BARKLY PROJECT
NORTHERN TERRITORY

TENEMENT EL27197

PARTIAL SURRENDER REPORT
FOR THE PERIOD 26 OCTOBER 2009 – 25 OCTOBER 2011

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Date: 15 December 2011
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<thead>
<tr>
<th><strong>Title Holder</strong></th>
<th>Vale Australia EA Pty Ltd</th>
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</thead>
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<tr>
<td><strong>Operator</strong></td>
<td>Vale Exploration Pty Ltd</td>
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<td><strong>Titles</strong></td>
<td>Exploration Licence 27197</td>
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<td><strong>Project Name</strong></td>
<td>Barkly</td>
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<td><strong>Report Title</strong></td>
<td>EL27197 Partial Surrender Report for the period 26 October 2009 to 25 October 2011</td>
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<td><strong>Personal Author</strong></td>
<td>Siggs, Brenton</td>
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<td><strong>Corporate Author</strong></td>
<td>Vale Exploration Pty Ltd</td>
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<tr>
<td><strong>Commodity</strong></td>
<td>Phosphate</td>
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<tr>
<td><strong>Date of Report</strong></td>
<td>15 December 2011</td>
</tr>
<tr>
<td><strong>250 000 K mapsheet</strong></td>
<td>Alroy</td>
</tr>
<tr>
<td><strong>100 000 K mapsheet</strong></td>
<td>Frewena, Playford, Dalmore, Favenc</td>
</tr>
<tr>
<td><strong>Contact details</strong></td>
<td>Vale Exploration Pty Ltd</td>
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</tr>
</tbody>
</table>
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Executive Summary

Exploration Licence 27197 is part of the Barkly Project (ELs 27197, 27198, 27199, 27200). A total of 181 blocks was relinquished from EL27197, leaving the current retained area of 181 blocks. This Partial Surrender Report is for the period 26 October 2009 to 25 October 2011. The Barkly Project, located approximately 66km east of Tennant Creek, is a sub-project of Vale’s Georgina Phosphate Exploration Project and covers Cambrian rocks of the Georgina Basin. The rocks of the Georgina Basin range in age from Late Proterozoic to Early Palaeozoic. Outcrop within Barkly is limited with much of the basement geology concealed beneath Tertiary and Quaternary sediments. Phosphate exploration work on the relinquished area of EL27197 comprised: open file literature review; acquisition and reprocessing of geophysical data; acquisition of NRETAS environmental data; regional water bore analysis; helicopter-supported field mapping; collection and analysis of 32 rock chip samples; flora and fauna desktop study report; in-house depth to basement gravity modelling; a regional geophysical basin modelling study by Mira Geoscience; and line clearing and reconnaissance Reverse Circulation (RC) drilling (3 holes VGRC015-017 for 480m and 160 composite samples). The surrendered area was relinquished due to a lack of priority phosphate targets. The best result was 0.86% P (1.95% P₂O₅) from 168-171m in VGRC017.
1 Introduction

1.1 Location and Access

The tenement EL27197 is part of the Barkly Project (ELs 27197, 27198, 27199, 27200), located approximately 66 km east of Tennant Creek (Figure 1). The Barkly Project is comprised of four contiguous tenements on the Tennant Creek (SE53-14) and Alroy (SE53-15) 1:250,000 and the Balmore 6058, Barkly 5859, Dalmore 6058, Favene 5958, Frewena 5959 and Playford 6059 1:100,000 map sheets. EL27197 falls within the Alroy 1:250,000 map sheet and the Frewena, Playford, Dalmore and Favene 1:100,000 map sheets.

The Barkly Project straddles parts of Tennant Creek (PPL1142), Dalmore Downs (PPL988, NT Por 773) and Alroy Downs (PPL985, NT Por 651) cattle stations.

The Barkly Roadhouse is located near the eastern margin of the project area and was used as an exploration field base. The nearest homestead, Dalmore Downs, is approximately 8km east of the project area.

