FINAL GROUP REPORT
2013

BARKLY GROUP PROJECT
(GR 167)

Title Holder: NATURAL RESOURCES EXPLORATION PTY. LTD.
Operator: Natural Resources Exploration Pty. Ltd.
Tenement Manager: Becana Devencorn, Natural Resources Exploration Pty. Ltd.
Titles / Tenements: EL(s): 27647, 29644, 29753, 29722 & 29720.
Project Names:

<table>
<thead>
<tr>
<th></th>
<th>McNichol</th>
<th>Alroy Downs</th>
<th>Playford Junction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brazilian</td>
<td>Buchanan</td>
<td>Limestone Ridges</td>
<td></td>
</tr>
</tbody>
</table>

Report Title: Final Group Report 2013 – Barkly Group Project (GR 167)
Type of Report: Final Report
Author(s): Peter Forder, Geologist
Company Ref: NRE_NT2012: BarklyGroup
Target Commodity / Commodities: Phosphate, Diamonds & Uranium
Date of Report: 31 October 2013
Contact Details:

NATURAL RESOURCES EXPLORATION PTY. LTD.
PO Box 9235, Gold Coast Mail Centre, QLD 9726
Level 8 Corporate Centre, 2 Corporate Ct, Bundall QLD
Tel: (07) 5644 5500
Fax: (07) 5528 4558
Email: info@naturalresources.net.au
Contents

Summary................................................................................................................................. 3

1. Introduction ...................................................................................................................... 4

2. Tenure............................................................................................................................... 4

   2.1 Location and Access .................................................................................................... 7

   2.2 Topography and Drainage ......................................................................................... 8

3. Geology ........................................................................................................................... 9

   3.1 Regional Geology ...................................................................................................... 9

   3.2 Permit Geology ........................................................................................................ 12

4. NRE’s Exploration Activities during the Reporting Period ............................................. 14

   4.1 Previous Exploration Studies .................................................................................... 14

   4.2 Helicopter Reconnaissance Programs & Geological Mapping .................................... 25

   4.3 Soil and Rock Chip Sampling .................................................................................... 27

   4.4 Regional Phosphate Modelling ................................................................................ 29

6. Reports lodged during the reporting period ................................................................... 30

7. Conclusions .................................................................................................................... 31

8. Bibliography .................................................................................................................... 32

Figures

Figure 1. Native Title Claim Map ....................................................................................... 6

Figure 2. Cadastral Map .................................................................................................... 7

Figure 3. Location and Access Map .................................................................................... 8

Figure 4. Topographic Map ................................................................................................ 9

Figure 5. Regional Geology Map ....................................................................................... 10

Figure 6. Stratigraphic Summary of the Georgina Basin .................................................. 11

Figure 7. Permit Geology Map .......................................................................................... 13

Figure 8. Historic tenements over the Barkly Project ....................................................... 15

Figure 9. Water Bore Location Map .................................................................................. 30

Tables

Table 1. Tenement Details .................................................................................................. 4

Table 2. Historical Reports Reviewed by NRE .................................................................. 15
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 Final Group Report for ‘the Barkly Project’ GR 167, prepared by Natural Resources Exploration (‘NRE’).

This Final Group Report for the Barkly Project relates to five (5) exploration licences 27647, 29644, 29753, 29722 & 29720. The purpose of the following Final Group Report is to provide a summary of the activities carried out over the entire area up to the time when the titles ceased to be in force, including any results produced by those activities. All five (5) licences will be referred to as ‘the Barkly Project’, unless specific attributes of each individual licence are discussed then in such a case the individual project name and number will be identified.

NRE recently amalgamated the tenures within this group but no further work has been completed on these tenures other than administrative work since the amalgamation.

NRE was exploring for phosphate, uranium and diamonds in the Northern Territory’s Barkly Sub-basin within the central Georgina Basin. A number of the Barkly Project licences are near proven phosphate prospects.

