ARAFURA
RESOURCES LIMITED

ABN 22 080 933 455

Report ARU-11/006

ANNUAL REPORT FOR YEAR ENDING 7/12/10, EL 23571 (REYNOLDS RANGE), NORTHERN TERRITORY, AUSTRALIA

By

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INTRODUCTION

Background

The Reynolds Range area is prospective for numerous styles of mineralisation with U, Au, As, Sb, Ag, Fe, Sn, Ta, W, Mo, Cu, Pb, Zn, Ni, REE, P, Th and talc occurrences known in the region. Of these, Arafura Resources is principally interested in exploring for economic REE mineralisation.

Several companies conducted exploration activities in EL 23671, adjacent to EL 23571, and failed to realise the potential of the world-class Nolans Bore REE deposit, which now has a defined total resource of 30.3 Mt @ 2.8% REO, 12.9 % P_2O_5 and 0.44 lb/t U_3O_8 [see Goulevitch (2008) for details]. This is encouraging because the Nolans Bore- type REE mineralisation may occur elsewhere in the region.

Elevated levels of phosphate-hosted rare earth elements (REEs) mineralisation was discovered 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. Total REE levels of 5-7% were reported from selected grab samples of apatite which crop out sporadically within an area some 1000 x 800 metres in extent around the Bore. A distinct ground-radiometric response correlates closely with this area of apatite development.

EL 23571 is part of a number of tenements in the Aileron-Reynolds Range area including EL 23571 (Reynolds Range), EL 23671 (Aileron), EL 24548 (Yalyirimbi Range) and EL 24741 (Woodforde).

Location and access

EL 23571 (Reynolds Range) is located about 170 kilometres north northwest of Alice Springs and 50 kilometres west-northwest of Aileron in the central-southern part of the Northern Territory. The Stuart Highway is the main north-south arterial highway through the Northern Territory passing the Aileron Roadhouse about 130 kilometres north of Alice Springs.

Access to the main part of the tenement is through station tracks on Pine Hill. Pine Hill Station can be reached by turning west off the Stuart Highway about 150 kilometres north of Alice Springs.

There is only a limited amount of vehicle tracks in the tenement area with the Woodforde River-Harverson Pass track forming the principle access route across the main part of the tenement. This station track follows the southern side of the Reynolds Range, is seldom used and typically washed-out, particularly in the Woodforde River Valley. In 2009, Arafura engaged Mr Gil Bowman of Pine Hill to conduct track maintenance and re-establish this track across the Pine Hill pastoral lease. At the request of Mr Roy Chisolm, tracks on the Napperby pastoral lease were not re-established. Despite this most of the tenement is reachable by 4WD vehicle or foot.

The southern part of the tenement is reached via a station track traversing the southern side of the ranges from the Stuart Highway via Old Alb's bore to Boundary Bore.

The east-west trending Yalyirimbi Range passes into to the southwest parts of EL 23571 and forms a barrier between the northern and southern parts of the tenement.

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Topography and drainage

The northern edge of the Reynolds Range approximately coincides with the northern boundary of EL 23571. The Reynolds Range is a relatively narrow (5-10 kilometre wide, 90 kilometres long), northwest trending belt of steep hills with deeply incised drainages. Elevations in the Reynolds Range exceed 750 metres above sea level, with the highest peaks reaching over 1000 metres above sea level (*eg.* Mt Thomas, 1116 metres). Mt Freeling (1005 metres) and Mt Dunkin (930 metres) are other prominent landmarks in the region and occur to the east of EL 23571 within SEL 23671.

A dissected broad open valley floor, about 650-700 metres above sea level, lies to the south of the Reynolds Range and is the largest topographic component on EL 23571, covering more than 50% of the tenement area.

The east-west trending Yalyirimbi Ranges extends into the southern parts of EL 23571. The Yalyirimbi Ranges are on the southern side of this open valley floor and typically exceed an elevation of 750-800 metres in EL 23571. A nearby unnamed peak reaches 881 metres in the adjacent EL 24548. These Ranges represent a significant natural topographic barrier separating the northern and southern parts of EL 23571 although most of the open valley plain to the north drains southwards through them via tributaries of Napperby and Day Creeks. The small portion of northeastern EL23571 drains southeast into the Woodforde River near the convergence of the Yalyirimbi and Reynolds Ranges.

The southern most parts of EL 23571 are on the edge of gently sloping red-sandy soil plain that drains towards a depression centred on Lake Lewis about 50 kilometres or more to the south.

Climate

The climate is characterised by long hot summers and short mild winters. Temperatures regularly exceed 40°C in summer with rare frosts in winter. The average rainfall is about 280 mm, most of which falls between October and March, but both frequency and amount are erratic.

The Aileron-Reynolds project area is part of the Burt Plain Bioregion as defined by Connors (2004). Connors (2004) indicates that the Ranges are broadly classified as "*mixed species low open woodlands*" which is described as spinifex hummocky grassland with a mixed low open-woodland overstory (principally Eucalyptus and Hakea species). The south slope of most rocky ridges also have characteristic stands of native Pines. The open valley between the Ranges is classified as "*tall open schrublands"* which is principally *Acacia kempeana* (Witchetty Bush) tall open-shrubland with Cassia and Eremophila open-shrubland understory, but also includes an unmapped area of *Acacia aneura* (Mulga) tall open-shrubland with Cassia and Eremophila open-shrubland understory. Major drainages contain good stands of Ricer Red Gums, Bloodwood and lesser Beantree.

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SUMMARY

Minor desktop studies were undertaken to evaluate the mineralisation potential and outline exploration activities for 2010. Unfortunately the extreme wet year and ground conditions prevented access for on ground exploration activities in 2010.

The desktop assessment and evaluation of the existing rock chip dataset and HyMap targets indicates that the exploration of additional, smaller HyMap targets is probably not warranted. However a cluster of rock chips collected from an advanced argillic HyMap target were highlighted for follow up systematic exploration sampling.

Two of the 2009 HMC samples from EL 23571 were determined to be of interest with respect to REE mineralisation. The HMC geochemical signature of these samples showed geochemical indicators consistent with the possible presence REE mineralisation and/or alkaline or carbonatitic igneous rock in the source region. Repeat and more detailed systematic stream sediment sampling was planned for these catchment areas to follow up the geochemical signature and evaluate mineralogy of the HMC and its mineralisation potential.

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TENURE

Mining/Mineral Rights

Exploration Licence 23571 (Reynolds Range) is 100% held by Arafura Resources Limited (ACN 080 993 455) under Miners Right number 13249. Under a JV Agreement, NuPower Resources Ltd (ACN 120 787 859) holds the uranium Mineral Rights to this tenement whilst Arafura Resources retains all other Mineral Rights.

The original application of 141 sub-blocks (447.7 square kilometres) was by Norquest Mines Pty Ltd (ACN 010 729 987) on 18 April, 2002. All 141 sub-blocks in EL 23571 were granted to Norquest Mines on 8 December, 2003, for a period of 6 years and subsequently transferred to ARAFURA RESOURCES NL (ACN 009 627 132) on 2 April, 2004.

EL 23571 was reduced to 71 sub-blocks (225.3 square kilometres) on 8 December, 2006, after three years of grant. Arafura Resources twice gained approval to waive the statutory 50% reduction allowing it to retain all 71 sub-blocks until 7 December, 2009.

The granted six years of tenure for EL 23571 was to expire 7 December, 2009, however as permitted under the Mining Act, Arafura Resources applied for a two year extension of 36 sub-blocks. The current land tenure (Figure 1) is due to expire 7 December 2011.

Land Tenure

The land tenure under EL 23571 (Reynolds Range) includes Perpetual Pastoral Leases 1177/1178 (Napperby), PPL 1030 (Pine Hill) and PPL 1097 (Aileron). Most of EL 23571 is on Napperby and Pine Hill.

- Napperby Station, PPL 1177/1178 – NT parcel 00748 is owned by Mr Roy Chisolm of Napperby Station (phone 08 8956 8666, fax 08 8956 8660).
- Pine Hill Station, PPL 1030 – NT parcel 00725 is owned by Mr Gil Bowman of Pine Hill Station (phone 08 8956 9590, fax 08 8956 9841).
- Aileron Station, PPL 1097 – NT parcel 00703 is owned by Mr Garry Dann of Aileron Station (Waite River Holdings Pty Ltd), (phone 08 8956 9705, fax 08 8956 8535).