Access to the Barkly Project is 23 km north of Tennant Creek thence 134 km eastwards from Three Ways Roadhouse along the Barkly Highway. The sealed Barkly Highway transects the two easternmost tenements of the project (EL27197 and EL27200). Vehicular access throughout the western tenements is hampered by sandy, low scrub terrain and a paucity of tracks.

1.2 Tenement Details

The Barkly Project consists of four contiguous tenements held by Vale Australia EA Pty Ltd and operated by Vale Exploration Pty Ltd. There are two exclusion zones within the project.

EL27199: Excludes NT Por 1416; small parcel of private land far NE corner;
EL27200: Excludes NT Por 5738; Barkly Homestead Roadhouse.

The Barkly tenements were subject to Year 2 50% reductions. Table 1 summarises the number of blocks relinquished and retained. Figure 2 shows the relinquished area.
Figure 1: Barkly Project (Post 2011 Relinquishment) Location Plan
1.3 **Native Title**

For land council jurisdiction, the Barkly tenements can be classified as follows:
- Barkly East (EL27197, EL27200) in NLC jurisdiction with a native title claim.
- Barkly West (EL27198, EL27199) in CLC jurisdiction with no native title claims.

The three native title claims over the Eastern Barkly Project are:
- Dalmore Downs DC01/30 is registered (overlaps southern portion of EL27197 and western portion of EL27200);
- Dalmore Downs South DC02/2 is registered (overlaps eastern half of EL27200);
- Rockhampton Brunette Downs DC03/1 is not registered (overlaps northern portion of EL27197).

1.4 **Historical, Aboriginal and Heritage Sites**

An inspection of the Aboriginal Areas Protection Authority (AAPA) Register was conducted for Barkly Project tenements on 9 September 2009.

An information meeting for EL27197 and EL27200 with Traditional Owners was organized by the Northern Land Council (NLC) and held in Tennant Creek on 1 December 2009.

Aboriginal Areas Protection Authority (AAPA) Certificates for EL27198 and EL27199 and for EL27197 and EL27200 issued 17 June 2010 and 22 June 2010 respectively.

Prior to any ground disturbance activities taking place (site preparation, sump excavation, hole pegging), a Vale representative accompanied a Northern Land Council (NLC) representative and one or more Traditional Owners on a field visit to check all proposed drill sites on Barkly East EL27197 and EL27200). The NLC representative and Traditional Owners were satisfied with all proposed ground disturbance and a good relationship with the NLC and Traditional Owners was established.
Table 2: Barkly Project Cultural Heritage Consultation Schedule

<table>
<thead>
<tr>
<th>Licence</th>
<th>Exclusions from Grant</th>
<th>Land Council</th>
<th>AAPA Register Inspection</th>
<th>AAPA Authority Certificate</th>
<th>Meetings</th>
</tr>
</thead>
<tbody>
<tr>
<td>EL27197</td>
<td></td>
<td>NLC</td>
<td>9-Sep-09</td>
<td>C2010/144 22-Jun-10</td>
<td>30 Nov - 1 Dec 09</td>
</tr>
<tr>
<td>EL27198</td>
<td></td>
<td>CLC</td>
<td>9-Sep-09</td>
<td>C2010/143 17-Jun-10</td>
<td></td>
</tr>
<tr>
<td>EL27199</td>
<td>excl. NT Por 1416; small parcel of private land far NE corner</td>
<td>CLC</td>
<td>9-Sep-09</td>
<td>C2010/143 17-Jun-10</td>
<td></td>
</tr>
<tr>
<td>EL27200</td>
<td>excl. NT Por 5738; Barkly Homestead Roadhouse</td>
<td>NLC</td>
<td>9-Sep-09</td>
<td>C2010/144 22-Jun-10</td>
<td>30 Nov - 1 Dec 09</td>
</tr>
</tbody>
</table>

No sites of historical significance are listed on the Australian Heritage database.
1.5 Climate and Hydrology

The Barkly region is semi-arid with annual rainfall of 453 mm. The climate is characterized by distinct wet and dry seasons (Table 3) with the majority of rain falling between November and March. The predominant wind direction is from the east.