Available geological information, subsurface drill and borehole information and geophysical data including airborne magnetics, gravity and radiometrics were collated for the area and evaluated in the context of published models for the formation of phosphate in shallow marine shelf environments. NRE’s exploration activities also included two (2) helicopter assisted reconnaissance programs, soil sampling, geological mapping and associated rock chip sampling, analysis of water bore cuttings on a regional scale as well as phosphate horizon mapping on a regional scale.

NRE was able to integrate and collate the results of the specialised phosphate study with all available geological, geophysical and drill and bore hole data and identify various targets for its limited Reverse Circulation Drilling program. NRE has been able to establish the sedimentological and structural controls constraining phosphate deposition, use the sedimentological, stratigraphic and structural models to assess the phosphate potential of the Barkly Project.
1. Introduction

Natural Resources Exploration (‘NRE’) has conducted extensive office-based studies and field work of the five (5) exploration licences making up its Barkly Project.

Given the amalgamated titles overlap original titles held by NRE, this report covers all work conducted on the area covered by those titles however during the time NRE held the newly amalgamated titles, NRE only conducted administrative work.

NRE conducted an extensive review of all previous exploration across the tenement, completed two (2) reconnaissance helicopter assisted field trips, carried out rock chip sampling and an extensive soil sampling across the tenures. Furthermore, NRE went on to conduct analysis of water bore cuttings on a regional scale as well as regional scale phosphate horizon modelling, in order to delineate drill targets.

2. Tenure

NRE’s original Barkly Project initially consisted of five (5) granted exploration licences. Table 1 lists the pertinent tenement details of these ELs.

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>Status</th>
<th>Grant Date</th>
<th>Term (Yrs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barkly</td>
<td>McNichol</td>
<td>27647</td>
<td>100</td>
<td>Granted</td>
<td>20-May-10</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Aroy Downs</td>
<td>29644</td>
<td>227</td>
<td>Granted</td>
<td>5-Mar-13</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Playford Junction</td>
<td>29753</td>
<td>229</td>
<td>Granted</td>
<td>5-Mar-13</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Limestone Ridges</td>
<td>29720</td>
<td>195</td>
<td>Granted</td>
<td>5-Mar-13</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Buchanan</td>
<td>29722</td>
<td>214</td>
<td>Granted</td>
<td>5-Mar-13</td>
<td>6</td>
</tr>
</tbody>
</table>

Native Title Claims and Recorded Sites

There is one (1) Native Title Claim over the Barkly Project, namely the Dalmore Downs Claim (DC 01 / 30). These claims are shown in Figure 1 below.

There are three (3) recorded sacred sites within the Barkly Project.
Figure 1. Native Title Claim Map

Pastoral Leases

NRE’s Barkly Project overlies five (5) Perpetual Pastoral Leases namely, NT Por 960, NT Por 962, NT Por 1483, NT Por 651 and NT Por 1. These Perpetual Pastoral Leases have been identified in Figure 2.
2.1 Location and Access

Given that the Barkly Project is located in the Barkly Tablelands, access to these tenures is difficult by road. While part of the project is located over the Barkly Highway, it is nevertheless difficult to access the projects due to weather deteriorating currently available tracks.

The Project is located near Mitiebah Station and the Station is accessed via the Ranken Road (gravel) from the Barkly Highway (sealed). Location and access to the project is identified in Figure 3.

Field activities over the whole project area were conducted with the assistance of a helicopter. NRE found that the use of a helicopter to conduct work across the project area would ensure that the area was covered in a more timely and efficient manner. The risk of using vehicle access to much of this area would have, in NRE’s view, proved very unsuccessful given the ground coverage in the region.
Figure 3. Location and Access Map

2.2 Topography and Drainage

The Barkly Tableland is a vast terrain of flat to very gently undulating black soil plains. The variation in elevation from the maximum plain level to the drainage is said to be less than 50 meters (Edgoose, 2003).