Native Title

Arafura Resources has negotiated and executed an Exploration Agreement with the Central Land Council (on behalf of registered Native Title Claimants). EL 23571 is subject to this agreement. As a result, there are no Native Title impediments to continued exploration on EL 23571 other than holding appropriate consultations, avoiding activity on identified sacred sites and paying agreed amounts of financial compensation.

In December, 2003, an Introductory Meeting was held at Nolan’s Bore with members of the relevant Native Title groups. A further meeting with CLC officers and relevant Native Title groups was held at Aileron on 31 March, 2006, where EL 23571 was confirmed as part of the Exploration Agreement. Under the terms of Arafura’s Exploration Agreement, the initial date of entry is 1 October, 2009.

Should mining eventuate within the area of EL 23571, a mining compensation agreement will have to be negotiated both with the holder of the pastoral lease in accordance with the Mining Act, and also

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with the registered Native Title Claimants in accordance with the Right To Negotiate provisions of the Native Title Act. A mining tenement can only be granted where an appropriate Native Title agreement is emplaced.

The terms of the Exploration Agreement provide for continuation of exploration on the area of the proposed mining tenement while the mining agreement is being negotiated with the registered Native Title Claimants.

Site Clearances

Under the terms of the Exploration Agreement, Arafura must provide all relevant details of its proposed exploration activities to be conducted on EL 23571. The CLC must advise if clearances are necessary and then, if required, conduct clearances and provide details of exclusion zones as advised by the Native Title holders. Under the Exploration Agreement, the CLC is required to provide all necessary Scared Site Clearances and details of the exclusion zones to allow exploration activities to progress in a timely manner.

Arafura submitted a request to the CLC for reconnaissance access to EL 23571 in 2007/08. Due to the nature of the area, the CLC advised that clearances could not be given without substantial clearances. The CLC declined access to EL 23571 for reconnaissance activities in 2007/08. Arafura therefore decided to acquire hyperspectral survey data over the entire region as this technique could potentially serve as a method to refine exploration targets and hence reduce the amount of clearance required.

Arafura provided all relevant details of its proposed reconnaissance exploration activities over the Aileron-Reynolds project area to the CLC in July 2009. On 25 September, 2009, the CLC provided Sacred Site Clearance Certificate 2009-075 detailing all exclusion zones within the outlined exploration area. All exclusion zones and sites were avoided.

Sensitive Areas

Part of EL 23571 is covered by the Ti-Tree Water Control District which is a designated sensitive area. According to the Northern Territory of Australia Water Act as in force at 14th of January, 2004, subsection 7, mining and petroleum activities are permissible as according to the *Mine Management Act*.

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GEOLOGICAL SETTING

Regional Geology

The Arunta Region contains more than 200 000 km^2 of metamorphic rocks in the southern parts of the NT and has been subdivided into three distinct geological regions by the NTGS, the Ailerion, Warumpi and Irindina Provinces (Figure 2). The Arunta Region is unconformably overlain by sediments of the Neoproterozoic to mid-Palaeozoic Ngalia, Georgina, Amadeus and Wiso Basins.

The Aileron Province predominantly consists of Palaeoproterozoic sedimentary and igneous rocks that have undergone greenschist to granulite facies metamorphism. The majority of the preserved metasedimentary and igneous rock units in this region were deposited or emplaced prior to the 1740-1690 Ma Strangways Orogeny (*e.g*. Scrimgeour 2003, Hussey *et al.*, 2005, Claoué-Long *et al.,* 2008a, 2008b). This event appears to have affected the entire Aileron Province to some degree, as opposed to the Mesoproterozoic 1595-1570 Ma Chewings Event that appears to be localised within the central and southern(?) parts of Aileron Province (*e.g.* Hand and Buick, 2001, Fraser, 2004). The 1800 Ma Stafford and 1790-1770 Ma Yambah Events also appear to be present throughout the Aileron Province, with extensive bimodal igneous activity, associated sedimentation and localised Low Pressure-High Temperature metamorphism.

Most of the exposed Aileron Province was metamorphosed to greenschist or lower amphibolite facies conditions during the 1740-1690 Ma Strangways Orogeny, with an apparent localised abundance of 1810-1700 Ma igneous activity and deformation in parts. The central-southern parts of the Aileron Province preserves an east-west zone of granulite facies metamorphic rocks associated with the Strangways Orogeny. Regions of the Aileron Province have also been subject to younger (1640-1500 Ma) periods of magmatism and localised metamorphism.

Current views on the depositional and tectonic setting of the Aileron Province are based on recent geochemical, isotopic and igneous studies and the contained mineral systems. These favour a rifted continental crust or evolving backarc setting in the early parts of the depositional history [*e.g.* Hussey *et al.,* 2005, Hoatson *et al.,* 2005 Matthew Cobb (PhD student, Curtin University) *pers. comm.,* 2005], with a prolonged tectonothermal convergent event in the Strangways Orogeny. Hussey *et al.* (2005) and Hoatson *et al.* (2005) argue for contiguous sedimentation and bimodal igneous activity during Stafford Event. This Event is thought to be responsible for the development of localised(?) deep-marine basins in the Arunta Region, as opposed to contemporaneous subaerial to shallow-water volcanism and sedimentation in the adjacent Davenport Province.

The Aileron Province contains temporal equivalents of the gold-bearing Granites-Tanami and Tennant Creek Regions and regional aeromagnetic data suggest lateral continuity between these Regions. The Aileron Province is therefore regarded as part of the North Australian Craton, however, localised facies variations and differences in sedimentary environments are evident (*e.g.* Hussey *et al.,* 2005).

The Warumpi Province in the south and southeast of the Arunta Region (Figure 2) contains a younger package of metasedimentary and volcanic rock types with protoliths in the range 1690-1600 Ma (Scrimgeour *et al.,* 2003). The Province was variably metamorphosed in the 1640 Ma Leibig Orogeny, 1570 Ma Chewings and the 1150 Ma Teapot Events.

Unmetamorphosed Neoproterozoic to Palaeozoic marine and terrestrial sedimentary rocks of the Georgina, Ngalia and Amadeus Basins surround and unconformably overly the Arunta Region. Contemporaneous Neoproterozic to Cambrian strata of the Harts Range Group (Buick *et al.,* 2001, Maidment *et al.,* 2004, Buick *et al.,* 2005) are also caught up within the eastern parts of the Arunta Region in the newly defined Irindina Province (Scrimgeour, 2003). This revision and reinterpretation of the Arunta Region has significant geological implications and has come about largely as a result of several extensive chronological, metamorphic and metallogenic studies in the eastern Arunta Region (eg Miller *et al.,* 1998, Mawby *et al.,* 1998, 1999, Hand *et al.,* 1999a, b, Buick *et al.,* 2001, Scrimgeour and Raith, 2001, Hussey 2003, Maidment *et al.,* 2004, Buick *et al.,* 2005, Claoué-Long and Hoatson, 2005, Close *et al.,* 2005, Hussey *et al.,* 2005).

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Geochronological and metamorphic studies have shown that the rocks of the Harts Range Group in the Irindina Province are variably metamorphosed to transitional granulite facies in the (480-450 Ma) Ordovician Larapinta Event. This high-grade event is followed by lower-grade Devonian to Carboniferous deformation and granite and pegmatite intrusion. Interestingly, the high-grade Larapinta Event appears to have had little influence on the thermal history of the surrounding rocks of the Aileron Province, and apart from rare exceptions appears to be largely restricted to the Irindina Province (Maidment 2004, Close *et al.,* 2005, Hussey *et al*., 2005, Claoué-Long and Hoatson, 2005).

Many of the fault bounded contacts between the various units within the Arunta and surrounding regions are attributed to the (390-300 Ma) Devonian-Carboniferous Alice Springs Orogeny. Most of the fault movements within the adjacent Georgina Basin also appear to be related to the Ordovician Larapinta Event and Devonian-Carboniferous Alice Springs Orogeny.

Localised carbonatite occurs at Mud Tank (730 Ma), Mt Bleechmore and also in the Casey Inlier area in the central and southern parts of the Aileron province. The carbonatite ages the latter two regions are unknown but it is conceivable that both are about 730 Ma. A small potassic alkaline igneous complex, the Mordor Igneous Complex that has lamphyrophyric affinities (Barnes *et al.,* 2008) was emplaced in the southern-central parts of the Aileron Province at 1132 Ma (Clauoe-Long & Hoatson, 2005).

