COMBINED:
ANNUAL & FINAL REPORT
ARAPUNGA
(EL 27843)
11/08/2010 to 13/09/2012

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Summary

Section 94 of the *Mineral Titles Act* requires the submission of reports prepared by the titleholder for each Exploration Licence about the authorised activities conducted under the title and other matters relating to the title. The following report is a combined Annual and Final Report for Exploration Licence (EL) 27843, known to NRE as the ‘Arapunga Prospect’, prepared by Natural Resources Exploration (‘NRE’).

NRE’s exploration rationale and objectives for its Arapunga Prospect considered the evaluation of potential base metals and uranium mineralisation. Investigations were intended to locate any outcropping of mineralisation and any indicators of any sub-surface mineralisation within the tenement. NRE carried out a detailed geological assessment of its EL 27843. NRE’s exploration activities included a helicopter reconnaissance program, geological mapping and associated rock chip sampling.

Based on the exploration activities conducted on EL27843, NRE made application to the Department to completely surrender the entire title for EL27843 under section 103 of the *Mineral Titles Act*. EL27843 was surrendered on 13 September 2012.

This combined Annual and Final Report for EL27843 offers a summary of the activities carried out over all of the title area up to the time when the title ceased to be in force, including any results produced by those activities.
1. Introduction

Natural Resources Exploration (‘NRE’) was granted EL 27843 on 11 August 2010, consisting of a total of 254 sub-blocks. EL27843 is located in the Georgina Basin, just north of the Aileron Province.

Based on the exploration activities conducted on EL27843, NRE made application to the Department to completely surrender the entire title for EL27843 under section 103 of the Mineral Titles Act. EL27843 was surrendered on 13 September 2012. During the entire term of its licence period, NRE was the sole titleholder and operator of EL27843.

NRE conducted extensive office-based studies and field work on EL27843 up until the title ceased to be in force over all of the title area. NRE conducted an extensive review of all previous exploration across the tenement, completed a reconnaissance helicopter assisted field trip and carried out rock chip sampling based on processed ASTER Imagery over the tenure.

NRE was also able to visit the Alice Springs Core Library to carry out an extensive study and analysis of a number of cuttings available from a historically drilled water bore within the Arapunga Prospect to delineate prospective areas for base metals and uranium mineralisation.

2. Tenure

Exploration licence (EL) 27843, is more commonly known by NRE as its ‘Arapunga Prospect’. The Arapunga Prospect consists of 254 sub-blocks across the Arapunga and was granted to NRE on 11 August 2010. Table 1 lists the pertinent tenement details.

Table 1. Tenement Details

<table>
<thead>
<tr>
<th>Project Name</th>
<th>Tenement Name</th>
<th>Title No. (EL)</th>
<th>Sub-blocks</th>
<th>Sq. Km</th>
<th>Status</th>
<th>Grant Date</th>
<th>Term (Yrs)</th>
<th>Surrender Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Southern Georgina</td>
<td>Arapunga</td>
<td>27843</td>
<td>254</td>
<td>789.09</td>
<td>Granted</td>
<td>11-Aug-10</td>
<td>6</td>
<td>13-Sept-16</td>
</tr>
</tbody>
</table>

Pastoral Leases

EL27841 overlies four (4) Perpetual Pastoral Leases. The location of these leases in relation to the EL is shown in Figure 1 below.
Native Title
There are currently two (2) Native Title Claims over the area.

Recorded Sites
The Aboriginal Areas Protection Authority has identified no Recorded Sites within the Arapunga Prospect.

2.1 Location and Access

Exploration Licence EL27843 is located approximately 280 kilometres northeast of Alice Springs in the southern Georgina Basin, just north of the Aileron Province (Arunta Region). Ooratippra Creek runs though the tenement in the east as well as Frazer Creek in the west. The location of the tenure is shown in Figure 2 below.

Access to EL27843 is identified in Figure 3
Figure 2. Location Map

Figure 3. Access Map
2.2 Topography and Drainage

The Arapunga Prospect had good access on the ground, with various tracks. The tenement is located over the Dulcie Range. Various creeks over the Arapunga tenement converge with the Ooratippra Creek in the east and Frazer Creek in the west. Altitude varies by approximately one hundred (100) meters. The topography across the tenement is identified in Figure 4.

Figure 4. Topographical Map

3. Geology

3.1 Regional Geology

EL27843 is located within the extensive and complex Georgina Basin. The Georgina Basin constitutes an extensive 360,000 square kilometres remnant of the NeoProterozoic and Palaeozoic, sedimentary sequence that was originally deposited across an intra-continental platform that covered a large part of central Australia.
The Basin is elongated north west to south east and regional magnetic data can be used to infer a north west – south east structural grain with ridge and depression sub-basin topography.

**Stratigraphy and sedimentology**

Shergold and Druce (1980) subdivided the Basin sequence into three tectono-stratigraphic units or “tectotopes”.

- **Tectotope 1** is Neoproterozoic to Early Cambrian in age and consists of glacial, siliciclastic sediments overlain by marine and marginal marine or continental siliciclastic sediments.