The drainage is endoheic and flows to several large, shallow lakes in the centre of the region. On the northern margin of the tableland, topographic definition increases northwards toward the drainage divide with the Gull Fall and its northerly flowing drainage. The tableland’s southern margin is encroached upon by extensive Aeolian sand plains. Figure 4 shows the topography of the Project area.
3. Geology

3.1 Regional Geology

The Barkly Project lies centrally within the Georgina Basin, straddling the boundary between the Barkly and Undilla Sub-basins (Figure 5). Together with the Wiso and Daly Basins, which lie to the west and northwest respectively, 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 Georgina Basin comprises rocks ranging in age from Neoproterozoic to Devonian and covers an area of approximately 325,000 square kilometres. 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.

As Cook (1989) noted that no single stratigraphic column can be provided for the Georgina Basin. Figure 6 is an attempt to reconcile localised stratigraphic interpretations for the Early and middle Cambrian, which is most relevant to the discussion of phosphate mineralisation. The following outline of the geological history of the Georgina Basin from Neoproterozoic to Late Cambrian times is taken largely from Cook (1989).

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).

Figure 6. Stratigraphic Summary of the Georgina Basin
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.

Howard (1990) used bore hole and drillhole, aeromagnetic and gravity data to define a phosphatic lithofacies within the Middle Cambrian of the Georgina, Wiso and Day Basins. The phosphatic horizon has an average width of 32 km and a thickness of between 10 and 190 metres. The strike length exceeds 2000 km. The phosphate deposits in the southeast are slightly younger than those found elsewhere. The dominant lithology of the phosphatic lithofacies is siltstone and the phosphatic horizon occurs either at basin margins, adjacent to Proterozoic basement (e.g. in the eastern Undilla sub-basin and Burke River outlier) or above structural basement highs (e.g. Barkly subbasin).

### 3.2 Permit Geology

The geology within the Barkly Project consists of units which have been mapped and interpreted across the Alroy, Mt Drummond, Brunette Downs and Ranken 1:250K geological sheets by government geologists. The Alroy, Mt Drummond and Brunette Downs geological sheets have been mapped re-mapped as recently as 2011. The Ranken 1:250K geological sheet was last updated in 2005. The project geology is illustrated in **Figure 7**.

Within the Barkly Project, lithologies have been interpreted as belonging largely to the Barkly Group.
The Barkly Tableland coincides closely with the north-central and northern parts of the Neoproterozoic to Palaeozoic Georgina Basin. Exposures of the basinal sediments in the area are rare, but where present, are typically composed of weakly deformed middle Cambrian carbonate sedimentary rocks. Locally overlying the Palaeozoic rocks are thin deposits of flat lying late Palaeogene limestone. Thin deposits of Cretaceous marine sediments also locally occur in the northern margin of the Barkly Tableland.

The Barkly Group is only limitedly exposes through the Barkly Project where centrally located licences appear to have more Barkly Group exposer than those licences to the west and east.
4. NRE’s Exploration Activities during the Reporting Period

NRE’s exploration program for the first term consisted of historic exploration review, two (2) helicopter assisted reconnaissance programs, soil sampling, rock chip sampling associated with a geological mapping program over the area, analysis of water bore cuttings and regional phosphate horizon modelling.

4.1 Previous Exploration Studies

NRE has conducted an extensive review of historic exploration over its Barkly Project. Historic exploration in this region has largely been for phosphate and diamond exploration with some uranium exploration. Encouraged by IMC’s success in locating high grade phosphate in the late 1960’s, a number of explorers have continued to search for phosphate in the region.

The Barkly region was part of the Australian Diamond Exploration Joint Venture regional programme to search for kimberlitic pipes. Results varied across the region with microdiamonds recovered, and intrusive pipes located. Recent exploration has favoured base metal mineralisation. A number of historic tenements have covered areas overlapping NRE’s tenures and these are shown in Figure 8 below.
NRE has reviewed a number of previous companies’ exploration reports overlapping its Barkly Project, including those listed in Table 2 below.