Local Geology

(Modified after McGilvray 2006)

STRATIGRAPHY

Palaeoproterozoic

The Lander Rock beds are the oldest known outcropping rocks in the area. The Lander Rock package is a suite of dominantly quartzose and pelitic sediments with a facies transition in the northwest, to alternating pelites and psammites, in the Mt Stafford Beds. At least some parts of the Lander Rock beds preserve sedimentary structures (Bouma sequences) indicative of sedimentation below storm wave base. Major outcrops occur in the Lander River Valley north of the Reynolds Range and in the vicinity of Harverson Pass (Figure 3). The metamorphic grade varies from lower greenschist facies in the northwest of the Reynolds Range to granulite facies in the southeast. Minor sills or dykes of mafic rocks occur in the package. The timing of deposition of the Lander Rock Package is unclear although 1795-1806 Ma granite intrusives (Worden *et al.,* 2008) and U-Pb SHRIMP detrital zircon ages provide a rough maximum estimate of 1806-1840 Ma (Vry *et al.,* 1996, Claoue-Long 2003, Claoue-Long *et al.,* 2005, Claoué-Long *et al*., 2008a). It is important to note that recent dating suggests the Lander Rocks beds can be divided into at least two stratigraphic units based on zircon provenance patterns and the presence of a younger zircon population in some areas (Claoué-Long 2003, Claoué-Long *et al.,* 2005, Claoué-Long *et al*., 2008a).

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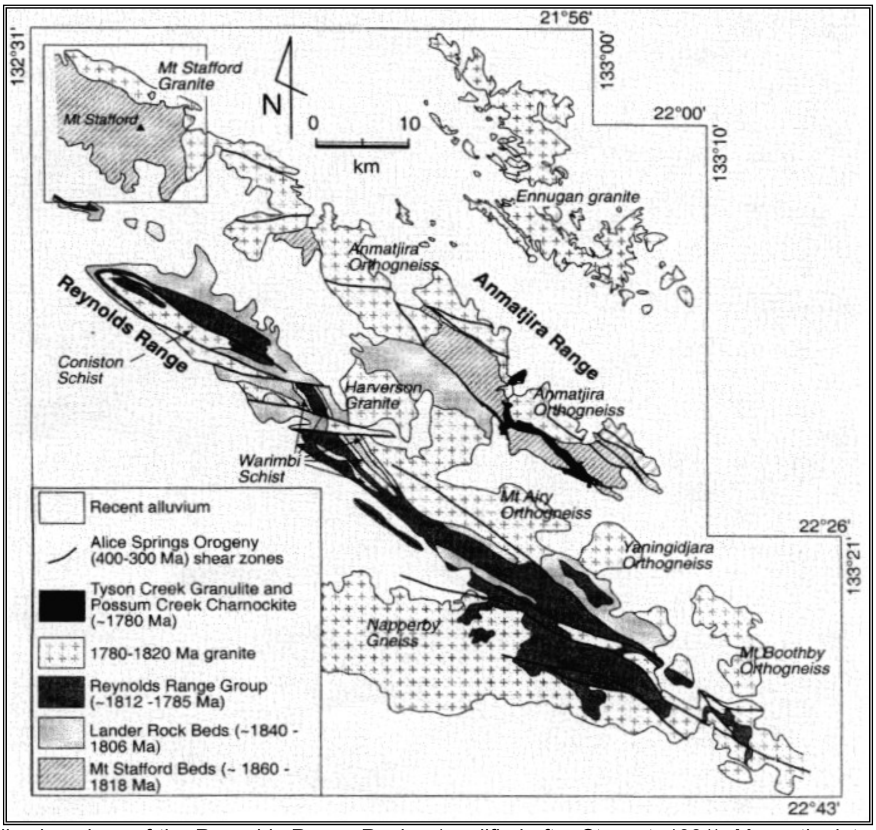

Figure 3: Generalised geology of the Reynolds Range Region (modified after Stewart, 1981). Magnetic data indicates that the bulk of the regions covered by recent alluvium are underlain by granite/granitic gneiss (*from* Hand & Buick 2001).

The Reynolds Range Group is sub-divided into four stratigraphic units (Buick *et al.* 1999). The basal Quartzite Unit, the Mt. Thomas Quartzite, is a mature orthoquartzite that unconformably overlies the Lander Rock Package in the northwest of the Reynolds Range (Figure 3). The unit varies in thickness from ~200 metres to 550 metres cropping out along the length of the range. The lower units are predominantly conglomeratic with minor pebbly arkose rocks. The upper intervals are pelitic and generally ferruginous. A lateral facies change occurs from the northeast to the southwest across the range from basal conglomerates into homogenous pelitic rocks. Relict sedimentary structures indicate a high-energy, intertidal depositional environment (Buick *et al.,* 1999).

The Lower Calcsilicate Unit forms the basal unit of the group in the southern margin of the Reynolds Range. This unit can be age constrained as an equivalent to the Mt Thomas Quartzite and by the intruding Napperby Gneiss (metagranitoid). The unit is composed of finely layered, carbonate-poor calcsilicate rocks rich in clinopyroxene, plagioclase and grossular-andradite garnet locally interlayered with white quartzites and rare marbles. The unit is strongly metamorphosed and intensely deformed lacking sedimentary structures (Buick *et al.,* 1999).

The Pelite Unit which was previously part of the Pine Hill Formation achieves a minimum thickness of 500 metres to 600 metres. Pelitic rocks are interlayered with thin sheets of fine grained siltstone and sandstone interpreted as storm deposits (Buick *et al.* 1999).

The Upper Calcsilicate Unit encompasses the previously defined Algamba Dolomite Member and the Woodforde River Beds. The unit achieves a maximum thickness of about 250 metres to 300 metres along the length of the Reynolds Range except in the central part where the maximum thickness is only 20 metres. The unit occurs as a series of lenses within the Pelite Unit dominated by interlayered limestone and dolomite locally intercalated with pelites and psammites. Stromatolites and sedimentary structures, *i.e.* climbing ripples, are preserved where rocks are metamorphosed at a regional low grade (Buick *et al.,* 1999).

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Neoproterozoic

Ngalia Basin rocks were deposited between the Neoproterozoic to the Late Carboniferous (Wells & Moss, 1983). The rocks are an important component of the adjacent EL 24548, but do not occur in EL 23571.

Tertiary

Cainozoic sediments occur in sedimentary basins outside of EL 23571 and will not be discussed in this report.

Geological research in Tertiary basins, (Senior *et al.,* 1995), has defined three weathering events which affected Arunta igneous and metamorphic basement rocks and lacustrine and fluviatile Tertiary sedimentary rocks. The weathering events will be discussed herein.

Weathering Event A occurred during the Late Cretaceous to Early Tertiary (Palaeocene). A trizonal profile was 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 metres thick that grades into a multicoloured mottled zone up to 10 metres thick. The mottled zone is overlain by a ferruginous zone up to 8 metres thick (Senior *et al.,* 1995). The weathering profile is developed in basement rocks and the Mesozoic Hooray Sandstone, and is overlain by Palaeocene sediments in Tertiary basins.

Weathering Event B affects the upper part of the Ambalindum Sandstone Member immediately beneath the Delaney Mudstone Member in the Hale Basin, located in the eastern part of the NTGS Alice Springs 1:250,000 Geology Map Sheet. The upper part of the Ambalindum Sandstone Member is friable and yellow, having a mottled appearance in parts. The weathering event occurred prior to the Middle Eocene. Little evidence exists outside of the Hale Basin for this weathering event (Senior *et al.,* 1995).

Weathering Event C affects the upper part of the Tug Sandstone Member of the Hale Formation in the Hale Basin. The weathering event preceded deposition of the Waite Formation in the Waite Basin, or equivalents of the Waite Formation.

Quaternary

Further uplift in the Reynolds Region, and northern Arunta Region has resulted in deposition of red earth and alluvium from uplifted areas and continued movement of colluvium down present-day hill-slopes. Calcrete has precipitated along stream channels, evaporites have formed in playa lakes, and sand plains and Aeolian dunes have developed in low lying areas (Stewart, 1981).