<table>
<thead>
<tr>
<th>Jan</th>
<th>Feb</th>
<th>March</th>
<th>April</th>
<th>May</th>
<th>June</th>
<th>July</th>
<th>Aug</th>
<th>Sept</th>
<th>Oct</th>
<th>Nov</th>
<th>Dec</th>
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</thead>
<tbody>
<tr>
<td>Mean Maximum Temperature °C</td>
<td>36.7</td>
<td>35.7</td>
<td>34.4</td>
<td>31.7</td>
<td>27.6</td>
<td>24.5</td>
<td>24.6</td>
<td>27.4</td>
<td>31.5</td>
<td>34.8</td>
<td>36.5</td>
</tr>
<tr>
<td>Highest Temperature °C</td>
<td>44.0</td>
<td>44.5</td>
<td>40.7</td>
<td>38.4</td>
<td>36.4</td>
<td>33.6</td>
<td>34.7</td>
<td>35.5</td>
<td>38.9</td>
<td>41.6</td>
<td>43.4</td>
</tr>
<tr>
<td>Mean days ≥ 40 °C</td>
<td>5.9</td>
<td>2.7</td>
<td>0.3</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.9</td>
<td>3.5</td>
</tr>
<tr>
<td>Mean Minimum Temperature °C</td>
<td>25.0</td>
<td>24.5</td>
<td>23.3</td>
<td>20.4</td>
<td>16.4</td>
<td>12.9</td>
<td>12.2</td>
<td>14.4</td>
<td>18.4</td>
<td>21.8</td>
<td>23.8</td>
</tr>
<tr>
<td>Lowest Temperature °C</td>
<td>17.2</td>
<td>17.2</td>
<td>14.6</td>
<td>11.6</td>
<td>6.7</td>
<td>5.3</td>
<td>4.5</td>
<td>6.0</td>
<td>7.4</td>
<td>11.6</td>
<td>10.7</td>
</tr>
<tr>
<td>Mean Rainfall (mm)</td>
<td>113.5</td>
<td>118.6</td>
<td>54.3</td>
<td>15.4</td>
<td>7.4</td>
<td>5.4</td>
<td>4.3</td>
<td>1.7</td>
<td>8.1</td>
<td>20.2</td>
<td>38.0</td>
</tr>
<tr>
<td>Mean number of days of rain</td>
<td>9.8</td>
<td>9.2</td>
<td>5.9</td>
<td>1.9</td>
<td>1.4</td>
<td>0.9</td>
<td>0.6</td>
<td>0.7</td>
<td>1.8</td>
<td>3.9</td>
<td>5.8</td>
</tr>
</tbody>
</table>

1.6 Land Area Type

The majority of the project is within the Davenport Murchison Ranges (DMR) bioregion; however the northern boundaries of the easternmost tenement extend into the Mitchell Grass Downs (MGD) bioregion. Both of these bioregions are further described below.

MGD: Lies over the Georgina and Dunmurra basins containing sedimentary rocks of Cretaceous, Tertiary and Cambrian ages and soils are predominantly cracking clays. The vegetation is predominantly *Eucalyptus microtheca* low open-woodland with Bluebush (*Chenopodium auricomum*) sparse-shrubland understory and Mitchell Grass (*Astrebla*) grassland on the Barkly Tableland.

DMR: Comprises low but rugged rocky hills formed from folded volcanics, sandstone, siltstone and conglomerates. Soils are generally shallow lithosols, but fine grained alluvial soils occur in the valleys and surrounding plains. Vegetation includes hummock grasslands and low open woodlands dominated by eucalypt and Acacia species. (Baker et al., 2005).

On the eastern side of the project (within EL27197) lies Prentice Lake, a small ephemeral wetland.

The entire Alroy sheet area occurs within the Barkly Basin. The Barkly Basin is not a single entity but consists of a number of bluebush swamps or lakes which are internal drainage conduits. The major lakes lie to the north. To the south, the Frew River flows into local internal drainage claypans.

Physiographic features are delineated by the divisions of landforms into grass-covered downs and timbered areas.