Table 2. Historical Reports Reviewed by NRE

<table>
<thead>
<tr>
<th>Historical Tenement</th>
<th>Company Report</th>
</tr>
</thead>
<tbody>
<tr>
<td>EL 7203</td>
<td>CR1992-0214</td>
</tr>
<tr>
<td>EL 8122</td>
<td>CR1994-0487</td>
</tr>
<tr>
<td>EL 9067</td>
<td>CR1996-0263</td>
</tr>
<tr>
<td>EL 23634</td>
<td>CR2004-0233</td>
</tr>
<tr>
<td>EL 9824</td>
<td>CR2003-0410, CR2004-0500</td>
</tr>
<tr>
<td>EL 10373</td>
<td>CR2004-0231</td>
</tr>
<tr>
<td>EL 22162</td>
<td>CR2003-0283, CR2004-0232</td>
</tr>
<tr>
<td>EL 22983</td>
<td>CR2004-0044</td>
</tr>
<tr>
<td>EL 26766</td>
<td>CR2009-1044</td>
</tr>
<tr>
<td>EL 26763</td>
<td>CR2009-1043</td>
</tr>
<tr>
<td>EL 22982</td>
<td>CR2004-0044</td>
</tr>
<tr>
<td>EL 26110</td>
<td>No Records</td>
</tr>
<tr>
<td>EL 22978</td>
<td>CR2004-0044</td>
</tr>
<tr>
<td>EL 24840</td>
<td>CR2008-0419, CR2009-0085</td>
</tr>
<tr>
<td>EL 8035</td>
<td>No Records</td>
</tr>
<tr>
<td>EL 6576</td>
<td>CR1990-0605</td>
</tr>
<tr>
<td>EL 4388</td>
<td>No Records</td>
</tr>
<tr>
<td>EL 4349</td>
<td>CR1985-0024, CR1986-0100</td>
</tr>
<tr>
<td>EL 4348</td>
<td>CR1985-0023, CR1986-0099</td>
</tr>
<tr>
<td>EL 4343</td>
<td>CR1984-0230, CR1986-0022</td>
</tr>
<tr>
<td>EL 4084</td>
<td>CR1983-0304</td>
</tr>
<tr>
<td>EL 4534</td>
<td>CR1986-0116</td>
</tr>
<tr>
<td>EL 4530</td>
<td>CR1986-0111</td>
</tr>
<tr>
<td>EL 3536</td>
<td>CR1983-0151</td>
</tr>
<tr>
<td>EL 1125</td>
<td>CR1977-0039</td>
</tr>
<tr>
<td>EL 1082</td>
<td>CR1977-0040</td>
</tr>
<tr>
<td>EL 1081</td>
<td>CR1977-0038</td>
</tr>
<tr>
<td>AP 1802</td>
<td>CR1968-0030</td>
</tr>
<tr>
<td>AP 1801</td>
<td>CR1968-0030</td>
</tr>
<tr>
<td>AP 1788</td>
<td>CR1968-0030, CR1968-0057</td>
</tr>
<tr>
<td>AP 1776</td>
<td>CR1969-0025</td>
</tr>
</tbody>
</table>
Previous explorers and a summary of their work in the area covered by NRE’s tenures have been detailed below.

**NRE’s EL 27647 – McNichol**

*Mines Exploration - AP1540 (1966)*
The tenement overlaps the south west corner of EL27647. Phosphate exploration was unsuccessful, due to absence of desirable lithologies and low phosphate content of sampled rocks, therefore the area was relinquished.

*IMC - AP1766, AP1788, AP1801, AP1802, AP1897 (1968)*
Exploration by IMC over the Alexandria region overlapped the western side of EL27647. Phosphate deposits found, beneficiation test results good, high grade product can be obtained.

*Mines Exploration - AP1776*
The tenement covered the eastern side of EL27647. The phosphoric sediment was not of economic grade, tenement subsequently relinquished.