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IGNEOUS ROCKS

Palaeoproterozoic

Based on recent high precision SHRIMP U-Pb dating of zircons in igneous rocks by the NTGS (Worden *et al.,* 2008), granitic rocks of the Reynolds Range region can be subdivided into two age-related suites. The existence of two igneous suites requires:

1. emplacement of the first granitic suite into the Lander Rock package,
2. uplift and erosion,
3. deposition of the Reynolds Range Group, and
4. emplacement of the second igneous suite

The emplacement age of the first igneous suite is now well constrained at about 1795-1805 Ma (Worden *et al.,* 2008). This suite crops out on the northern side of the Reynolds Range, is contemporaneous with LP/HT metamorphism and partial melts at Mount Strafford (the Stafford Event) and provides localised evidence for bimodal magmatism (in the Anmatjira Orthogneiss).

From southeast to northwest, the first granitic suite includes the Boothby Orthogneiss (1806 ±4 Ma, Worden *et al.,* 2008), Yaningidjara Orthogneiss [1798 ± 4 Ma, Worden *et al.,* 2008 which is within error of the 1806 ± 6 Ma age by Vry *et al.,* (1996)], Mount Airy Orthogneiss (1799 ±3 Ma, Worden *et al.,* 2008) Harverson Granite (1799 ±3 Ma, Worden *et al.,* 2008), Anmatjira Orthogneiss [1798 ±3 Ma by Worden *et al.,* 2008 and 1802 ±3 Ma by Rubatto *et al.,* (2006) about 15 kilometres north of the first location near Mount Stafford]. Early SHRIMP U-Pb determinations on zircon from these igneous rocks by Collins & Williams (1995) are much less precise and are discounted in favour of more recent CL-assisted SHRIMP U-Pb dating by Worden *et al.,* (2008) and Rubatto *et al.,* (2006). Rubatto *et al.,* (2006) also determined that the LP/HT metamorphism at Mount Stafford occurred between ~1795 and 1805 Ma.

The second slightly younger igneous suite appears to be about 1770-1785 Ma and probably reflects the Yambah Event in this region. The suite mainly outcrops the Reynolds Range and further south, although the Possum Creek Charnokite [1774 ± 6 Ma, Collins and Williams (1995)] and the Tyson Creek Granulites in the Anmatjira Range are similar age. The age of second igneous suite is typically poorly constrained with larger errors, particularly those in the Reynolds Ranges. These are all high level granites that contain metasedimentary enclaves and have a peraluminous geochemical signature. The assimilation of sedimentary units causes significant zircon inheritance issues making interpretation of magmatic zircon ages difficult (eg Smith 2001). The differentiation of some granitic units is unclear based on current published maps and careful remapping is needed.

The second igneous suite includes the Warimbi Schist [1785 ± 22 Ma, Collins & Williams (1995)], Coniston Schist [1780 ± 10 Ma, Smith (2001)] and Napperby Gneiss [1780 ± 10 Ma, Collins & Williams (1995)]. The Yakalibadgi Microgranite probably also belongs in this suite as do a number of undifferentiated granites and gneisses that intrude the Reynolds Range Group (see Stewart and Pillinger 1981).

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METAMORPHISM & STRUCTURAL GEOLOGY

The Arunta Region was shaped by two major intervals of tectonism. The first major tectonic interval occurred during the Palaeo- to Mesoproterozoic, 1850-1560 Ma, and was associated with multiple episodes of regional medium to high temperature metamorphism and magmatism (Hand & Buick, 2001). The second major tectonic interval occurred in the early to mid-Palaeozoic, about 490 to 300 Ma, and was associated with north-south intraplate extension and subsequent north-south convergent deformation (Hand & Buick, 2001). Regional structures produced during each period of tectonism in the Reynolds Range Region are discussed by Hand & Buick (2001).

The first tectonic interval is defined by three main tectonic events, the 1805-1795 Ma Stafford Event, the 1785-1770 Ma Yambah Event, and the 1595-1560 Ma. Chewings Orogeny. There has been significant debate about the Strangways Orogeny in the Reynolds and Anmatjira Ranges. Historically the Strangways Orogeny was about 1780-1720 Ma however recent revision by the NTGS identifies the Yambah Event (1785-1770 Ma) and the Stangways Orogeny (about 1740-1690 Ma). All published literature still refers to the historic usuage of Strangways Orogeny. The Yambah Event occurs in the Reynolds Range region and the affect of the Strangways Orogeny as newly defined needs to be resolved.

The Stafford Event is based on LP/HT metamorphism and igneous relationships in the Mount Stafford area. The first igneous suite noted above is coincident with the Stafford Event and includes the Harverson Granite highlighted in Figure 4. The Lander Rock Package around the Harverson Granite is characterised by the growth of andalusite and cordierite (Dirks *et al.,* 1991; Vry & Cartwright, 1998). The contact metamorphic porphyroblasts overprint a biotite-quartz-muscovite foliation which indicates prior regional deformation to granite emplacement. In other parts of the northwest Reynolds Range, muscovite±biotite bearing greenschist assemblages, (Dirks *et al.,* 1991), define a sub-vertical northwest-southeast trending foliation, (Stewart, 1981; Dirks & Wilson, 1990). Fold structures are truncated to the overlying Reynolds Range Group in an unconformity that dies to the southeast, indicating the Stafford Tectonic Event may have been localised in the northwestern part of the Reynolds Range, and Anmatjira Range, region (Hand & Buick, 2001).

Contact metamorphic assemblages formed in the Reynolds Range Group around the granitic precursors of the Warimbi and Coniston Schists during intrusion of the second igneous suite at around 1785-1770 Ma (Collins & Williams 1995). Contact aureoles in meta-pelites adjacent to the Warimbi Scist are andalusite and cordierite bearing. The stability of these assemblages indicate maximum P-T conditions of 550°C and 3.5 kilobars (Xu *et al.,* 1994; Mahar *et al.,* 1997). Scapolite porphyroblasts in anorthite-bearing marbles adjacent to the Coniston Schist also give maximum temperatures of 550°C (Buick & Cartwright, 1994). Contact metamorphic blasts surrounding the Warimbi Schist contain straight or gently curved internal foliations defined by muscovite-quartz±biotite. Curved inclusion trails indicate the growth of the contact metamorphic assemblages occurred during deformation. Inclusion trails are reported to show systematic changes in orientation defining gentle folds. The orientation of folding is not clear but has been postulated as a southeast trending foliation based on findings in other parts of the Arunta Inlier (Hand & Buick, 2001; Goscombe, 1991; Collins & Sawyer, 1996).

The Chewings Orogeny produced a nearly continuous northeast-southwest transition in metamorphic grade from greenschist to granulite facies along the length of the Reynolds Range (Figure 5). Meta-pelitic rocks of the Reynolds Range Group are transformed from phyllites to andalusite±cordierite-bearing schists to migmatitic granulites (Dirks *et al,.* 1991; Hand & Dirks, 1992; Williams *et al.,* 1996 & Buick *et al.,* 1998). The metamorphic field gradient is summarised by Hand and Buick (2001) by the metamorphic zones: muscovite-chlorite±biotite; texturally stable Strangways Orogeny andalusite and cordierite; first appearance of sillimanite and; stable co-existence of cordierite-spinel assemblages.

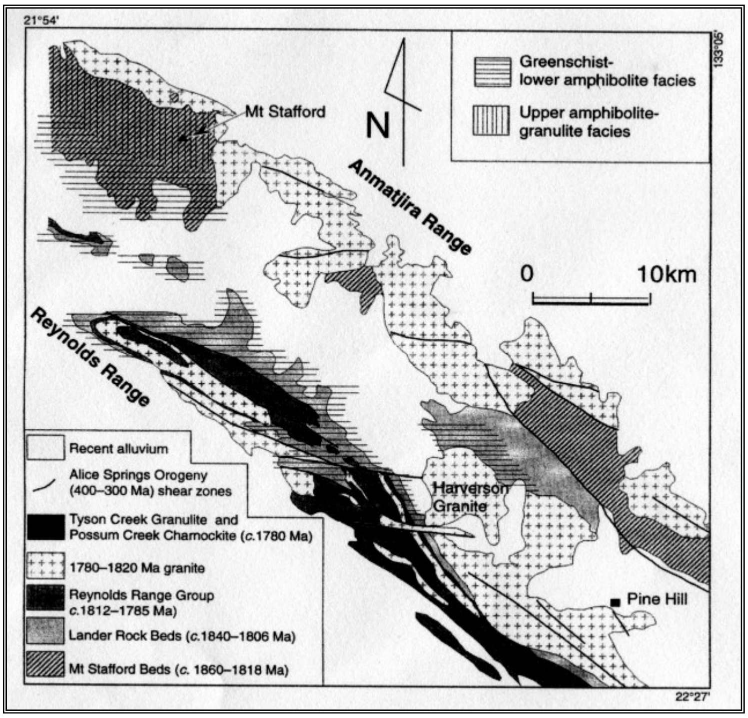

Figure 4: Regional distribution of metamorphism inferred to be associated with the Stafford Event (*from* Hand & Buick, 2001).