- **Tectotope 2** is distributed widely across the Basin, is of Middle Cambrian to Ordovician in age and comprises sequences dominated by carbonates with some early siliciclastic units.

- **Tectotope 3** is Ordovician to Devonian in age, dominated by siliciclastic rocks and occurs only in the south.

The significant phosphate deposits of the Georgina Basin occur in the Middle Cambrian and consequently the relevant part of the stratigraphy belongs to tectotopes 1 and 2. The sedimentology across the Basin is complex and consequently the stratigraphy developed by many people working in specific relatively localised areas includes a plethora of units and stratigraphic names.

Sedimentation in the Georgina Basin was initiated in the Neoproterozoic in grabens formed by regional north east- south west extension. Tholeiitic basalts and felsic volcanic rocks were emplaced in the centre and north during the earliest Cambrian; these lie unconformably on Proterozoic basement and include the Helens Springs and Peaker Piper Volcanics. Elsewhere, the basal units of the Georgina Basin comprise conglomerates, sandstones, shales and glacial and fluvial sediments (e.g. Mount Birnie, Riversdale and Mount Hendry Formations).

Ongoing extension and subsidence were accompanied by a marine transgression and by the Middle Cambrian, the Basin was covered by a shallow intra-continental sea, rich in marine life. Extensive limestone and dolomitic sequences (e.g. Thorntonia Limestone and Gum Ridge Formation) were deposited. These also contain evidence for shallow, intertidal and highly saline conditions (e.g. algal structures and pseudomorphs of halite and gypsum crystals).

Following a short break in sedimentation, subsidence continued with the deposition of a sequence of siltstone and sandstones around the Basin margins and carbonate shoals in deeper water. Cook (1989) noted that this was a time when the Basin was characterised by a complex interplay of sedimentary environments, ranging from shallow marine, through intertidal and estuarine to lagoonal. It was also the time when the major phosphatic units (e.g. the Beetle Creek and Wonarah Formations and Anthony Lagoon and Burton Beds) and the phosphorites were deposited.
Formation of the phosphatic units of the Georgina Basin was followed by deposition of black organic-rich shales (Inca Formation) in near shore areas and shallow carbonates throughout most of the Basin. Carbonate sedimentation continued until uplift and erosion associated with the Delemarian Orogeny occurred in the Late Cambrian.

Figure 5 shows the location of the tenement within the Georgina Basin.

3.2 Permit Geology

The geology within the Arapunga Prospect consists of units which have been mapped and interpreted across the Huckitta 1:250,000 Geological Map Sheet by government geologists. The permit geology is illustrated in Figure 6.

The tenement covers the central part of the Dulcie Syncline. This is a fold structure covered with Palaeozoic sedimentary rocks. These rock types in this area of the Georgina Basin along this section of the tenement are largely the Palaeozoic aged, late Devonian Dulcie Sandstone. These are comprised of two units, which are both quartz arenite. One unit is fine to medium grained whilst the other is medium grained with rare conglomerates.
The Dulcie Sandstone was deposited on top of the Cambro-Ordovician Tomahawk Beds, which can be found outcropping around the Dulcie Sandstone. These are comprised of quartz sandstone, quartz-arenaceous limestone and dolostone.

Mesozoic rocks can be found in the southeast part of the tenement. It is Jurassic to Cretaceous aged Hooray Sandstone on top of the Dulcie Sandstone and composed of quartz arenite to quartz wacke. In areas of low topography, the tenement is covered in Cenozoic, Quaternary aged soil and sand sheets and dunes.

**Figure 6. Permit Geology Map**
Table 2. *Stratigraphy of the Arapunga Prospect.*

<table>
<thead>
<tr>
<th>Era</th>
<th>Period</th>
<th>Company Reports</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cenozoic</td>
<td>Quaternary</td>
<td>Sands and soils</td>
<td></td>
</tr>
<tr>
<td>Mesozoic</td>
<td>Jurassic – Cretaceous</td>
<td>Hooray Sandstone</td>
<td></td>
</tr>
<tr>
<td>Palaeozoic</td>
<td>Late Devonian</td>
<td>Dulcie Sandstone</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cambro-Ordovician</td>
<td>Tomahawk Beds</td>
<td></td>
</tr>
</tbody>
</table>

4. NRE’s Exploration Activities during the Reporting Period

NRE’s exploration program for the second term of EL27843 consisted of an extensive review in relation to the tenement and believes that no further exploration is warranted at this time. During the reporting period, NRE made application to the Department to completely surrender the entire title for EL27843 under section 103 of the *Mineral Titles Act.* EL27843 was surrendered on 13 August 2012.

NRE has conducted an extensive review of historic exploration over its Arapunga Prospect. Historic exploration over Arapunga has largely been for base metals and uranium exploration. Previous exploration has been summarised in Table 3 and location of historic tenements is shown in Figure 7.