*ICI - EL1125 (1976)*
The tenement overlaid the eastern side of EL27647. Only minor phosphate mineralisation was found and localized in extent.

*A.D.E. Joint Venture (Aberfoyle Explorations Pty, Ltd, Ashton Mining Ltd, A.O.G minerals Ltd) - EL4372, EL4373 (1980)*
Regional exploration programme for kimberlite pipes, overlapping all of EL27647. Although a high concentration of microdiamonds was discovered, they were not commercially sized and failed to represent an economic resource.

*EL6571*
This tenement overlaps the eastern half of EL27647. Regional exploration initially looked at diamond potential, but results were disappointing. Exploration then focussed on base metals.

*BHP - EL7203*
The tenement overlaid the south western region of EL27647, with exploration favouring Sedex style base metals mineralisation. Work consisted of ground magnetic s and Sirotom surveys. Depth to basement was interpreted to be greater than 300m, thus excessive and the tenement was relinquished.
NRE’s EL 29644 – Alroy Downs

**IMC - AP1766, AP1788, AP1801, AP1802, AP1897 (1968)**
Exploration by IMC over the Alexandria region overlapped the southern margin of EL27665. Phosphate deposits found, beneficiation test results good, high grade product can be obtained.

**Continental Oil Company, Minoil - AP1874**
Tenement overlaid all except the southern margin of EL27665. Exploration programme was designed to investigate known phosphatic horizons for sedimentary base metal mineralisation. Phosphate reserves were considered not economic, a black mineralized shale was considered to have potential for base metals and worthy of further investigation.

**ICI Australia Ltd, Australian Fertilizers Ltd - EL1081 (1976)**
Tenement overlaid most of EL27665, except the north western corner. Joint venture exploration programme to test phosphate reserves reported by previous explorers. Drilling failed to reproduce high grade phosphoric concentrations.

**CRA - EL3536 (1982)**
Tenement covers the south east area of EL27665. Exploration sought to investigate the extent of the black mineralised shale previously reported by Conoco. Gravity and ground magnetic surveys failed to delineate the shale and drilling results showed no significant mineralisation.

**Australian Diamond Exploration Joint Venture - EL4348, EL4349 (1980)**
Regional exploration programme for kimberlite pipes, overlapping all of EL27665. Although a number of microdiamonds were discovered in EL4348, there was little potential for kimberlitic pipes and the tenements were surrendered.

NRE’s EL 29753 – Playford Junction

**IMC - AP1766, AP1788, AP1801, AP1802, AP1897 (1968)**
Exploration by IMC over the Alexandria region overlapped the northern half of EL27666. Phosphate deposits found, beneficiation test results good, high grade product can be obtained.
**Continental Oil Company, Minoil - AP1874 (1970)**
Tenement overlaid all except the southern half of EL27666. Exploration programme was designed to investigate known phosphatic horizons for sedimentary base metal mineralisation. Phosphate reserves were considered not economic, a black mineralized shale was considered to have potential for base metals and worthy of further investigation.

**ICI Australia Ltd, Australian Fertilizers Ltd - EL1081 (1976)**
Tenement overlaid the south east corner of EL27666. Joint venture exploration programme to test phosphate reserves reported by previous explorers. Drilling failed to reproduce high grade phosphoric concentrations.

**CRA - EL3536 (1982)**
Tenement covers the south east section of EL27666. Exploration sought to investigate the extent of the black mineralised shale previously reported by Conoco. Gravity and ground magnetic surveys failed to delineate the shale and drilling results showed no significant mineralisation.

**Australian Diamond Exploration Joint Venture - EL4343, EL4349 (1983)**
EL27666 was overlain by EL4343 in the north and EL4349 in the south. A number of microdiamonds were recovered in EL4343, but potential to locate kimberlite pipes was downgraded and both tenements surrendered.

**BHP - EL8122 (1994)**
The tenement covered the northern half of EL27666. BHP conducted a review of all open file data to determine potential for stratiform lead and zinc mineralisation. Low prospectivity lead to the tenement being surrendered.

