central Pacific entered into an agreement with Australia and New Zealand Exploration Company (ANZECO) to allow them to explore for tungsten and uranium. ANZECO field checked unraniferous prospects; Quartz Hill associated with apatite-bearing schists and granite, and Pinnacle Dam associated with granite (neither are within EL 29205) and completed a petrological evaluation of the rocks in the area.

ANZECO concluded that while the rocks generally contained anomalous amounts of uranium, there was little evidence of alteration and concentrating mechanisms required to mobilise, transport and fix uranium in economic grades and quantities. Similarly, despite high background tungsten values, no prospective areas of economic mineralisation were identified.
5.1.6 EL 8411, PNC Exploration (Australia) Pty Ltd, 15 March 1994 to 20 February 1996

EL 8411 was granted to PNC on 15 March 1994 and covered 1,482km². PNC applied for the ground to cover all known outcrops of Wickstead Creek Beds (WCB) metasomatised calc-silicate gneiss after discovering the Napperby Creek U-prospect during regional reconnaissance exploration. The Napperby Creek U-prospect is located along the south west boundary of EL 29221, just outside the current tenement. Exploration included detailed mapping of the WCB, collecting rock samples to define petrogenesis of U±Th mineralisation, detailed magnetics and spectrometrics at 20m and 10m station spacings along traverse respectively. Small intense radiometric anomalies were not resolved by the 50x10m station spacing and detailed infill radiometric was recommended. Field follow-up showed the source of the surface radiometrics was associated with intensely fractured feldspar-rich metasomatite, which had a background radiometric reading of 150-200cps compared with 75-100cps over the adjacent WCB.

Field follow-up of radiometric anomalies across EL 8411 indicated that many anomalies could be attributed to; Napperby Gneiss, some of which contained visible secondary uranium minerals; soils; metapelites; U-rich gravel banks in minor drainages; quartz veins; or calc-silicate gneiss. PNC concluded the most significant mineralisation potential within EL 8411 was located at Nolans Bore P-REE prospect in the south east of the tenement and recommended surrendering EL 8411 and just retaining the ground pertaining to the Nolans Bore.

5.1.7 EL 23923 Tanami Exploration, 1 June 2004 to 31 May 2010

EL 23923 was a very large tenement covering 1,177km². It overlapped all three tenements of interest and was granted to Tanami Exploration NL (a wholly owned subsidiary of Tanami Gold NL) on 1 June 2004 to target palaeochannel hosted uranium mineralisation. Exploration related to the current tenement areas comprised reprocessing geophysical data and regional regolith mapping. Results from the geophysical survey were used to determine which blocks were to be dropped. On 31 May 2007 the area coincident with EL 29202 was part of a compulsory relinquishment. The retained areas were then 100% transferred to Deep Yellow Ltd in August 2007 and correspond to the current EL 29205 and the northern portion of EL 29221.

Exploration over the relinquished blocks included; review of open file exploration data, reconnaissance field trips, Night Time Thermal Infrared (NTI) data interpretation and Airborne Electromagnetic survey. A number of palaeochannels were identified from the NTI interpretation coinciding with the current tenements of interest. No further information was available.
5.1.8 EL 23991, Deep Yellow Limited, 1 June 2004 to 4 July 2011

Only a relinquishment report covering the southern portion of EL 29221 up to 1 June 2009 was available for review. EL 23991 was originally granted to Tanami Exploration NL on 1 June 2004 and was 100% transferred to Deep Yellow on 5 December 2006. The exploration target was palaeochannel hosted uranium mineralisation.

Deep Yellow conducted a review of open file exploration data, reconnaissance field trips, Night Time Thermal Infrared data interpretation and an Airborne Electromagnetic survey. No details of the results or data were included in the relinquishment report.

5.2 Other Commodities

5.2.1 EL 2341, BHP Minerals Ltd, 27 January 1981 to 29 June 1983

EL 2341 was granted to BHP on 27 January 1981, primarily to explore for diamonds but also to assess the base metal potential. The tenement covered 1,113 km² and overlaps with a significant portion of EL 29205. BHP conducted reconnaissance heavy mineral stream sediment sampling, predominantly within the Reynolds Ranges, and a 4 km square grid ground magnetometer survey upstream from a sample containing a kimberlitic indicator mineral. None of the samples were collected within EL 29205. Further diamond exploration continued in the southern portion of EL 2341. Kimberlitic indicators identified in the initial sampling could not be replicated in subsequent sampling and were later considered spurious. BHP determined that no further work was warranted and the tenement was surrendered on 29 June 1983.