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1 All rainfall and temperature measurements from 1969 - 2009 (i.e. 40 years data)
A prominent timberline separates the mainly carbonate rocks of the downs country to the north from the timbered and scrubby exposures of shale, siltstone and chert of the Wonarah Beds and from areas of Cainozoic travertine, red sandy soil and sand dunes (Randal, 1966).

South of the Barkly Highway and north-west of Frewena, the country consists of gently undulating terrain and vegetation consists mainly of snappy gum, with some Acacia spp and mallee scrub, particularly in the south. The scrublands south of the Barkly Highway form part of a large semi-desert which extends north westwards from near Georgina Downs in the Sandover River Sheet area (Nichols, 1966) to the Brunchilly area. (after Nichols, 1966 as cited in Randal, 1966).

### 1.7 Flora

The dominant vegetation community within the project area is Corymbia low open woodland. Small areas of Acacia tall open shrubland, Astrebla low tussock grassland and Triodia low open hummock grassland also occur within the project (Figure 4).²

Introduced flora (weed) species that may occur in the Barkly region, possibly within the Barkly project area include:

<table>
<thead>
<tr>
<th>Species Name</th>
<th>Generic Name</th>
<th>Where</th>
<th>Type of Presence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acacia nilotica</td>
<td>Prickly acacia</td>
<td>Barkly Highway</td>
<td>Occurrences</td>
</tr>
<tr>
<td>Parkinsonia aculeata</td>
<td>Parkinsonia</td>
<td>Lake Sylvester (further north)</td>
<td>Infestation</td>
</tr>
<tr>
<td>Prosopis sp</td>
<td>Mesquite</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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² Figure 3 Produced with Digital Vegetation Mapping data purchased from NRETAS October 2009.
Figure 4: Barkly Project (Pre 2011 Relinquishment) Vegetation Plan


1.8 Fauna

A search of NRETAS\textsuperscript{3} data found that two fauna species covered by the *EPBC Act 1999* have been recorded in surveys completed within the Barkly Project. These are the Greater Bilby (*Macrotis lagotis*) and the Hooded Robin (*Melanodryas cucullata*) (Table 5-6).

The Australia Bustard (*Ardeotis australis*) has been recorded within the Barkly Project tenement EL27197. This species is not considered to be vulnerable, endangered or critically endangered under the *EPBC Act*, however it is considered vulnerable by the NT Government and is protected by the *Territory Parks and Wildlife Conservation Act 2009*.

The following vulnerable species have been recorded within the project area (see Figure 5).

<table>
<thead>
<tr>
<th>Species Name</th>
<th>Generic Name</th>
<th>EPBC\textsuperscript{4} Status</th>
<th>TPWC\textsuperscript{5} Status</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Macrotis lagotis</em></td>
<td>Greater Bilby</td>
<td>Vulnerable</td>
<td>Vulnerable</td>
</tr>
<tr>
<td><em>Ardeotis australis</em></td>
<td>Australia Bustard (Bush Turkey)</td>
<td>No Status</td>
<td>Vulnerable</td>
</tr>
<tr>
<td><em>Melanodryas cucullata</em></td>
<td>Hooded Robin</td>
<td>Ssp melvillensis</td>
<td>Ssp melvillensis</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Hooded robin (Tiwi Islands) is</td>
<td>Hooded robin (Tiwi Islands) is</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Endangered</td>
<td>Endangered</td>
</tr>
</tbody>
</table>

A search of the Australian Government Department of the Environment, Water, Heritage and the Arts website, ‘Protected Matters Search tool’ identified one threatened species and seven migratory bird species (one of which is threatened) within a rectangular search area encompassing the tenements (Table 7). These species may also occur within the tenements, however birds listed as migratory or marine are most likely to be located in the vicinity of Lake Prentice.