**Australian Diamond Exploration Joint Venture – EL4336, EL4343, EL4348, EL4349 (1984)**
The tenements combined covered all of EL27819. Several gravel samples were found to contain microdiamonds; however the intensive exploration program failed to locate kimberlite pipes.

**NRE’s EL 29720 – Limestone Ridges**

**IMC - AP1766, AP1788, AP1801, AP1802, AP1897 (1968)**
Exploration by IMC over the Alexandria region overlay most of EL27667, except for the west margin. Phosphate deposits found, beneficiation test results good, high grade product can be obtained.

**Continental Oil Company, Minoil - AP1874 (1970)**
Tenement overlaid the western margin of EL27667. Exploration programme was designed to
investigate known phosphatic horizons for sedimentary base metal mineralisation. Phosphate reserves were considered not economic, a black mineralized shale was considered to have potential for base metals and worthy of further investigation.

ICl Australia Ltd, Australian Fertilizers Ltd - EL1081, EL1082 (1976)
The tenements overlay all of EL27666. Joint venture exploration programme to test phosphate reserves reported by previous explorers. Drilling failed to reproduce high grade phosphoric concentrations.

Australian Diamond Exploration Joint Venture - EL4530, EL4534 (1985)
The tenements cover all of EL27667. Several microdiamonds recovered, but location of kimberlite pipes unlikely.

Northern Cement - EL4968
Tenement covers the south west section of EL27667. Part of a larger programme to locate high grade gypsum in economic quantities.

Mine Exploration - AP1540 (1966)
The tenement overlaps the northern half of EL27668. Phosphate exploration was unsuccessful, due to absence of desirable lithologies and low phosphate content of sampled rocks, therefore the area was relinquished.

Australian Diamond Exploration Joint Venture (Aberfoyle Explorations Pty, Ltd, Ashton Mining Ltd, A.O.G minerals Ltd) - EL4372, EL4373 (1980)
Regional exploration programme for kimberlite pipes, overlapping northern half of EL27653. Although a high concentration of microdiamonds was discovered, they were not commercially sized and failed to represent an economic resource.

CRA - EL6576
This tenement covered all except the south east corner of EL27668. CRA undertook a comprehensive aeromagnetic and radiometric survey over four tenements, with discrete anomalies selected for follow up work. Fifteen magnetic features were drilled to test potential for kimberlite pipes. Negative results, led to the surrender of all tenements in the project.

BHP - EL7203
The tenement overlaid the northern margin of EL27668, with exploration favouring Sedex style base metals mineralisation. Work consisted of ground magnetic s and Sirotex surveys. Depth to basement was interpreted to be greater than 300m, thus excessive and the tenement was relinquished.
NRE’s EL 29722 – Buchanan

Continental Oil Company, Minoil - AP1874
Tenement overlaid all of EL27669. Exploration programme was designed to investigate known phosphatic horizons for sedimentary base metal mineralisation. Phosphate reserves were considered not economic, a black mineralized shale was considered to have potential for base metals and worthy of further investigation.

ICI Australia Ltd, Australian Fertilizers Ltd - EL1081 (1976)
The tenement overlaid all of EL27669. Joint venture exploration programme to test phosphate reserves reported by previous explorers. Drilling failed to reproduce high grade phosphoric concentrations.

CRA - EL3536 (1982)
Tenement covers all of EL27669. Exploration sought to investigate the extent of the black mineralised shale previously reported by Conoco. Gravity and ground magnetic surveys failed to delineate the shale and drilling results showed no significant mineralisation.

Australian Diamond Exploration Joint Venture - EL4349 (1983)
The tenement covered EL27669 entirely. No microdiamonds were recovered, thus tenement potential was downgraded and subsequently surrendered.

Australian Diamond Exploration Joint Venture - EL4534 (1985)
The tenement covered all except the western edge of EL27670. Several microdiamonds were recovered; however the potential to locate kimberlitic pipes was low.