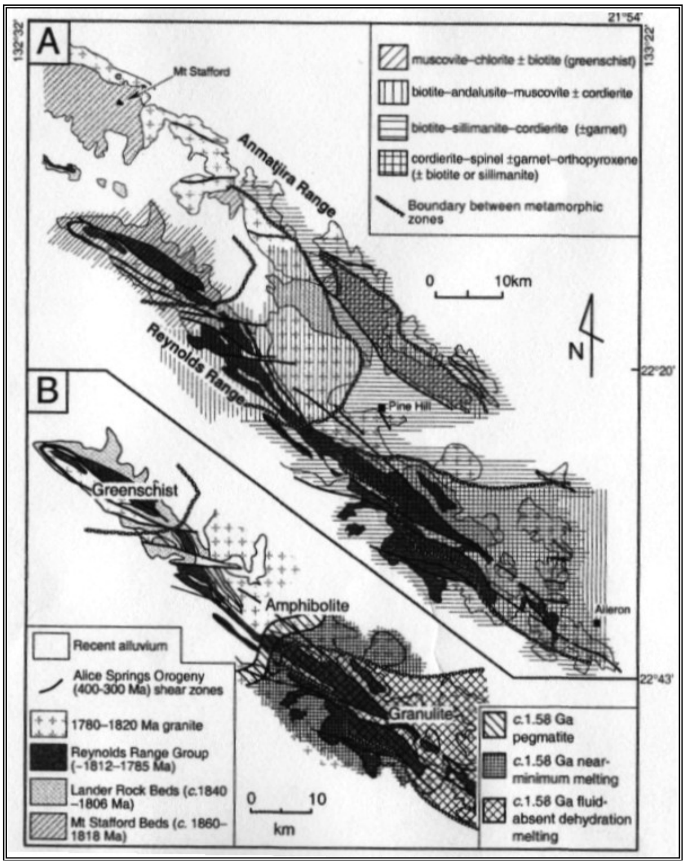

Figure 5: (a) Simplified geological map of the Reynolds Range Region showing the metamorphic zones associated with the 1595-1570 Ma Chewings Event. (b) Metamorphic zones in the Reynolds Range defined by the assemblages produced during partial melting. Assemblages in the near minimum melting zone include ilmenite-magnetite-bearing leucosomes in migmatised granite. In the granulite zone, leucosomes contain cordierite ± garnet ± orthopyroxene (*from* Hand & Buick, 2001).

The higher grade regions of the Reynolds Range are further sub-divided by Hand and Buick (2001) based on the leucosome assemblages that formed during partial melting. Upper amphibolite regions show immediate upgrade of the sillimanite isograd, and volumetrically minor leucosomes are pegmatitic in character with simple mineralogies that reflect water-saturated melt (Buick *et al.,* 1998). At slightly higher grades leucosomes contain ilmenite-magnetite intergrowths that form via breakdown of biotite (Hand & Dirks, 1992). The highest grade granulite leucosomes contain cordierite and/or garnet or orthopyroxene and formed during fluid-absent dehydration reactions that consumed biotite and sillimimanite.

Partial melting assemblages overprint the gneissose layering suggesting high temperature metamorphism outlasted pervasive deformation (Hand & Buick, 2001). Granulite and upper amphibolite assemblages are aligned parallel to the axial surface of the regional, upright, southeast-trending, isoclinal folds (Hand & Buick, 2001). The upright folds reflect around 50% shortening and can be traced along the length of the Reynolds Range (Dirks & Wilson, 1990). Many of the macro-scale folds within northwest-southeast regional folds are doubly plunging, (Stewart *et al.,* 1980; Dirks & Wilson, 1990), which represents significant vertical extension (Hand & Buick, 2001). In the lower grade northwestern Reynolds Range, the axial surface fabric overprints approximately 1785 Ma contact metamorphic minerals.

In the Reynolds Range, the regional fabric has been deformed on all scales by conjugate, steeply-dipping shear and crenulation bands that, in geometry, represent conjugate kink bands (Dirks & Wilson, 1990; Hand & Dirks, 1992). The dominant kink set trends approximately east-west plunging between 0° and 70° east. The subordinate kink set trends approximately north-south and plunges to the north (Hand & Buick, 2001). Zircons from leucosomes within the crenulation bands have been aged at 1570 Ma (Hand *et al.,* 1995; Williams *et al.,* 1996), which confirms development of structures during the Chewings Orogeny (Hand & Buick, 2001).

Proterozoic structures in the Reynolds Range are heavily dissected by southeast and east trending shear zones associated with the 400-300 Ma Alice Springs Orogeny (Hand & Buick, 2001). Micaceous greenschist to lower amphibolite assemblages are dated to 330-300 Ma (Cartwright *et al.,* 1999).

Collins and Teyssier (1989), interpret the overall geometry of the Reynolds-Anmatjira Ranges to have formed in a transpressional setting with a northeast-plunging lineation representing a component of sinistral movement during the Alice Springs Orogeny, resulting in juxtaposition of granulites against lower grade rocks in the southwestern Reynolds Range (Dirks *et al,.* 1991).

The metamorphic grade of Alice Springs Orogeny structures increases to the southwest (Figure 6) such that shear zones in the southwest of the Reynolds Range contain kyanite, staurolite and sillimanite-bearing assemblages in metapelite, (Dirks *et al.,* 1991) with P-T conditions of 5-5.5 kilobars and 550-600°C. In the southeastern Anmatjira Ranges, the shear zones contain andalusite and staurolite assemblages in meta-pelite, with P-T conditions of 4 kilobars and 580°C (Xu *et al.,* 1994). In the central and northwest Reynolds Range the shear zoneas are associated with greenschist or lower-grade metamorphism (Dirks *et al.,* 1991). Accompanying the increase in metamorphic grade is an increase in the number and width of the shear zones, with zones in the southeastern Reynolds Range up to 300m wide (Hand & Buick 2001).

Episodic mild uplift and warping consisting of limited upward doming of ranges and minor tilting continued through the Palaeozoic and Cainozoic to present day (Senior *et al.,* 1995).

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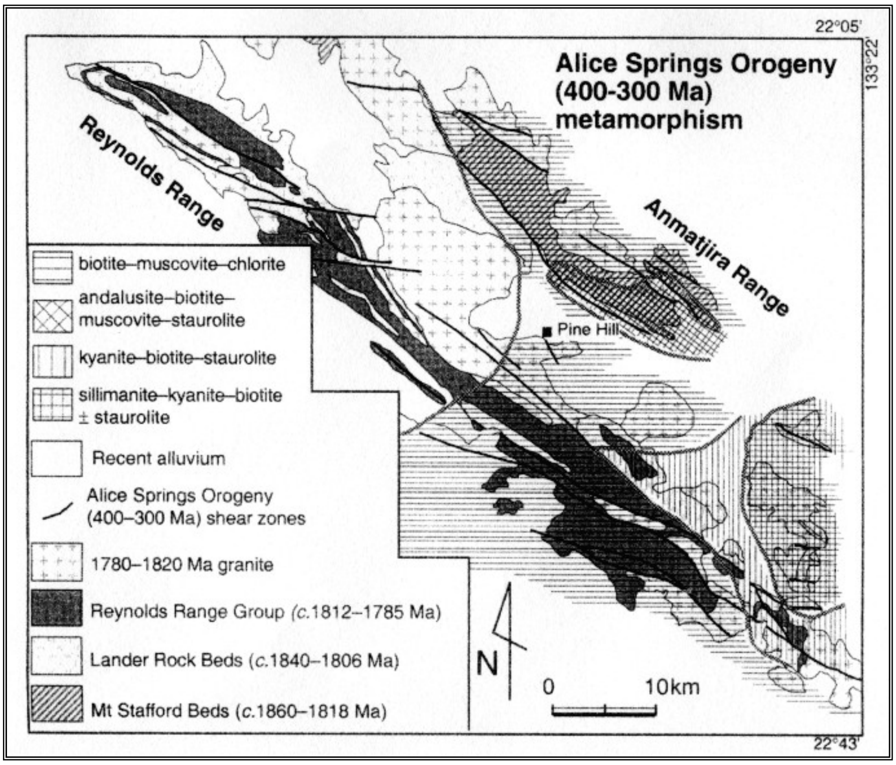

Figure 6: Metamorphic zones defined by mid-Palaeozoic metapelitic shear zone assemblages in the Reynolds Range Region (from Hand & Buick 2001).

