FINAL GROUP REPORT 2013
BARKLY GROUP PROJECT

Year ending 05/03/2013
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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 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 eleven (11) exploration licences 27653, 27665, 27666, 27667, 27668, 27669, 27670, 27671, 27672, 27673 and 27819. 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 a majority of the titles ceased to be in force, including any results produced by those activities. All eleven (11) licences will be referred to as ‘the Barkly Project’, unless specific attributes of each individual licence are discussed then is such case the individual project name and number will be identified.

NRE recently amalgamated a majority of the ELs within this Group along with other ELs in the area which area operated by NRE. In doing so, the ELs within the original Barkly Project have now been amalgamated and ‘replacement titles’ have been issued. The Barkly Annual Group Report GR 167 for 2014 will report on the remainder of the original Barkly Project as well as the replacement titles.

NRE is 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 at Highland Plains, Alexandria, Alroy and Buchanan Dam.

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 and develop a design for a limited Reverse Circulation Drilling program to better constrain prospective targets within NRE’s Barkly Project.
1. Introduction

Natural Resources Exploration (‘NRE’) has conducted extensive office-based studies and field work of the eleven (11) exploration licences making up its Barkly Project. 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 delimitate drill targets.

The exploration licences cover the Barkly Tableland, west of the Northern Territory – Queensland border. These licences are located in close proximity to well documented phosphate prospects at Buchanan Dam, Alroy, Alexandria and Highland Plains. The significantly larger Arruwurra and Wonarah prospects are approximately 60 kilometres to the south of the Barkly Project.

2. Tenure

NRE’s original Barkly Project initially consisted of eleven (11) granted exploration licences. *Table 1* lists the pertinent tenement details of these ELs.

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<tr>
<th>Project Name</th>
<th>Tenement Name</th>
<th>Title No. (EL)</th>
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<td>9</td>
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<td></td>
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<td></td>
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<td></td>
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<td>27667</td>
<td>62</td>
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<td></td>
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NRE recently amalgamated a majority of the ELs within this Group along with other ELs in the area which are operated by NRE. In doing so, the below ELs have now been amalgamated and ‘replacement titles’ have been issued. Under the provisions of regulation 60(5), the issue of exploration licences 29644,
29645, 29720, 29722 and 29753 took effect from 5 March 2013 for a term of six (6) year. The Barkly Annual Group Report GR 167 for 2014 will report on the following ELs:

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<th>Pre-Amalgamation: Title No.</th>
<th>Post-Amalgamation: Replacement Title No.</th>
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<th>Expiry Date:</th>
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<td>28583</td>
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</table>

Native Title Claims and Recorded Sites

There are two (2) Native Title Claims over the Barkly Project, namely the Dalmore Downs Claim (DC 01 / 30) and the Mt Drummond Claim (DC 01 / 12). These claims are shown in Figure 1 below.

There are three (3) recorded sacred sites within the Barkly Project and one (1) very small section of EL27667 is covered by a restricted work area.
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.
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. As a result of those activities, NRE has also developed two (2) drilling programs in relation to its Barkly Project, one limited drilling program and an extensive drilling program.

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

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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 27653 – Don Creek

**IMC - AP1766, AP1788, AP1801, AP1802, AP1897 (1968)**
Exploration by IMC over the Alexandria region overlapped all of EL27653 except the north west corner. Phosphate deposits found, beneficiation test results good, high grade product can be obtained.

**ICI - EL1125 (1976)**
This tenement overlaps the western side of EL27653. Only minor phosphate mineralisation was found and localized in extent.

**Afmeco - EL2112 (1979)**
The tenement overlaps the eastern side of EL2765. Afmeco exploration programme included airborne geophysics, mapping, stream sediment and rock chip sampling, ground radiometry and drilling. Weak geophysical anomalies were seen, however no significant base metal prospects were identified.