<table>
<thead>
<tr>
<th>Species Name</th>
<th>Generic Name</th>
<th>Status</th>
<th>Type of Presence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Birds</td>
<td><em>Rostratula australis</em>, <em>Rostratula benghalensis s. lat</em></td>
<td>Australian Painted Snipe</td>
<td>Species or species habitat may occur within the area</td>
</tr>
</tbody>
</table>

\textsuperscript{3} NRETAS - NT Department of Natural Resources, Environment, the Arts and Sport
\textsuperscript{4} Environmental Protection and Biodiversity Conservation Act 1999
\textsuperscript{5} Territory Parks and Wildlife Conservation Act
Figure 5: Barkly Project (Pre 2011 Relinquishment) Fauna Plan
Table 7: Marine and Migratory Bird Species (Protected Matters Search tool, 2009)

<table>
<thead>
<tr>
<th>Terrestrial/ Marine/ Wetland</th>
<th>Species Name</th>
<th>Generic Name</th>
<th>Status</th>
<th>Type of Presence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Migratory Terrestrial Species</td>
<td>Merops ornatus</td>
<td>Rainbow bee-eater</td>
<td>Listed overfly Marine area; Migratory: JAMBA.</td>
<td>Species or species habitat may occur within the area</td>
</tr>
<tr>
<td>Migratory Wetland &amp; Marine Species</td>
<td>Ardea alba (CAMBA &amp; JAMBA as Egretta alba)</td>
<td>Great Egret, White Egret</td>
<td>Listed overfly Marine area; Migratory: CAMBA, JAMBA.</td>
<td>Species or species habitat may occur within the area</td>
</tr>
<tr>
<td>Migratory Wetland &amp; Marine Species</td>
<td>Ardea ibis (CAMBA as Ardeola ibis, JAMBA as Bubulcus ibis)</td>
<td>Cattle Egret</td>
<td>Listed overfly Marine area, Migratory: CAMBA, JAMBA.</td>
<td>Species or species habitat may occur within the area</td>
</tr>
<tr>
<td>Migratory Wetland Species</td>
<td>Charadrius veredus</td>
<td>Oriental Plover, Oriental Dotterel</td>
<td>Listed overfly Marine area, Migratory: Bonn A2H6, JAMBA, ROKAMBA.</td>
<td>Foraging, feeding or related behaviour may occur within the area</td>
</tr>
<tr>
<td>Migratory Wetland Species</td>
<td>Glareola Maldivarum</td>
<td>Oriental Platincole</td>
<td>Listed overfly Marine area, Migratory: CAMBA, JAMBA, ROKAMBA.</td>
<td>Species or species habitat may occur within the area</td>
</tr>
<tr>
<td>Migratory Wetland Species</td>
<td>Rostratula australis / Rostratula benghalensis s. lat.</td>
<td>Painted Snipe</td>
<td>Listed overfly Marine area, Migratory: CAMBA.</td>
<td>Species or species habitat may occur within the area</td>
</tr>
<tr>
<td>Migratory Marine Birds</td>
<td>Apus pacificus</td>
<td>Fork-tailed Swift</td>
<td>Listed overfly Marine area, Migratory: CAMBA, JAMBA, ROKAMBA.</td>
<td>Species or species habitat may occur within the area</td>
</tr>
</tbody>
</table>

Feral animals that may occur within the project area include:
- Cat (Felis catus)
- Donkey (Equus asinus)
- Fox (Vulpes vulpes)
- Horse (Equus caballus)
- Pigs (Sus scrofa) – near permanent water sources.

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6 BONN - Bonn Convention
7 ROKAMBA - Republic of Korea – Australia Migratory Bird Agreement
2 Regional Geology

The Barkly Project covers Cambrian rocks of the Georgina Basin (Figure 6-7). The rocks of the Georgina Basin range in age from Late Proterozoic to Early Palaeozoic. To the north, they overlie Mid Proterozoic rocks of the South Nicholson and McArthur Basins and to the east they unconformably overlie Mid Proterozoic rocks of the Cloncurry-Mt Isa Block. Georgina Basin rocks overlie Arunta Block rocks on the southern margin of the Georgina Basin and to the west, Georgina Basin rocks unconformably overly basement composed of rocks of the ?Early Proterozoic Hatches Creek and Warramunga Groups and their equivalents (Cook, 1986).