MINERALISATION

Relevant company reports and descriptions of the Reynolds Range region by the NTGS describe numerous occurrences of mineralisation. These include copper-lead-zinc, gold, tungsten, tin, tantalum, rare earth elements, mica, nickel, chromium, semi-precious stones, talc, iron and uranium. A variety of mineralisation styles have potential in the Reynolds Range region but few mineralisation styles have proven prospective.

Prospective deposits known to present day include the Nolans Bore Rare Earth Element- Phosphate-Uranium deposit currently being investigated at the feasibility stage of activities by Arafura Resources within EL 23671 Aileron (Hallenstein and Goulevitch, 2008). In addition, Poseidon Gold discovered a zone of gold-arsenic-antimony mineralisation called the Sabre Prospect, located north of Mount Thomas. Further details of Poseidon Gold's findings and activities are contained in the 'Previous Investigations' section.

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PREVIOUS INVESTIGATIONS

EXPLORATION PRIOR TO 1996

(modified after Drummond 2003)

The following historic exploration summaries may not be explicitly associated with EL 23571 but are relevant when considering regional prospectivity of the Aileron-Reynolds project area. Reference is made to historic EL 9672 (Dragons Lair) and contemporary ELs 23671 (Aileron), 23571 (Reynolds Range), 24548 (Yalyirimbi Range) and 24741 (Woodforde) in the following exploration summaries. The relevant historic exploration licences and activities are summarised in Table 1 and are detailed further below.

Table 1: Summary of historic exploration.

Years	Tenement(s)	Exploration Company	Exploration Targets/Commodities	NT Department of Resources Open File Company Report(s)
1977-1978	EL 1294	CSR Minerals & Chemical Division	Base metals, tungsten and uranium.	CR1979-0198
1977-1979	EL 1444	Otter Exploration	Base metals, tin-tungsten, uranium and REE.	CR 1979-0021, CR 1980-0056, CR 1980-0252.
1981-1983	EL 2942, EL 3075, EL 3084, EL 3088.	BHP Exploration	Diamonds, base metals.	CR 1983-0015, CR 1983-0289.
1982-1983	EL 3506	J Weir	Uranium and REE	CR 1983-0216
1983-1984	EL 4188	BHP Exploration	Possible carbonatite	CR 1984-0117
1987-1990	EL 5511	Colchis Mining Corporation	Gold and base metals	CR 1989-0020, CR 1990-0036.
1988-1989	EL 5901	Track Minerals	Gold and base metals	CR 1989-0704
1991-1993	EL 7344, EL 73445	Poseidon Gold	Gold and base metals	CR 1993-0410
1993-2001	EL 7343	Poseidon Gold & Exodus Minerals	Gold and base metals	CR 1999-0255 CR 2001-0270
1993-1994	EL 8117	Tidegate	Gold	CR 1994-0589
1994-1996	EL 8411	PNC Exploration	Uranium	CR 1995-0266, CR 1996-0187
1995-1998	EL 9146	Aberfoyle Resources	Gold	CR 1996-0692, CR 1997-0688
1996-1998	EL 9672	Homestake Gold of Australia	Gold and iron	

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CSR minerals (1977-1978) EL 1294.

This historic licence covered most of EL 23571 and the north central portion of the adjacent EL 24548. The licence area was considered prospective for base metals, tungsten and uranium. An airborne radiometric survey was flown in 1977. Thirty seven airborne radiometric anomalies were checked along with stream sediment sampling and rock chip sampling.

Reconnaissance sampling located elevated rock chip values in the range 190 to 1620m ppm U_3O_8. These were obtained from areas of secondary uranium mineralisation with the highest values outside EL 23571 in the Yalyirimbi Range. The best rock chip assay within EL 23571 was 160 ppm U_3O_8. One of these sites does not correspond with a significant airborne radiometric anomaly and its plotted location is suspect. No Sn-W or base metal geochemistry of significance was identified. None of the anomalies were considered prospective.

Otter Exploration (1977-1979) EL 1444.

EL 1444 was located north of EL 23571 and covered the northern portion of EL 23671. The area was considered prospective for skarn-hosted base metal and tin-tungsten deposits. Additionally the Reynolds Range, Lander River valley and Anmatjira Range were considered prospective for hydrothermal skarn uranium deposits.

Otter Exploration commissioned an airborne radiometric survey and identified eighteen radiometric anomalies in the area worth further investigation. Ground truthing of radiometric anomalies was carried out using a scintillometer along traverses. Bore waters in the licence area were analysed for uranium.

Several uranium, thorium and rare earth element (REE) occurrences were located. Otter's exploration activities identified what is now referred to as the Mount Finness REE prospect. The Mount Finniss REE occurrence is described by Kojan (1980) as a localised monazite-rich pod about 1-metre in size with activity noted as off-scale (>20,000 CPS).

Further exploration of the Mount Finniss REE prospect is unlikely as it lies within an exclusion zone.

BHP Exploration (1981-1983) ELs 2942, 3075, 3084 and 3088.

The tenements were taken up principally in a diamond search, with base metals a secondary consideration. BHP acquired 75 x 20 kg stream sediment samples from favourable trap sites at an average density of about 23 km^2. BHP withdrew in the light of negative results however all data was not reported in their final report. A coincident stream sediment silt sample was also collected. Two stream sediment samples were anomalous for cerium (Ce) and lanthanum (La): they drained an area near Mt Finniss in the north-west corner of EL 23671, and which hosts the Mt Finniss REE (Th-U) prospect. This work suggests that stream geochemistry may be useful in a search for further REE deposits in Arafura's tenements. However caution is warranted given the presence of monazite in the surrounding metamorphic rocks.

J Weir (1982-1983) EL3506.

Via a scintillometer search, Weir located an allanite-bearing pegmatite vein near Mt Boothby, which is 5 km north-east of Nolans Bore and within the adjacent EL 23671. The pegmatite is of limited extent and assayed: Ce 4250 ppm, La 3100 ppm and Yttrium (Y) 70 ppm. The presence of REE-enriched pegmatite is noteworthy and encouraging given the presence of calc-silicate country rocks in the Reynolds Range Group.

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BHP Exploration (1983-1984) EL4188.

The western half of that tenement lay within the eastern margin of EL 23671. BHP reviewed the BMR 1:250 000 total magnetic intensity contour map for the Napperby Sheet and identified a "bullseye" shaped anomaly of nearly 1 000 nT, the source of which was considered to be a possible carbonatite. It lies just north-east of EL 23671, with a possible repetition inside Arafura's licence. Without any outcrop to explain it, the area was applied for and BHP carried out an aeromagnetic survey and follow-up ground magnetometer and gravity traverses. These surveys confirmed the size and location of the anomaly and identified a five to six milligal gravity anomaly. The geophysical anomalies were drill tested by hole OG-1 (total depth 256 metres) which intersected non-magnetic "basement" rocks at 94 metres, and weakly magnetic hornblende-quartz-feldspar gneiss at 213 metres. It was considered that these rocks belonged to the Arunta Complex and were the source of the geophysical anomaly. Analysis for base metals proved negative.

Colchis Mining Corporation Pty Ltd (1987-1990) EL5511.

This tenement occupied the western part of EL 23671. Colchis targeted both Au and base metal mineralisation. It undertook a review of previous data, interpreted aerial photography and Landsat imagery, and carried out an intensive mapping programme. Rock chip samples (45) and stream sediment sampling (210 samples, not BLEG Au) did not indicate any anomalism warranting Colchis' further work.

Track Minerals Pty Ltd (1988-1989) EL5901.

EL 5901 occupied the southeast part of EL 9672 Dragons Lair and subsequently EL 23671. Track searched for Au in the Aileron Metamorphics, which there consist of a calc-silicate, meta carbonate and meta arenite suite. It focused on areas proximal to granitic intrusions, thrust faulting and shearing. Stream sediment sampling with BLEG Au and base metal analysis, geological traverses and rock-chip geochemistry did not provide any encouragement. However, Drummond considers that its 27 sample stream geochemical programme could not be considered an adequate test of the ±300 sq km that Track endeavoured to evaluate.