**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 most of EL27653. Although a high concentration of microdiamonds was discovered, they were not commercially sized and failed to represent an economic resource.

**EL6577**
This tenement covered all except the western margin of EL27653. 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.

**Australian Diamond Exploration Joint Venture - EL8101 (1997)**
The tenement was part of ADE Joint venture exploration program for kimberlite pipes, and covered all but the western margin of EL27653. Results were not encouraging and tenement subsequently relinquished.

**Anglo American Exploration (Australia) Pty Ltd - EL10373, EL22162 (2003)**
Part of a regional exploration project over the north western extension of the Lawn Hill Platform, the tenements overlap EL27653 entirely. The exploration target was to discover a large tonnage; sediment hosted massive sulphide Pb-Zn deposit. Drilling results and project re-evaluation led to the prospect being downgraded and tenements surrendered.
NRE’s EL 27659 – Robies Bore

IMC - AP1766, AP1788, AP1801, AP1802, AP1897 (1968)
Exploration by IMC over the Alexandria region overlapped the north western half of EL27659. Phosphate deposits found, beneficiation test results good, high grade product can be obtained.

ICI - EL1125 (1976)
This tenement overlaps the north west corner of EL27659. Only minor phosphate mineralisation was found and localized in extent.

Afmeco - EL2112 (1979)
The tenement overlaps the north west margin of EL2769. Afmeco exploration programme included airborne geophysics, mapping, stream sediment and rock chip sampling, ground radiometry and drilling. Weak geophysical anomalies were seen, however no significant base metal prospects were identified.

Regional exploration programme for kimberlite pipes, overlapping all of EL2769. Although a high concentration of microdiamonds was discovered, they were not commercially sized and failed to represent an economic resource.

CRA - EL6577 (1990)
This tenement covered all of EL2769. 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.

Australian Diamond Exploration Joint Venture - EL8101, EL8102 (1993)
The tenements were part of ADE Joint venture exploration program for kimberlitic pipes, and overlaps EL2769 entirely. Results were not encouraging and tenement subsequently relinquished.

Anglo American Exploration (Australia) Pty Ltd - EL10373, EL22162 (2003)
Part of a regional exploration project over the north western extension of the Lawn Hill Platform, the tenements overlap EL2769 entirely. The exploration target was to discover a large tonnage; sediment hosted massive sulphide Pb-Zn deposit. Drilling results and project re-evaluation led to the prospect being downgraded and tenements surrendered.
**Genesis Resources Ltd - EL24840 (2006)**
This tenement overlaid all of EL27659, with exploration targeting base-metals, uranium, diamond, gold and palladium. However, lack of regional magnetic anomalies, geological structures or mineral occurrences, the area is not believed to host any significant mineralisation.

**NRE’s EL 27665 – Playford River**

**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 27666 – Black Plain**

**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.

NRE’s EL 27667 – Alexandria

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.
ICI 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.

NRE’s EL 27668 – Limestone Ridges

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.

IMC - AP1766, AP1788, AP1801, AP1802, AP1897 (1968)
Exploration by IMC over the Alexandria region overlaid all of EL27668. Phosphate deposits found, beneficiation test results good, high grade product can be obtained.

ICI Australia Ltd, Australian Fertilizers Ltd - EL1081, EL1082 (1976)
Tenements overlaid all of EL27668. 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 (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.

Australian Diamond Exploration Joint Venture - EL4530, EL4534 (1985)
The tenements cover southern half of EL27668. Several microdiamonds recovered, but location of kimberlite pipes unlikely.
**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 Sirotem surveys. Depth to basement was interpreted to be greater than 300m, thus excessive and the tenement was relinquished.

**NRE’s EL 27669 – 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.

**NRE’s EL 27670 – Bore 50**

*Continental Oil Company, Minoil - AP1874*

Tenement overlaid all of EL27670. 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 EL27670. 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 western margin of EL27670. 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 the western edge of EL27670. 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.