The Georgina Basin rocks show complex facies relationships and no single stratigraphic column can be provided for the Georgina Basin (Smith, 1972; Cook 1986). Figure 6 shows the schematic stratigraphic relationship of formations across the Wiso Basin and Georgina Basin. Stratigraphic locations of phosphate occurrences are also identified (Khan et al., 2007). The Undilla Sub-Basin sequence has been sourced from Kruse and Radke (2008) and the southern Georgina Basin after Dunster et al (2007). Regional NTGS outcrop geology is shown in Figure 7.

Figure 6 is a useful guide but it should be noted that Rio Tinto geologists who worked at Wonarah considered the Wonarah Deposit occurred within the Gum Ridge Formation (Lilley, 2002). However, the Wonarah is identified here as occurring in the Wonarah Formation, as others consider that the phosphorite interval on the Alexandria-Wonarah basement high is more likely to be the basal Wonarah Formation (Kruse et al., 2010)

![Figure 6: Schematic west to east stratigraphic transect across Wiso and Georgina Basins (Khan et al., 2007)]
Figure 7: Barkly Project (Pre 2011 Relinquishment) Regional Geology Plan
Major phosphate deposition occurred in the Middle Cambrian (Templetonian), a period which corresponds to a major rise in sea level. It was the time of maximum phosphate deposition with up to 100m of siltstones, fine-grained sandstones, cherts and phosphorites being deposited around the eastern margins of the basin and adjacent to the Alexandria-Wonarah High (Cook, 1986).

Drillhole data indicates a consistent thickness of 141-151m for the Gum Ridge Formation across the Barkly Sub-basin, thinning to approximately 51m near the Wonarah basement high (Kruse et al. 2010). The formation consists of two successive marine limestone units, each underlain by a thin (8-10m) peritidal siliciclastic unit. Basal rocks consist of brecciated, brown-red dolomitic siliciclastic siltstone.

3 Local Geology

Outcrop within the Barkly Project is limited with much of the basement geology concealed beneath Tertiary and Quaternary sediments. The area is covered by extensive superficial deposits with loose blocks of carbonate rocks and pebbles of chert and pisolithic ironstone gravel.

Although no Proterozoic rocks outcrop in the area, by extrapolation, it is thought that the Cambrian succession may be underlain by the Warramunga Group (Noakes & Traves, 1954; Ivanac, 1954) in the west and by the Hatches Creek Group in the south and south-west (Smith, Stewart, & Smith, 1961). The depth to magnetic basement is approximately 800 feet (240m) near the Wonarah Telegraph Station (Jewell, 1960). Magnetic basement estimates in the western part of the project area is between 650-3700 feet (200 – 1100m) below surface.

The 2010 edition of the 1:250,000 Alroy map (Sheet SE53-15) shows a small amount of Gum Ridge Formation outcrops near the northern boundary of EL27198. The NTGS have collected a fossil sample NTGS4676⁸ (fossil sample reference) from this outcrop.

Anthony Lagoon Beds outcrop near the North West corner of EL27199 and straddle the boundary with EL27198. Small outcrops have also been mapped near the eastern margin of EL27199 and within the western portion of EL27197.

A number of small outcrops of Cainozoic ferricrete, calcrete, and alluvium have been mapped within EL27199.

EL27197 and EL27200 are both dominated by Cainozoic calcrete and unconsolidated colluvial and Aeolian sand and red earths.

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⁸ Details of NTGS4676 have not been obtained at present.
4 Previous Exploration

A review of open-file historic exploration reports (Source: NTDoR) was completed in the previous report period and is included here for reference. The historic report compilation revealed the Barkly Project tenements have been unexplored for phosphate.

Approximately six previous explorers have held exploration tenements overlying or partially overlapping the Barkly Project. Much of the area has never been held under granted tenement. The majority of exploration within the Barkly project area has been for diamonds (Ashton) with some copper-gold (CRA, Giants Reef, Kratos, Asian Minerals).

Continental Oil Company of Australia Ltd held title over parts of the Barkly Project for phosphate. Some drilling was completed but this work was not within the area now under Vale tenure.

Exploration activity on each of the historic tenements is summarised below:

AP2081
CR 1968-0016
Continental Oil Company of Australia Ltd
1968

The tenement was taken out to test for western extensions of known phosphatic units at Alroy. Four holes totaling 458ft were drilled and none were collared within Vale’s tenements.