Poseidon Gold Ltd and Exodus Minerals N L (1993 - 1999) EL7343

The original large tenement was centred on the Lander River valley, and almost all of it lay well north to northwest of EL 23571 Reynolds Range near the Harverson Pass. The target was structurally controlled Au and base metal mineralisation. Strong programmes were undertaken, including airborne geophysical surveys, stream and lag sampling, RAB drilling and geomorphological interpretation, and successive statutory partial relinquishments of the tenement were made. Although Posgold considered that no anomalous geochemical systems had been defined, Exodus states that "… the relinquished portion … is not unprospective…": this comment, presumably, being applicable to the Harverson Pass area.

Tidegate Pty Ltd (1993-1994) EL8117.

Aileron roadhouse lies in the north-west part of this tenement, which covered the eastern part of EL9672 Dragons Lair and the southerly lobe of EL 23671 Aileron. Work consisted of taking BLEG Au samples, soil samples and rock chip samples near a known nickel (Ni)-chrome (Cr) prospect, and the amphibolite at Harry's Yard (both of these lie to the south-east of Arafura's tenements). Exploration target was Au in greenstones but results were discouraging.

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Aberfoyle Resources Ltd (1995-1998) EL9146.

This tenement covered the south-eastern portion of EL 23671 Aileron. Aberfoyle considered that the poorly outcropping sequences in the tenement could host Granites-Tanami style Au mineralisation, and that the latter may be associated with magnetic anomalies. An early RAB drill programme (6 holes, 299 metres) established that Cainozoic cover thickness was not prohibitive (between 12 and 38 metres). A detailed aeromagnetic survey was flown and several magnetic anomalies located which Aberfoyle considered worthy of follow-up. Apparently this was not undertaken, and the tenement was relinquished.

PNC Exploration (Australia) Pty Ltd (1994-1996) EL8411.

PNC acquired EL8411 so that it could seek uranium. It covered Arafura's relinquished tenement EL9672 Dragons Lair and extended north-westerly well beyond it along the Reynolds Range, now EL 23571 Reynolds Range and EL 23671 Aileron. In its exploration it discovered the Nolans Bore apatite-REE deposit. Via regional reconnaissance, airborne radiometrics and ground traversing, PNC found numerous prospects, many of which it considered were of Mary Kathleen or East Alligator style. However, they were apparently too small to justify more detailed work. Despite the discovery of Nolans Bore, PNC relinquished the tenement.

EXPLORATION BY ARAFURA RESOURCES NL FROM 1996 TO 2004

(After Drummond 2003)

Homestake Gold of Australia Pty. Ltd. (1996 – 1998) EL 9672.

EL 9672 Dragons Lair was farmed out to Homestake Gold of Australia Ltd. Homestake perceived potential for Granites-Tanami style mineralisation associated with a major fluid pathway, the Trans-Tanami structural zone. It was encouraged by the small Au and Cu prospects in the tenement, and by the proximity to the Sabre Province (Cu-Ag & Cu-Pb-Zn).

The ±1500 sq km of the tenement were covered by 235 BLEG Au samples. Results were disappointing, with only 15 samples attaining 0.1 ppb or better. Six of those were clustered near the Harverson Pass, with a maximum value of 34.6 ppb and three others attaining 0.3 ppb or better. The anomalous area was followed up with detailed stream BLEG sampling (114 samples) and 10 chip samples of rocks with encouraging appearance. Essentially all BLEG samples recorded results below the level of detection. Homestake then withdrew, apparently unaware of PNC's Nolans Bore discovery. Drummond, (2003), considered a minus 4mm fraction BLEG program, and a follow-up minus 2mm fraction BLEG program was ineffective, accounting for poor duplication in results.

Ironstone occurrences were investigated in the Harverson Pass and upper Woodforde River areas by Lindsay-Park (1998) and Goulevitch (1999). Lindsay-Park (1998) described haematitic beds in a zone 50-100 metres wide at a stratigraphic change from arenitic units, (now mica schist), to coarser arenitic units, (now quartzite) in the Harverson Pass area. The highest assay result for iron was 21.4%. Goulevitch (1999) investigated goethitic ironstone occurrences in the upper Woodforde River area that were surficial developments in a major marble/limestone unit of the Woodforde River Beds, (upper Reynolds Range Group). Assay of the grab samples yielded 46.10% Fe, and slightly elevated base metals.

NORTHERN TERRITORY GEOLOGICAL SURVEY

The Napperby-Hermannsberg 1:250,000 map sheet areas were surveyed in late 1997 by the Northern Territory Geological Survey (NTGS). Flight line spacings were 400 metres on a north-south line orientation. Readings were taken at 70 metre intervals for radiometrics and 7 metre intervals for magnetics. The survey was navigated using Differential GPS at an average terrain clearance of 60 metres. Data was collected by the World Geoscience Corporation.

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PREVIOUS INVESTIGATIONS BY ARAFURA RESOURCES

The investigations by Arafura Resources noted below are directly related to regional exploration activities in the Aileron-Reynolds project area (EL 23571, SEL 23671, EL 24548 and EL 24741, with EL 27290 and EL 27291 recent inclusion), and are separate to resource definition activities in the vicinity of Nolans Bore (SEL 23671 and MLA 26659) detailed in Hallenstein and Goulevitch (2010) and references therein.

In 2005, Arafura conducted helicopter-borne reconnaissance of selected U and Fe targets on EL 23571 and the adjacent EL 24548 (McGilvray 2006). Reconnaissance exploration results were disappointing.

In 2008, Arafura participated in the NTGS regional gravity acquisition over the central Arunta Region. The NTGS gravity dataset on Arafura's EL 23571 and SEL 23671 were infilled at a 2 x 2 kilometre spacing (Hussey 2009, Hallenstein and Goulevitch 2009).

In 2008, Arafura acquired HyMap hyperspectral survey data and processed imagery, covering the majority of EL 23571 and SEL 23671 (Hussey and Hornibrook 2008). The acquisition of this HyMap hyperspectral survey data was seen as a method of refining reconnaissance exploration activities by focussing on specific mineral signatures.

In 2008, representative samples of mineralisation and other relevant rocks from Nolans Bore were subjected to PIMA studies to document their hyperspectral characteristics. The mineral signatures in samples matched existing spectral library files but highlighted potentially useful absorptions for apatite in SWIR1 band near 1.55 um. Hussey and Hornibrook (2010) processed the hyperspectral data using standard library signatures for various minerals and identified 10 meaningful end-members within the SWIR. It was decided that ground-truthing of these mineral signatures and refinement to the processed imagery may be required and after reconnaissance sampling. Representative samples were collected during the 2009 reconnaissance program and will be used to assist with refinements and reprocessing of the hyperspectral dataset in 2010.

INVESTIGATIONS BY ARAFURA RESOURCES IN 2009

Arafura's 2009 exploration of EL 23571 are detailed in Hussey (2010) and outlined below.

In May-September 2009, desktop studies were undertaken to identify radiometric and hyperspectral mineral targets using Arafura's survey data in conjunction with other relevant GIS layers in MapInfo. Targets were located the approximate centre of the highest probability mineral map signature for small targets or at a number of positions with the highest mineral map probability within a given target area. For large more coherent hyperspectral targets, systematic 50 or 100 metres spaced samples were typically proposed.

Targets were generated from the standard hyperspectral image dataset provided by Hussey and Hornibrook (2008). The relevant mineral end-members included topaz, kaolinite, chlorite, epidote, carbonate, amphibiole (tremolite-actinolte), muscovite, paragonite and apatite/epidote mineral end-members. During an in-house demonstration of the dataset to Arafura in 2008, Dr Mike Hussey (HyVista Corporation) also demonstrated that a probable dickite end-member signature is also locally present within EL 23571. These end-mineral signatures can form in phyllic, argillic, advanced argillic and propylitic alteration assemblages. In addition and the principal reason for the survey, some of these mineral signatures (eg epidote/apatite, kaolinite and carbonate) may also be useful in locating addition Nolans Bore mineralisation. Haematite, goethite and dolomite were also used to assist geological knowledge.

The rock chip targets that were sampled and assayed as well as their mineral signature(s) are shown in Appendix 1. These targets were primarily hyperspectral mineral targets and those with elevated coincident radiometric signatures were given priority.