**NRE’s EL 27671 & 27672 – Little Buchanan & Sandy Crossing**

**Continental Oil Company, Minoil - AP1874**
The tenement overlaid all of EL27671 and EL27672. 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 EL27671 and EL27672. 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 - EL4349 (1983)**
The tenement covered EL27671 and EL27672 entirely. No microdiamonds were recovered, thus tenement potential was downgraded and subsequently surrendered.
NRE’s EL 27673 – Dolostone Rim

ICI Australia Ltd, Australian Fertilizers Ltd - EL1082 (1976)
The tenement overlay EL27673 entirely. 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 - EL4349 (1983)
The tenement covered the north west section of EL27673. No microdiamonds were recovered, thus tenement potential was downgraded and subsequently surrendered.

Australian Diamond Exploration Joint Venture - EL4534 (1985)
The tenement covered the south east section of EL27673. Several microdiamonds were recovered; however the potential to locate kimberlitic pipes was low.

NRE’s EL 27819 – Boree

IMC - AP1766, AP1788, AP1801, AP1802, AP1897 (1968)
Exploration by IMC over the Alexandria region covered the northern half of EL27819. Phosphate deposits found, beneficiation test results good, high grade product can be obtained.

Continental Oil Company, Minoil - AP1874
The tenement overlay the southern half of EL27819. 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.

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.

BHP - EL8122 (1994)
The tenement covered the northern half of EL27819. 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.

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 27653 – Don Creek

The radiometric signature of the area was observed to be very low and the potential for uranium mineralisation was downgraded. It is considered that the radiometric anomaly may represent uranium being trapped by subsurface phosphatic material. A rock chip of this lithology was taken for assay (3007107). No significant results were retried for this sample.

NRE’s EL 27659 – Robies Bore

Three (3) rock chip samples were taken for laboratory analysis, 3007108 to 3007110. Only trace phosphate was encountered, as was expected in this leached surface expression of the unit. Low level copper was returned from 3007109, but at a level too low to be deemed worth following up.
NRE’s EL 27665 – Playford River

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 anomalism has indicated that surface levels in these zones are elevated in respect to the surround region but not high enough to be considered economic and the potash potential has been downgraded on this tenement.

NRE’s EL 27666 – Black Plain

The site of peak potassium anomalism 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.

NRE’s EL 27667 – Alexandria

A rock chip sample of the limestone/calcareous sandstone at the sink hole site was taken, Sample 300710, with trace phosphate being identified by the laboratory.

NRE’s EL 27668 – Limestone Ridges

Ten (10) 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.

NRE’s EL 27669 – 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.

NRE’s EL 27670 – Bore 50

No samples were taken from this tenure during the helicopter reconnaissance programs.
NRE’s EL 27671 & 27672 – Little Buchanan & Sandy Crossing

No samples were taken from these tenures during the helicopter reconnaissance programs.

NRE’s EL 27673 – Dolostone Rim

A sample of the surface material was collected for laboratory analysis, 3007115. The assay results showed no signs of elevated phosphorous, returning only 15ppm P.

NRE’s EL 27819 – Boree

Eight (8) representative surface samples were collected. No significant levels of any of the 35 elements tested at the ALS Laboratories’ were detected.

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’s 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’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 and developing a limited, as well as a more extensive, drilling program.

NRE believes that the region is prospective for fairly shallow phosphate mineralisation and NRE has successfully identified various targets for a limited Reverse Circulation Drilling program over the replacement titles in its Barkly Project.

The objective of NRE’s exploration activities over the next 12 month period in relation to its Barkly Project is to finalise and lodge its Mining Management Plan in respect of the Project, award the limited Reverse Circulation Drilling program to an acceptable drilling contractor and conduct its limited Reverse Circulation Drilling program.

NRE is looks forward to commencing exploration activities over the replacement titles of the Barkly Project and will report on same in the next term.
8. 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.
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