5.2.2 EL 2500, CRA Exploration, 6 March 1981 to 5 March 1982

EL 2500 was granted to CRA on 6 March 1981 to explore for base metals. The tenement covered 540 km² and overlaps with the eastern half of EL 29202. CRA completed a reconnaissance geochemical stream sediment survey of 35 samples, sieved to -90#, -60#, -40# and +40# and weighing 100g each. Twelve samples were collected within EL 29202 and the highest assay values were 10ppm Cu, 22ppm Pb, 24ppm Zn, 362ppm Sn and 92ppm W. CRA identified moderately anomalous tin, tantalum and niobium values in stream sediments and gravel samples that were attributed to Tertiary sediment on Lower Proterozoic granite gneiss. CRA stated that anomalous gold values were due to an analytical error. The tenement was recommended for relinquishment.

5.2.3 EL 2602, Jays Exploration Pty Ltd, 27 March 1982 to 26 March 1983

Jays Exploration was granted EL 2602 on 27 March 1982 to target tin and tantalite alluvial mineralisation but pegmatites were also assessed to determine the extent and potential of the host rocks. The tenement covered 266 km² and overlapped the south eastern portion of EL 29202. Exploration included; alluvial sampling and concentrating on site and collecting pegmatite rockchips.
Jays note that a small deposit of scheelite was discovered in granites in the northern portion of EL 2602 in 1955 but the mineralisation proved negligible. This could possibly coincide with EL 29202 but no location is provided. Jays concluded that further investigation of the tenement would be warranted once metal prices were more encouraging but that the lack of large pegmatite bodies suggested little likelihood of potential exploitation.

5.2.4 EL 2942, BHP Minerals Ltd, 8 December 1981 to 29 June 1983

EL 2942 was granted to BHP on 8 December 1981 and covered 1,256km². Exploration was primarily for diamonds and also to assess the potential for base metals. The northwest portion of EL 2942 covers the north and east of EL 29221. BHP conducted reconnaissance heavy mineral stream sediment sampling and geochemical stream silt sampling. A total of 10 geochemical samples are within EL 29221. They were assayed for As, Ce, La, Ba, Nb, Zr, Cu, Pb, Zn, Co, Ni and Cr. The highest assay values for samples within EL 29221 were 22ppm Cu, 20ppm Pb, 50ppm Zn and 20ppm Ni. BHP did not find any kimberlitic indicators and relinquished the tenement on 29 June 1983.

5.2.5 EL 3488, BHP Minerals Ltd, 19 April 1982 to 15 November 1983

EL 3488, which overlaps with the southern portion of EL 29205, was granted to BHP on 19 April 1982, primarily to explore for diamonds and also assess the potential for base metals. Exploration included collecting loam samples, which were analysed for kimberlitic indicators. All the samples came back negative. No sampling was undertaken within EL 29205. BHP relinquished the tenement on 15 November 1983.

5.2.6 EL 5511, Colchis Mining Corp Pty Ltd, 19 November 1987 to 19 February 1990

EL 5511 was granted to Colchis Mining (a wholly owned subsidiary of Aquarius Exploration NL) on 19 November 1987 and operated by Aquarius Exploration NL. The tenement covered 1,603km² and overlaps with the Eastern portion of EL 29221. Aquarius were targeting Au (±Cu) and base metals based on similarities made with The Granites-Tanami and Tennant Creek blocks to the north. Exploration included; a literature review, geological mapping and stream sediment and rockchip sampling. None of the sampling was within EL 29221.

The first year of exploration concentrated on orientation and reconnaissance sampling, which did not identify any significant anomalies. More sampling was completed in the second year of exploration but the results were also disappointing. The tenement was considered a low priority exploration target.

5.2.7 EL 5986, Stockdale Prospecting, 1 September 1988 to 28 June 1989

Stockdale Prospected were granted EL 5986 on 1 September 1988 to explore for diamonds. Current tenement EL 29202 covers the north east portion of EL 5986. Stockdale did not find any kimberlitic indicators and relinquished the tenement on 28 June 1989.
5.2.8  **EL 7343, Poseidon Gold Ltd, 5 April 1991 to 15 March 1993**

EL 7343 was granted to Poseidon Gold Ltd on 5 April 1991 and covered 912km². The western boundary of EL 7343 overlapped the majority of EL 29205. Poseidon's exploration focus for was structurally controlled, lead, zinc, copper, silver and gold within the Lower to Mid Proterozoic metamorphosed units of the Arunta Orogenic Domain. Exploration included regional reconnaissance stream sampling, lag and rock chip sampling, RAB drilling, and an aeromagnetic and radiometric survey. No sampling was undertaken within EL 29205. The tenement blocks overlapping EL 29205 were included in a partial relinquishment on 29 May 1994.