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As per Arafura's Exploration Agreement, Arafura submitted a detailed work plan to the CLC for clearance to undertake these reconnaissance activities in late 2009. Arafura Resources was granted Sacred Site Clearance Certificate No. 2009-075 on 25 September 2009. A number of conditions and restricted areas were identified in the region and hence some of the proposed reconnaissance sampling was aborted. All proposed reconnaissance localities were reviewed to make sure they conformed to the Clearance Certificate.

Arafura Resources conducted 4WD vehicle-assisted reconnaissance exploration of EL 23571 in October 2009. Three crews, each comprising a 4WD, geologist and field assistant, worked on EL 23571 for a 2 week field stint.

The pre-determined GPS coordinates (MGA94/GDA94) of selected hyperspectral and/or radiometric targets were accurately located in the field using a Garmin C60 GPS and representative 2-4 kg rock chip samples from the nearest outcrop were collected for assay. In some cases sample locations were moved up to about 20-30 metres, to nearest outcropping rock. During sampling it was important to note that the identified hyperspectral target coordinates may be 20 metres or more from their true location. Hence in most cases, only the larger and most probable mineral targets were sampled.

Radiometric targets were located by systematic traversing centred on the pre-determined target locality. Some low-level targets were difficult to locate in the field as Inspector hand-held Geiger counters did not identify any significant above-background activity within a 50-100 metres radius. Radiation activity measurements were taken by placing the meter on a flat surface and then counting for a 2 minute period. Where possible, the measurement was acquired on or adjacent to the assay sample before it was collected. The value was then divided by two and the resultant counts per minute (CPM) value recorded. By way of consistency, CPM values were recorded at all sample sites during the 2009 reconnaissance program. Meters were also left on in active "clicking" mode at all times whilst on foot-traverse.

266 rock chip samples were collected in EL 23571. The vast majority of rock chip samples were collected from targets generated during desktop studies. A small number of geologically interesting sites were also sampled. These included veins, altered rocks and radiometric localities. A number of sites were also omitted because they were transported material on scree slopes.

A number of sites within EL 23571 were not visited due to the local terrain and time constraints. It was decided that these reconnaissance sites should be delayed to the second phase and the decision to sample them would be based on results from nearby targets.

All rock chip samples were submitted to NTEL for analysis. Samples were dried and then coarse-crushed to -2 millimetres. A split of the coarse-crush was milled to +95%/-100 micron to form the assay pulp and the remaining coarse-crush retained. The prepared pulp was subjected to a standard 4-acid (G400, near total) digest and assayed for Ag, As, Ba, Be, Bi, Ce, Cu, La, Mo, Nb, Nd, Ni, Pb, Sb, Se, Sn, Sr, Ta, Th, Tl, U, V, W, Y, Zn, and Zr by ICPMS and Al, Ca, Cr, Fe, K, Mg, Mn, Na, P and Ti by ICPOES. Results are shown in Hussey (2010) and in Appendix 1.

To support the reconnaissance rock chip sampling program, large, regional stream sediment samples were collected from major drainage catchments to recover a heavy mineral concentrate (HMC). In most cases, the drainage was near the edge of the tenement area. Six of the 40 reconnaissance HMC samples from the project area were from EL 23571 (Appendix 2). The 40 reconnaissance level HMC samples represent regional catchment areas averaging about 25 km^2 and are similar in distribution to BHP's reconnaissance level diamond exploration samples. The main purpose of these reconnaissance level HMC samples was to explore for possible carbonatite or alkaline igneous rocks.

The HMC samples were located at trap sites within active channels. After digging down through the surface material, the coarse detritus was sieved to recover a 20-25 kilogram-sized sample of the -3.3 millimetres-sized fraction. Some samples had significant amounts of coarse over-sized conglomerate clasts. The sieved -3.3 millimetres product was collected into large polyweave bags and double-bagged for transport back to Aileron and subsequent wet-panning to recover the heavy mineral concentrate (HMC). The final HMC sample was not overly winnowed and due care was taken to ensure that all heavy minerals were retained for subsequent analysis. Pan concentrates were typically winnowed down to between about 100 and 500 grams, indicating that heavy minerals form up to about 1-2% of the bulk sample.

The HMC samples were submitted to NTEL for analysis. Samples were dried and a separate split retained for subsequent mineral identification if required. A split was milled to +95%/-100 micron to form the assay pulp. The prepared assay pulp was then subjected to a standard 4-acid (G400, near total) digest and assayed for Ag, As, Ba, Be, Bi, Ce, Cu, La, Mo, Nb, Nd, Ni, Pb, Sb, Se, Sn, Sr, Ta, Th, Tl, U, V, W, Y, Zn, and Zr by ICPMS and Al, Ca, Cr, Fe, K, Mg, Mn, Na, P and Ti by ICPOES. Results are shown in Hussey (2010) and in Appendix 2.

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2010 ACTIVITIES

Minor desktop studies were completed by Dr Michael Green of Remote Area Geoscience and the author to evaluate and prioritise exploration targets for the 2010 field season. Unfortunately no on-ground exploration activity was able to be conducted in 2010. The extreme wet year, ongoing rain events throughout the year and the nature of the tenement meant that 4WD access was not possible. An attempt was made to access the tenement however the absence of tracks, boggy ground conditions and additional rain events meant that vehicle access was not possible. Mr Gil Bowman of Pine Hill station advised that it would be best to postpone all vehicular access attempts until after the region thoroughly dried out, probably in 2011. Mr Bowman indicated that similar access problems occurred in this area in 1973/74.

Reconnaissance rock chip assays were collected across the tenement area in 2009 and most if not all HyMap hyperspectral targets larger than about 10 pixels (about 200 m^2) were sampled in this program. An evaluation of the disappointing REE assays for the rock chip dataset found that no other outcropping HyMap targets of a similar nature should be sampled in the 2010 field season.

Based on 2009 reconnaissance activities in EL 23571, it appears that outcropping Nolans Bore type mineralisation is unlikely. However the possibility of buried mineralisation can not be overlooked and accordingly the acquisition of detailed geophysics was discussed. It was ultimately decided that this could wait until Arafura's next major geophysical survey program, originally planned for 2010 but postponed until 2011.

The exploration rock chip dataset for EL 23571 shows there is a common association of relatively anomalous Bi+Sn±W±Ta. This metal association was expected and is consistent with the granite-dominated setting and the nearby Mount Allan tin mine and Mt Stafford W mine. The potential for Sn±W±Ta±Y±HREE mineralisation exists and must be considered as part future exploration activities in the tenement. Systematic detailed stream sediment sampling upstream of SSC35 and SSC36 were planned to further explore this opportunity however access was not possible.

A group of rock chip samples from a modelled HyMap argillic alteration target yielded anomalous Ag values of up to 3.9 ppm (ARA0008-ARA0013). These samples are clustered near a major structure and are considered worthy of follow up exploration sampling and gold assays. Unfortunately access for sampling was not possible in 2010.

No extremely elevated Nb assays were encountered in the 2009 HMC samples from EL 23571. However a number of regional HMC samples were found to have low Zr/Nb, indicating that rocks with Nb-rich phases must be present in their associated catchment areas. Most of these samples also show relatively high Nb/Y, a key geochemical indicator and alkaline index. The absence of significant Nb in the rock chip data collected so far also suggest that un-sampled rocks with elevated Nb must exist in the area. It was decided that these samples and their catchments warranted follow up investigations in 2010.

SSC35 yielded significant total REE, Th, U and Y levels. The assay is consistent with significant amounts of monazite and possibly xenotime in the concentrate. This sample has relatively low P and Sr. The absence of significant Sr suggests there is no Sr-enriched allanite, a key heavy mineral associated with Nolans Bore-type mineralisation. The low Nb content of this sample also suggests it may not be related to carbonatitic or alkaline igneous rocks.

SSC36 appears to be one of the most promising geochemical indicators in the project area and further evaluation highlights this region as a priority exploration target with a potential for REE mineralisation. Sample SSC36 has low Zr/Nb and high Nb/Y. These key geochemical signatures are considered promising for carbonatites and associated alkaline igneous rocks, however it is noted that the presence of elevated Sn and Ta in SSC36 is also consistent with a potential for Sn-Ta-Nb-Y-HREE mineralisation in the source region.

Clearly the catchments above SSC35 and SSC36 within EL 23571 are worthy of follow up exploration activity to evaluate the source of their geochemical signatures. Unfortunately the extensive wet year and ground conditions prevented 4WD access to the region in 2010.

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