AMALGAMATED ANNUAL EXPLORATION REPORT
GR284-13
EL24932, EL25027, EL26434, EL26777, EL27282, EL27349, EL27746, EL27747

FOR PERIOD ENDING 10/03/2013

ACACIA FRAZERS GROUP PROJECT NT

DARWIN SD5204 1:250,000
Noonamah 5172 1:100,000
Rum Jungle Mineral Field 1:100,000

Titleholder: Arnhem Minerals Pty Ltd (ABN: 40 158 247 226)

Report No. 2013-19
Prepared for Arnhem Minerals Pty Ltd
By Laura Petrella
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1 SUMMARY

The group number GR284-13 (grouped 11/03/2012) project area is located approximately 50kms south of Darwin to the east of the Stuart Highway and consists of eight tenements: EL24932, EL25027, EL26434, EL26777, EL27282, EL27349, EL27746 and EL27747.

The GR284-13, Acacia Frazers licence package is situated in the northern section of the Pine Creek Geosyncline within the Rum Jungle region. The Rum Jungle region is an Archean basement complex unconformably overlain by Proterozoic stratigraphy including Manton, Mount Partridge, South Alligator and Finnis River Groups. These sediments have been folded into a series of N/NW trending folds. Major structures include the Giants Reefs Faults Zone which strikes ENE and the Pine Creek Shear Zone striking NNW, both considered to be major conduits for mineralizing fluids. The Pine Creek geosyncline is host to numerous, structurally controlled, poly-metallic deposits including gold, base-metals and uranium.

During the current period a data compilation and assimilation work including interpretation of radiometric anomalism was carried to identify and highlight areas of interest. Six major target zones hosting different commodities were reviewed: Frazers (U), Frazers North (U), Acacia North (Au), Acacia South (Cu, Pb, Zn), Manton (Cu, Pb, Zn) and De Monchaux (Au). Modelling using VTEM sections and historical data has allowed future work program planning including drilling. The aim of this drilling is to intersect the faulted Whites Formation in the Frazers and Frazers North area, but also to test and extend anomalism at the De Monchaux site.
2 LOCATION AND ACCESS

The GR284-13 Acacia Frazers Group is located approximately 50kms south of Darwin to the east of the Stuart Highway, see Figure 1. Access is via asphalt road (including the Stuart and the Arnhem Highway) from Darwin and then locally on good gravel and dirt tracks. The project area covers freehold, perpetual and private land.

Figure 1: Location map of Acacia Frazers Tenement Package.
### 3 TENEMENT STATUES AND OWNERSHIP

Tenement Status and Landowner information is summarised in the table below:

<table>
<thead>
<tr>
<th>Tenement</th>
<th>Blocks</th>
<th>Grant Date</th>
<th>Year</th>
<th>Anniversary</th>
<th>Covenant</th>
<th>Tenure</th>
<th>Owner</th>
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<td>17/07/2006</td>
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<td>Divided in small blocks with around 8 different owners</td>
</tr>
</tbody>
</table>

**Table 1: Tenement Status and Landowner Information**
4 GEOLOGY

4.1 Regional Geology

The project area is situated in the northern section of the Pine Creek Geosyncline within the Rum Jungle region. The Rum Jungle area is an Archaen basement complex unconformably overlain by Proterozoic stratigraphy, see Figure 2. The Proterozoic stratigraphy comprises sediments of the Manton, Mount Partidge, South Alligator and Finnis River Groups, see Figure 3.

Figure 2: Geological Terrains Top End of NT (McCready A.J., Stumfel E.F. 2004)
4.2 District Geology

The GR284-13 Acacia Frazers Group sits in to the north-east of the Rum Jungle Archean Basement Complex, and contains Proterozoic sediments from the Coomali Dolomite to the Koolpin Formation of the Mt Partridge Group and South Alligator Group respectively, see Figure 3, Figure 4 and Figure 5.
Figure 4: Geological Map of Rum Jungle Complex (McCready A.J., Stumfel E.F. 2004).

Figure 5: Geological Map of the GR284-13 Acacia Frazers Group.
The sedimentary sequence being folded along a NNW trend with two major discontinuities crosscutting, the Giants Reef Fault Zone (ENE) and the Pine Creek Shear Zone (NNW). Both discontinuities are interpreted to be major paths for mineralising fluids.

Whilst regional mapping and geophysics, see Figure 6, may indicate that the area is structurally simple, previous prospect scale mapping shows that faulting (axial planar?) and parasitic folding increase complexity.

4.3 **Mineralisation**

The Rum Jungle area is recognised for its polymetallic mineralisation. Chapman (pers comm) highlights; Browns Oxide including Whites, Intermediate and Dysons (Cu, Pb, Zn, Ag, Co, Mi and U), Rum Jungle Uranium (U), Woodcutters (Zn, Sb, Ag and Pb), and Sundance (Au).

The metaliferous mineralisation of the area is predominantly located proximal to the Whites Formation/Coomalie Dolomite contact, see Figure 3. In terms of mineralisation style the various deposits in the Rum Jungle area are associated with fold hinges, shears and faults, and veins and breccias/cataclastites, independent of metal type.