5.2.9  **EL 7344, Poseidon Gold Ltd, 5 April 1991 to 15 March 1993**

EL 7344 was granted to Poseidon Gold Ltd on 5 April 1991 and covered 444km². The western boundary of EL 7344 overlapped the majority of EL 29221. Poseidon's exploration focus for was structurally controlled, lead, zinc, copper, silver and gold within the Lower to Mid Proterozoic metamorphosed units of the Arunta Orogenic Domain. Exploration included regional reconnaissance stream sampling and rock chip sampling. No samples were taken within EL 29205. Poseidon considered the initial sampling did not highlight any targets and the tenements were relinquished 15 March 1993.

5.2.10 **EL 8420, PosGold Ltd, 1 November 1994 to 21 August 1998**

EL 8420 was granted to PosGold Ltd on 1st November 1994. The exploration target was gold mineralisation in a stratigraphic repetition of Lander Rock Beds south of previously identified mineralisation. The tenement covered 1,140km² and completely overlapped EL 29202.

Within EL 29202, exploration included; an airborne magnetic and radiometric survey, regional soil sampling (over areas interpreted as having residual soil component; 144 samples within EL 29202), reconnaissance RAB drilling (69 RAB holes for 981m) and follow up vacuum bedrock drilling (64 vacuum drillholes for 332.6m). The soil samples were sieved to -125µm and in addition, 25 lag (+1-6mm) were collected where appropriate. The samples were assayed for Cu, Pb, Zn, Ag, As, Sb using ICPMS mixed acid digest; Cr, Ni, Fe, Mn, Ca, using ICPAES mixed acid digest; and Au using AAS. None of the soil or drilling samples were assayed for uranium.

The highest soil assay values were 2ppm Au, 25ppm Cu, 45ppm Pb, 85ppm Zn and 3ppm As (The NT soil database shows close spaced duplicate sampling, one set by Exodus Minerals and the other by Normandy that have different sample numbers but of the samples checked, identical assay values). Only assay values for Ag, Cr and Sb are included in the NT GIS database.
The reconnaissance RAB drilling was planned to determine the nature and depth of the regolith. Two samples were collected from each hole; at the transition from transported to residual material and a representative bedrock sample. A similar element suite to the soil sampling was used. The drilling assay values are not part of the NT GIS database so determining the highest assay value within EL 29202 is difficult. The overall highest assay values for the RAB drilling were 20ppm Au (within EL 29202), 100ppm Cu, 65ppm Pb, 240ppm Zn (within EL 29202) and 40.5ppm As. A broad area of elevated As was identified. Aeromagnetics over the area suggested soil cover may be concealing metasediments.

The vacuum drilling was designed to test a 20ppb Au result intersected during the reconnaissance RAB drilling. Two samples were collected from each hole; a palaeosol and bedrock sample. The samples were assayed for an element suite similar to the soil sampling. The multielement values were generally low with the exception of molybdenum (4-10ppm) which was thought to reflect the proximity of under-stopping granite.

In late 1996 PosGold was wholly merged with its parent company Normandy Mining Ltd, which subsequently changed its name to Normandy Gold Pty Ltd. On 6th August 1997, Exodus Minerals Ltd reached a joint venture agreement with Normandy to earn 60% in the “Reynolds Range” project (which EL 8420 was part of) by spending $1.5 million by August 2001. The tenement was surrendered 21st August 1998.

5.2.11 EL 9277, Normandy Gold Pty Ltd, 3 October 1995 to 21 August 1998

PosGold Ltd was granted EL 9277 the 3 October 1995, covering 219km². It overlapped all but the southern four blocks of EL 29205. In late 1996 PosGold was wholly merged with its parent company Normandy Mining Ltd, which subsequently changed its name to Normandy Gold Pty Ltd (Normandy). The exploration target was structurally controlled gold mineralisation within Lander Rock Beds. A few gravity station measurements were collected within EL 29205 and Normandy surrendered EL 9277 on 21 August 1998.