Table 3. *Historic Tenures and Previous Companies’ Exploration Reports*

<table>
<thead>
<tr>
<th>Tenement</th>
<th>Period</th>
<th>Company Reports</th>
<th>Company</th>
</tr>
</thead>
<tbody>
<tr>
<td>EL22528</td>
<td>2001 - 2004</td>
<td>CR2004-0305</td>
<td>Elkedra Diamonds</td>
</tr>
<tr>
<td>EL834</td>
<td>1973 - 1974</td>
<td>CR1973-0195</td>
<td>CRA Exploration</td>
</tr>
</tbody>
</table>
NRE also engaged Terra Search Pty. Ltd. to attend the Northern Territory’s Alice Springs Core Facility to analyse a number of cuttings available from a historically drilled water bore within NRE’s projects. The Department kindly allowed NRE to set-up in the Alice Springs Core Facility where NRE’s geologists undertook analysis of the water bore cuttings using a hand-held XRF device.

There was one (1) waterbore within the Arapunga Prospect. **Figure 8 and Table 4** identify the water bore analysed by PXRF within EL27843.
To view the full results from the XRF analysis of the water bore cuttings, please refer to the report that NRE lodged with the Northern Territory Department of Resources’ Geoscience Division on 12 September, 2011. This report was required in respect of the XRF and ALS Assaying of Water Bore Chips at the Alice Springs Core Facility. The Exploration Report was titled ‘XRF & ALS Assaying of Water Bore Chips – Core Facility: Alice Springs’.

NRE also completed a reconnaissance helicopter assisted field trip of the Arapunga Prospect in September 2011. NRE introduced themselves to local landholders, assessed a number of field targets across the tenement and carried out geological mapping of the project area. The field trip proved successful in evaluating the tenement in the most effective and timely manner possible.

The field targets within the Arapunga Prospect that required ground truthing or evaluation, were identified based on desk top research of regional geological and geophysical data, augmented with compilation and assessment of all previous exploration reports.
Field assessment of the field targets involved an initial fly over to obtain a regional perspective of the geological, physiographic and botanical setting, followed by a ground assessment where appropriate. At each of the sites which we regarded as having mineral potential, NRE through its geologists, Terra Search, collected rock chip samples and took magnetic susceptibility, radiometric and structural measurements. Detailed geological characteristics were also recorded at each site.

Assessment of mineral potential was primarily for base metals and uranium. Modern ASTER imagery was purchased and processed to further delineate possible sites of mineral concentration. This work assisted in defining eight (8) field targets. A regional assessment of the geology, topography and vegetation across the Arapunga Prospect was also made with a low fly over of all different environs identifiable within the tenement area. Figure 9 shows the field targets within the Arapunga prospect.

**Figure 9. Field Targets within the Arapunga Prospect**

EL27843 Observations

Five (5) geological observations were made at Arapunga. They were discovered at outcrops found by helicopter reconnaissance. The observations made were that the lithology of an
outcrop was highly permeable, porous, pure quartz sandstone, which is an ideal reservoir rock for water and (at depth) oil. It was anomalously low in metals.

Four (4) rock samples were taken from the tenure. NRE was unable to take additional samples due to unsafe conditions to land the helicopter. The sample descriptions are located in Table 5. The location of rock samples are plotted in Figure 10.

**Table 5. Sample descriptions**

<table>
<thead>
<tr>
<th>Sample ID</th>
<th>Lithological Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>3005380</td>
<td>Weakly ferruginous pure quartz sandstone, medium grained</td>
</tr>
<tr>
<td>3005384</td>
<td>Flaggy sandstone, clay intermittent illegible shale, weak acid fizz, minor mice, some shale clasts</td>
</tr>
<tr>
<td>3005385</td>
<td>Fine quartz sandstone, slightly ferruginous, very well sorted, no acid fizz</td>
</tr>
<tr>
<td>3005386</td>
<td>Fine medium grained quartz sandstone, weakly iron stained, very well sorted, no acid fizz</td>
</tr>
</tbody>
</table>

**Figure 10. Rock Sample Location Map**
5. Reports lodged during the reporting period

NRE lodged an Exploration Report with the Northern Territory Department of Resources’ Geoscience Division on 12 September, 2011. This report was required in respect of the XRF and ALS Assaying of Water Bore Chips at the Alice Springs Core Facility. The Exploration Report was titled ‘XRF & ALS Assaying of Water Bore Chips – Core Facility: Alice Springs’.

NRE believes that no other reports were required to be lodged during this reporting period.

6. Conclusions

Natural Resources Exploration’s exploration activities of its Corella Bore Prospect EL27841 have been focused on delineating targets within the tenement based on office-based studies and field programs.

NRE conducted extensive reviews in relation to the tenement and believes that no further exploration is warranted at this time. NRE made application to the Department to completely surrender the entire title for EL27841 under section 103 of the Mineral Titles Act. EL27841 was surrendered on 13 September 2012.

There was very limited (if any) disturbance in relation to these activities. NRE did not conduct any works involving land disturbance during the term of the licence. NRE believes that no rehabilitation is required in respect of EL27841.
7. Bibliography


Annexure 1

Laboratory Analysis Results of Rock Chip Samples