AP2588
CR 1971-0041
Kratos Uranium N.L.
1970 to 1971

Kratos Uranium conducted a ‘campaign of aeromagnetic prospecting’ to locate Tennant Creek style mineralisation. Follow-up ground magnetic surveys downgraded targets.

EL1184
CRA Exploration Pty Limited, Australian Ore and Minerals Ltd
1978 to 1980

CRA explored for Tennant Creek style copper-gold mineralisation. An airborne magnetometer and spectrometer survey was flown. No significant radiometric anomalies were detected. Only one magnetic feature was identified but was not considered worthwhile drill testing.

EL1951
CRA Exploration Pty Limited, Australian Ore and Minerals Ltd
1979 to 1980

EL 1951 lay between Vale’s EL27197 and EL27200, but it did cover the gravity high and CRA targeted concealed Tennant Creek Style Copper-gold mineralisation. An airborne magnetometer and spectrometer survey was flown. No significant radiometric anomalies were detected. Two magnetic features were identified from the survey. One of the anomalies was followed-up with ground magnetics and subsequently drill tested (79ALD1 and 79ALD2).
A 50m spaced gravity survey was also completed.

Drilling intersected approximately 158m of calcareous sediments before intersecting basalt. The top of the basalt showed palaeo-weathering with moderate haematisation. No assay results were presented in reports.

**EL2043**  
**CR1980-0157, CR 1981-0125**  
**CRA Exploration Pty Limited**  
**1980 to 1981**

The target was Tennant Creek style copper-gold mineralisation. The EL was designed to cover the eastern extensions of a magnetic anomaly on EL 1951. An airborne magnetometer and spectrometer survey was flown. Ground magnetics and drilling were undertaken on the anomaly that was originally defined in EL 1951. Source of the anomaly was magnetite bearing metasediments.

The single drill hole which is collared outside Vale tenure recorded:

- **0 to 6m** Aeolian sand
- **6 to 24m** Clayey Siltstone
- **24 to 54m** Calcilutite
- **54 to 116.5m** No sample return (end of RC precollar)
- **116.5 to 149.9m** Cambrian limestone with minor sandy bands (start of coring)
- **149.9 to 180.3m** Antrim Plateau basalt
- **180.3 to 346.2m** Proterozoic sediments and metamorphics

Diamond core was assayed for Pb, Zn, Cu, Mn, Ag, Au and Co.

**EL4251**  
**CR 1985-0038, CR 1986-0068**  
**AOG Minerals Limited, Ashton Mining Limited, Aberfoyle Exploration Pty Limited, Australian Diamond Exploration N.L.**  
**December 1983 to 1986**

The target was kimberlite pipes.

9 gravel and 50 loam samples were collected and processed at Ashtons Perth Laboratory. Gravel samples were taken from trap sites in streams, where approximately 30 to 35kg of minus 4mm material was collected. Samples were processed at Ashton’s Perth laboratory where they were concentrated by Wilfley table and heavy liquid separation. The heavy liquid used was tetrabromoethane which has an SG of 2.96. Any apatite (SG 3.19) in the sample should at this stage go to the concentrate. Sizing and magnetic and electrostatic separation of the concentrates followed, which probably excluded any apatite. Concentrates were only observed for diamonds.
EL4254  
CR 1985-0039, CR 1986-0039  
AOG Minerals Limited, Ashton Mining Limited, Aberfoyle Exploration Pty Limited, Australian Diamond Exploration N.L.  
December 1983 to December 1985

The target was kimberlite pipes.  
Loam samples (>12 samples) were collected and processed in the manner of other loams collected by Ashton within the Georgina Basin.

No evidence of kimberlites was found.

EL4332  
CR 1986-0084  
AOG Minerals Limited, Ashton Mining Limited, Aberfoyle Exploration Pty Limited, Australian Diamond Exploration N.L.  
February 1985 to November 1985

The target was kimberlite pipes.  
65 loam samples were collected and processed as per other Ashton samples collected in the Georgina Basin.

No evidence of kimberlites was found.