5.2.12 EL 9672, Mr Norm McCleary, 25 November 1996 to 24 November 2002

EL 9672 was granted to Mr Norm McCleary on 25 November 1996 and was subject to a joint venture agreement between Mr Cleary and Homestake Gold of Australia (Homestake), where Homestake was entitled to earn 80% interest. EL 9672 covered an area of 1548km² and overlaps with the southernmost portion of EL 29205 and northern portion of EL29221. The exploration focus was for gold. The blocks coincident with the current tenements were dropped as part of a partial relinquishment on 24 November 1998.
5.2.13 EL 10248, Gutnick Resources NL, 1 February 2002 to 23 July 2003

EL 10248 formed part of a Joint Venture (Rand Project) between Gutnick Resources NL and Johnsons Well Mining NL. The exploration target was based on a new genetic interpretation for Witwatersrand style of gold mineralisation. EL 10248 overlaps a significant portion of EL 29221. Exploration included in-house reprocessing of open file geophysical surveys and Landsat TM to aid targeting and identify regolith regimes. No sampling was conducted within EL 10248 and the tenement was surrendered on 23 July 2003 as part of a larger tenement package.

5.2.14 AP 1378, Trans Pacific Petroleum, 11 August 1965 to 18 August 1968

AP 1378 was a large tenement covering 1,277km², granted 11 August 1965 and expiring on 18 August 1968. The tenement is located much further south than in the shown in the NT GIS tenement database and covers the Stuarts Bluff Range and Reaphook Hills area.

5.2.15 AP 2617, CRA Exploration, 22 April 1970 to 1 November 1971

AP 2617 was granted to CRA on 22 April 1970 and covered 1,628km². It overlaps with the northeast to southeast portion of EL 29221. Exploration included drainage geochemistry for base metal mineralisation and a bore water investigation for uranium. Geochemical stream sediment samples were assayed for Cu, Pb, Zn, Ni, Co, Cr and U. A total of 13 stream sediment samples were collected within EL 29221 and the highest assay values were 3ppm Cu, 20ppm Pb and 23ppm Zn (these sample locations are not included in the NT GIS soils database). This area was not considered anomalous and no further work was conducted with EL 29221. No bore water samples were taken from within EL 29221.

CRA recommended no further work be conducted on the tenement for base metals as no economic mineralisation had been identified. CRA commented that anomalous uranium in the bore water samples highlighted possibilities for uranium deposits in the nearby sedimentary basins.

5.2.16 AP 3169, Tanganyika Holdings Pty Ltd, 30 March 1971 to 29 September 1972

AP 3169 was granted to Tanganyika on 30 March 1971. It is the precursor to EL 749 and covers an identical area. Work conducted at this stage included a photogeological interpretation and an aeromagnetic survey interpretation of the BMR 1960 survey. See EL 749 for further information.
5.3 **Summary of Exploration Results**

A total of 24 historical tenements were reviewed with an emphasis on uranium exploration. Historical tenements were also granted to explore for; gold, base metals, tungsten and diamonds. Figure 5.3.1 shows the focus of sampling and drilling was predominantly in the Reynolds Ranges to the north east of the tenements of interest. Of the three tenements, EL 29202 has had the most sampling and drilling undertaken, mainly during the 1970s (Figure 5.3.2). EL 29221 has had limited stream sediment sampling (Figure 5.3.3) and no sampling or drilling was conducted on EL 29205.

Significant historical anomalies are the Corrigan tin and tungsten anomaly (ANZECO, EL 1316) and the Napperby Creek U prospect both just outside the current tenements (PNC Exploration, EL 8411; Figure 5.3.1).

Many companies identified uranium anomalies in stream sediment samples and radiometric surveys but generally the samples collected showed the source rocks had high background values and no economic mineralisation was identified.
6 URANIUM PROSPECTIVITY

The tenements are located within the general region of uranium prospectivity (Lally and Bajwah, 2006) and of relevance are occurrences in the area of sandstone-hosted, surficial and the metasomatite uranium mineralisation styles.

Radiometric surveys (Figure 6_1) show an elevated uranium response for the Arunta Block along the northeastern margin of the Ngalia Basin. The uranium-enriched nature of the felsic basement gneisses and granites are considered a fertile source for subsequent uranium enrichment processes. The $\text{U}^{2+}/\text{Th}$ ratio anomalies coincide with a number of reported uranium occurrences in the Arunta Block. Thorium, unlike potassium and uranium, remains relatively unaffected by weathering and alteration making the $\text{U}/\text{Th}$ ratio sensitive to detecting areas of mineralisation (Shives, Charbonneau and Ford, 1997; Dickson and Scott 1997).
Significant areas with an anomalous U²/Th response are notably absent from the tenements (Figure 6_1), except for a scattered anomalies in tenement EL 29221 (Figure 4.2.3_1) and a small spike in EL 29205 (Figure 4.2.2_1). The anomaly immediately south of tenement EL 29202 (Figure 4.2.1_1) is located within the Wangala intrusive granite to the south of the arcuate shear.