The GR284-13 Acacia Frazers Group therefore offers the possibility of polymetallic mineralisation of economic interest as both the stratigraphic zone of interest interpreted as the possible metal host and structural history are present.
Figure 6: Acacia Frazers Geophysics (top left to bottom right, K%, Th ppm, U ppm, Ternary RGB (K, Th and U), Magnetic RTP, and Magnetic 1st vertical derivative). All geophysics over geology.
5 PREVIOUS EXPLORATION

Whilst significant exploration over the GR284-13 Acacia Frazers Group project area has been undertaken for base metals and gold, exploration for uranium has been limited. Historical exploration over the project mainly occurred from 1974 to 1998 and then recommenced in 2007 with Glengarry. Work done includes geochemical exploration across the project area (stream sediment sampling, rock chips, soils and auger sampling), drilling (RAB, RC and Diamond drilling) and geophysics done by the Northern Territory Geological Survey. Geophysics work includes radiometric and magnetic maps, ground survey (over EL26434 and EL24027), DTM data, GA VTEM conductivity sections (over EL27282, EL27349, EL26434 and EL24027).

Previous exploration has identified targets that warrant further exploration, see Figure 7.

![Figure 7: Targets defined from historical work.](image-url)
EL2507 (Frazers Uranium) revealed surface uranium enrichment and strong radiometric anomaly (Figure 6). Auger sampling over this tenement (Figure 8) have returned geochemical anomalies in Cu, Co, Ni and Zn. RAB drilling results were also anomalous with up to 79ppb Au in drill hole NTR-A-50, 499ppm Cu in drill hole NTR-A-232, 1,070ppm Zn in drill hole NTR-A-46, 361ppm Co in drill hole NTR-A-11 and 38.8ppm U in drill hole NTR-A-54.

![Figure 8: Historical RAB (red) and Auger (green) drilling compiled over the project area.](image)

EL26434 (Frazers North) displays a strong radiometric anomaly with geochemical anomalous gossanous outcrops with values up to 3,340ppm Cu, 1,320ppm Zn, 1,640ppm Ni, 2,360ppm Co and 31.7ppm U. RAB drilling also returned anomalous values up to 20ppb Au, 499ppm Cu, 658ppm Pb, 703ppm Zn, 229ppm Co and 31.5ppm U.

At Frazers and Frazers North sites RAB and Auger drilling has taken place on the sites of radiometric anomalism and returned what can be considered geochemically significant results. Although the results cannot be considered economically significant, the drilling was
relatively shallow and maybe more indicative of regolith profile geochemical signals and ‘leakage’ proximal to faulting.

In lithology and structure both the Frazers and Frazers North radiometric anomalism sit over interpreted faults that intersect or lie close to the Whites Formations contact with the Coomalie Dolomite, see Figure 9 and Figure 10. As stated in 10, it is this stratigraphic position that forms a host to polymetallic mineralisation in the Rum Jungle area.

**Figure 9:** Frazers and Frazers North VTEM and geological interpretation with Polymetallic Whites Formation indicated (facing NE).

**Figure 10:** Frazers and Frazers North VTEM and geological interpretation with Polymetallic Whites Formation indicated (facing NNW).
EL27282 includes Acacia North (AU), Acacia South (Cu, Pb, Zn), Manton (Cu, Pb-Zn) and De Monchaux Creek (Au).

At Acacia North, gold mineralisation has been associated with brecciated and massive quartz veining within a granophyric differentiated mafic sill intruded into the Whites Formation. A program of mini RAB and soil sampling identified the deposit which has since been tested with 37 RC holes (29 by Normandy and 8 by Glengarry in 2008) and one diamond hole.

RC drill results from Normandy returned:

- 4m @ 4.90g/t Au from 20m in ANRC005;
- 6m @ 6.64 g/t Au from 31m in ANRC006;
- 10m @4.30g/t Au from 15m in ANRC007;
- 6m @ 11.3g/t Au from 72m in ANRC029.

Glengarry reported an interesting section of 3m @ 4.33ppm Au including 1m @ 11.2ppm Au.

At Manton Dam prospect, exploration targeted Woodcutters massive sulphide which returned values up to 4,680ppm Pb, 2,070ppm Zn and 77ppb Au. Anomalous uranium values (up to 30ppm U) were also found in gossanous material.

At De Monchaux Creek, historic work has identified anomalous gold associated with disseminated pyrite in the Whites Formation in an area where magnetic data may indicate the presence of discontinuities. Historical surface sampling quoted assays up to 71ppm Au and drilling returned 8m @ 6.04 g/t AU from 3m in DCRC004 and 3m @ 47.8 g/t Au from surface in DCRC005.
6 EXPLORATION DURING CURRENT PERIOD

Over the last annual reporting period, exploration work undertaken on GR284-13 Acacia Frazers Group area has comprised a review of previous reports, modelling and targeting. Historical data compilation and interpretation was used to generate prospective REE, gold, base-metals and uranium targets. The licences were also grouped during the period.

6.1 EL25027

A study of radiometric anomalis, VTEM sections, geochemical data available from previous drilling and interpreted faults have been done over this area. It was used to build a 3D model which highlighted a 1.3km zone where Whites Formation and Faults intersect (see Figure 11).

The elevated geochemical values intercepted within previous drilling are highly likely related to regolith development and leakage along and up faults. Therefore the intersection between Whites Formation and a faulted area is likely to contain mineralisation. As a result, a drill plan of between 4 and 6 RC holes in order to intersect this zone which sits at a deeper level than historical drilling is being considered.

![Figure 11: Frazers, schematic position of proposed drilling relative to targeted faulted Whites Formation (facing N, 5x vertical exaggeration).](image-url)
6.2 **All GR284-13, Acacia Frazers Tenements**

The main interpreted target throughout the GR284-13 Acacia Frazers Group is, as described above, the basal Whites Formation and any contained mineralisation within Frazers and Frazers North area.

Given the length of Frazers’ radiometric anomalism (~1.6km), and other notable sites RC drilling and costeaining are being considered at the Frazers North and De Monchaux sites.

It is hoped that work carried out in the areas would give, as well as good results, a high level of information on possible mineralisation contained in the Whites Formation target stratigraphy.
7 References