4.2 Helicopter Reconnaissance Programs & Geological Mapping

NRE completed two (2) reconnaissance helicopter assisted field trips of the Barkly Project. 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 trips proved successful in evaluating the tenements in the most effective and timely manner possible.

The field targets within the Barkly Project 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. An array of material was assessed prior to field work to assist with optimal target generation, this included:

- Data from all previous exploration as documented in open file reports retrieved from the Northern Territory Government. This includes:
  - Surface geochemical sampling;
  - Geochemical anomalism mapping;
  - Geological Mapping;
  - Detailed geophysical survey data;
  - Geophysical anomalism mapping;
  - Drilling results; and
  - Local and regional geological assessments and conclusions derived from exploration programmes.

- Water bore data available for all bores drilled in the region. This data includes geological logging and water assaying.
- Geological maps provided by the Northern Territory government.
- Aeromagnetics, aero-radiometrics and gravity surveys provided by the Northern Territory government.
- Satellite imagery, ASTER and Google Earth imagery.
- Data supplied by landowners in relation to geological and topographic features of interest on their properties.

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. Detailed geological characteristics were recorded at each site and bulk surface samples were collected.

Geological ground truthing produced a multitude of new information regarding surface characteristics across the region. Observations were made at all target sites detailing the actual setting to ensure follow up work is carried out with optimal effectiveness.

Field work was followed with detailed literature research and data collation in order to evaluate mineral prospectivity and make recommendations for the next stage of exploration.

NRE’s Group (Technical) Report for Year 1 titled ‘Year 1 Annual Group Report – Barkly Project’ submitted with the Department provides a summary of tenements and field targets assessed,
and geological, structural, geophysical, physiographic and botanical characteristics of target sites.

4.3 Soil and Rock Chip Sampling

The Barkly Project is within the Georgina Basin, located in a region considered to be prospective for phosphate and possible uranium and potash. All potential mineralisation was targeted across the Barkly Project tenures, with a large suite of elements being assayed to ensure comprehensive recognition of mineral potential. Considerable focus was put upon delineation of surface potash potential on particular tenures.

Assay results from soil and rock chip samples collected during the two (2) helicopter reconnaissance programs were provided in NRE’s Group (Technical) Report for Year 1 titled ‘Year 1 Annual Group Report – Barkly Project’.

NRE’s EL 27647 – McNichol

Five (5) rock chip samples were collected across the target areas with the McNichol tenement. Two (2) rock chip samples were taken at the first target area, 3007126 and 3007127, only traces of phosphorous were detected. Sample 3007128 returned no significant results.

Coarse laterite was observed at surface at one site and a sample of this was collected for laboratory analysis, 3007129. Trace phosphorous was identified in sample 3007129, but no other significant results were returned. A sample of iron coated quartz rich sands dominate the surface geology. A sample of sand was taken for laboratory analysis but no significant values of any element were recorded.

NRE’s EL 29644 – Alroy Downs

Low level potassium was identified in a sample taken on the July 2010 reconnaissance trip and subsequent assessment of radiometric imagery suggested that the region may be prospective for potash also. Three sites were sampled and very low levels of potassium were identified. Sampling of three (3) sites representing areas of peak potassium anomalyism has indicated that surface levels in these zones are elevated in respect to the surrounding region but not high enough to be considered economic and the potash potential has been downgraded on this tenement.

NRE’s EL 29753 – Playford Junction

The site of peak potassium anomalyism on regional radiometrics was targeted to get an indication of the concentration responsible for the anomalous signature. When compared to the potassium levels in samples 3007111 and 112 collected in July (200ppm), the potassium is
more than three times higher (640ppm), but considered to be at a low concentration. There were also eight (8) representative surface samples collected. NO significant levels of any of the 35 elements tested at the ALS Laboratories’ were detected.