The style of mineralisation within the Arunta Block gneisses and metamorphic sequences is represented by pegmatite/vein style mineralisation (Sn-Ta-W) and the Nolans Bore metasomatite flour-apatite style mineralisation (REE-P-U).

All three tenements are located to the northeast, outside of the Ngalia Basin. They are therefore not considered prospective for sandstone-hosted style uranium mineralisation which is found within the Palaeozoic continental clastic successions of the Kerridy Sandstone Formation and Mount Eclipse Formation. The Ngalia Basin margin is clearly defined by the aeromagnetic, total magnetic intensity data (Figure 6_2) and the regional basement geology map (Figure 3.1_1).
Surficial style mineralisation related to, valley, playa, or terrace deposits may be developed in areas where significant calcrete and terrace deposits are preserved, associated with the drainage system and possible palaeo-playa lakes. Calcrete is reported from the central licence area, tenement EL 29205, associated with the Warburton Creek drainage system. Two areas of calcrete, approximately 1km in length are included on the NAPPERBY 1:250 000 scale geology mapsheet. No previous sampling and geochemical data are available from either of the calcrete locations.

7 CONCLUSIONS AND RECOMMENDATIONS

- The Pacific tenements are located within a general region of uranium prospectivity known for the occurrence of sandstone-hosted, surficial and metasomatite uranium mineralisation styles.
- The three tenements (EL 29202, EL 29205, EL 29221) are located to the northeast and outside the Ngalia Basin and are therefore not considered prospective for uranium sandstone-hosted style mineralisation.
- Surficial style mineralisation related to, valley, playa, or terrace deposits may be developed in areas where significant calcrete and terrace deposits are preserved. Calcrete is reported from tenement EL 29205 and the other two tenements, EL 29202 and EL 29221, have a thick Quaternary surficial cover that is potentially prospective.
- The Arunta Block lithologies are regionally enriched in uranium and are known to contain vein/pegmatite type mineralisation with Sn-W-Ta REE type systems. In addition rocks of the Lander Rock beds are host to the Nolans Bore fluor-apatite REE-P-U mineralisation and may be prospective for metasomatite style uranium mineralisation linked to structurally controlled fluid pathways.
- This study has shown that all three tenements (EL 29202, EL 29205 and EL 29221) do not have any significant historical sampling coverage and no useful baseline geochemical data are available for uranium. Although EL 29202 has had the most coverage, targeting base metals and gold, uranium was not analysed in the sampling.
- Given the poor to non-existent geochemical sample coverage it is recommended that a baseline geochemical sampling and geological mapping be initiated along the drainage systems within all three tenements (EL 29202, EL 29205 and EL 29221).
- Tenements EL 29205 and EL 29221 in particular are most prospective for surficial-style and calcrete uranium mineralisation given the significant surficial cover developed and the radiometric U²/Th radiometric anomalies identified. Although Tenement EL 29202, did not report any U²/Th radiometric anomalies, surficial material is still considered prospective given its proximity to the uranium enriched granitoid sources.
• In addition to prospective surficial-style mineralisation in tenement EL 29221, vein/metamotlitic style uranium mineralisation along the southwestern boundary of the tenement bordering on the reported Napperby Creek uranium anomaly should be investigated.

8 REFERENCES


Appendix A

Summary of Company Reports Reviewed
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<tr>
<th>Historical Tenement</th>
<th>Company Report</th>
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<tbody>
<tr>
<td>AP 2617</td>
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<td>Deep Yellow</td>
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Appendix B

Historical Tenement Locations
with Respect To Current Tenements
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### AP 1328

- EL29202
- EL29205
- EL29221

### AP 2617

- EL29202
- EL29205
- EL29221

### AP 3169

- EL29202
- EL29205
- EL29221

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EL1316

EL1317

EL 2341
Appendix B – Historical Tenement Locations With Respect To Current Tenements

EL 2500

EL 2602

EL 2942
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EL 3488

EL 5511

EL 5986
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