**NRE’s EL 29720 – Limestone Ridges**

Eleven (11) rock chip samples representing all of the rock types identified in the area were collected and sent to the laboratory for analysis. Low level phosphate ranging up to 6400ppm was identified. A rock chip sample was also taken of the limestone/calcareous sandstone at a sink hole site, Sample 300710, with trace phosphate being identified by the laboratory.

**NRE’s EL 29722 – Buchanan**

A sample of soil, 3007114, was collected for laboratory analysis, and the assay results provided no evidence of elevated phosphate, with only 150ppm P being returned. This was anticipated as the surface soils are not likely to provide a good indication of the phosphate in the Cambrian unit below surface. A sample of the surface material was also collected for laboratory analysis, 3007115. The assay results showed no signs of elevated phosphorous, returning only 15ppm P.

### 4.4 Regional Phosphate Modelling

NRE engaged specialists to conduct a study into the phosphate potential of the Barkly region and to prepare a model of NRE’s tenements speculating the depth and extent of the phosphate horizon. NRE’s Group (Technical) Report for Year 1 titled ‘Year 1 Annual Group Report – Barkly Project’ submitted with the Department provides a more in depth summary of the phosphate study.

NRE has been able to establish the sedimentological and structural controls constraining phosphate deposition, use the sedimentological, stratigraphic and structural models to assess the phosphate potential of the Barkly Project and develop a design for a limited Reverse Circulation Drilling program to better constrain prospective targets within NRE’s Barkly Project.

### 4.5 Water Bore Cuttings Analysis

NRE engaged Terra Search Pty. Ltd. to attend the Northern Territory’s Darwin and Alice Springs Core Facilities to carry out an extensive study and analysis of a number of cuttings available from historically drilled water bores around the Barkly Project (*Figure 9*).
The Department kindly allowed NRE to set-up in the Darwin and Alice Springs Core Facilities where NRE’s geologists undertook logging of water bores and analysis of the water bore cuttings using a hand-held XRF device, a Thermo Niton XL3t 500 analyser. Not all water bores had cuttings available for testing however, NRE was able to test a number of water bore cuttings in the region.

A list of water bores with drill chips stored at the Northern Territory’s Darwin and Alice Springs Core Facilities was compiled and individual water bores were selected for follow up work, based on geographical location, geological locations, proximity to other bores and depth.

NRE lodged two Exploration Reports with the Northern Territory Department of Resources’ Geoscience Division on 7 June, 2011 and 12 September, 2011. These reports were required in respect of the XRF and ALS Assaying of Water Bore Chips at the Darwin and Alice Springs Core Facilities. The Exploration Reports are titled ‘XRF & ALS Assaying of Water Bore Chips – Core Facility: Darwin’ and ‘XRF & ALS Assaying of Water Bore Chips – Core Facility: Alice Springs’.

5. Reports lodged during the reporting period

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

Natural Resources Exploration recently amalgamated the tenures within this group but no further work has been completed on these tenures other than administrative work since the amalgamation (new titles).

NRE’s exploration activities of its Barkly Project has been focused on determining the mineral prospectivity of each of its tenements, modelling phosphate horizons in those tenements as well as delineating targets.

Prior to amalgamation NRE conducted both office-based studies and field operations on its Barkly Project during the term of this tenure. NRE carried out a detailed geological assessment of the relinquished area which included considerable research prior to two (2) reconnaissance helicopter assisted field trips of the Barkly Project. Research included review and compilation of the data in the Northern Territory Geological Services’ (NTGS) open file reports, air photo imagery and examination of the latest geological maps. NRE also carried out XRF analysis of water bore cuttings across the Barkly Project, held at the Alice Springs Core Library.

NRE made application to the Department to completely surrender the entire Barkly Group under section 103 of the Mineral Titles Act. The Barkly Group was surrendered on 31 October 2013.

NRE believes that there is no rehabilitation required in relation to the Barkly Group.
7. Bibliography


Note many more references are also located in the References section of the Alroy, Brunette Downs, Mt Drummond and Ranken 1:250,000 geological map series explanatory notes.