EL4333  
CR 1986-0086

AOG Minerals Limited, Ashton Mining Limited, Aberfoyle Exploration Pty Limited, Australian Diamond Exploration N.L.  
February 1985 to November 1985

The target was kimberlite pipes.  
19 gravel and 35 loam samples were collected and processed as per other Ashton samples collected in the Georgina Basin.

No evidence of kimberlites was found.

EL4340  
CR 1985-0021, CR 1986-0090  
AOG Minerals Limited, Ashton Mining Limited, Aberfoyle Exploration Pty Limited, Australian Diamond Exploration N.L.  
December 1983 to December 1985

The target was kimberlite pipes.  
5 gravel and 47 loam samples were collected and processed as per other Ashton samples collected in the Georgina Basin.

No evidence of kimberlites was found.
EL4341
CR 1985-0022, CR 1986-0091
AOG Minerals Limited, Ashton Mining Limited, Aberfoyle Exploration Pty Limited, Australian Diamond Exploration N.L.
December 1983 to December 1985

The target was kimberlite pipes.
An initial 11 gravel and 35 loam samples plus a follow up 52 samples were collected and processed as per other Ashton samples collected in the Georgina Basin.

No evidence of kimberlites was found.

EL22231
CR 2002-0336
Giants Reef

Giants Reef explored for Tennant Creek style ironstone-related gold-copper deposits.

Work included a literature search, geological assessment and geophysical assessment. No physical work was conducted on the tenement.

EL23776, EL23779
CR 2005-0170
Asian Minerals Pty Ltd
December 2003 to November 2004

The target was Tennant Creek style copper-gold mineralisation beneath shallow cover. Targeting was based on recently released NTGS geophysics. Asian Minerals were unable to attract a joint venture partner and the tenements were relinquished.
5 Work Completed on Relinquished Area

Work completed by Vale on the relinquished area comprised:

- AAPA Certificate.
- Open file literature review; acquisition and reprocessing of geophysical data; and acquisition of NRETAS environmental data.
- Commissioned CSIRO to undertake a regional study of the Barkly Project area involving XRF analysis of water bore chip samples from historic water bore holes to assist phosphate horizon targeting.
- Helicopter-supported field mapping.
- Rock chip sampling and analysis (32 samples).
- Flora and fauna desktop study report.
- In-house depth to basement gravity modelling to assist first pass drill targeting.
- Regional geophysical basin modelling study by Mira Geoscience and drill targeting.
- Line and drill pad clearing.
- RC drilling – 3 holes for 480m and 160 composite samples.
- Rehabilitation.

5.1 Flora and Fauna Study

The Barkly Project Flora and Fauna Desktop Study Report dated May 2011 by Sustainability is attached as Appendix 1.

5.2 Geophysical Basin Modelling

Regional 3D Inversion Modelling of Gravity and Magnetic Data for Vale’s Georgina Phosphate Project was completed by MIRA Geoscience (Brisbane) in May 2011. This modelling study assisted phosphate targeting by generating detailed images of depth/basement, gravity and magnetics. A basement depth plan is shown at Figure 8 and geo-referenced TIF images are located in Appendix 2.

5.3 Rock Chip Sampling

A reconnaissance rock-chip sampling program was completed on the relinquished part of EL27197. Thirty-two (32) samples were collected. Sample locations are shown in Figure 9 and rock chip analytical data is contained in Appendix 3, along with additional rock-chip samples from the Barkly Project area. Lithologies observed included mainly carbonate lithologies (dominant light grey-light brown limestone) and very minor chert samples The samples were analysed at ALS, Townsville. No elevated phosphate results were recorded.
5.4 RC Drilling
Reverse Circulation (RC) drilling (VGRC015-017 3 holes for 480m and 160 samples) was completed by Kennedy Drilling (Kalgoorlie WA) in 2010. The drill rig used was a Schramm T685.

The drilling intersected carbonate (dolomitic) rich sequences, suggesting deep water facies.

No significant phosphate drill intercepts over 2% were recorded. The best result was 0.86% P (1.95% P₂O₅) from 168-171m in VGRC017.

A drill hole location plan is provided in Figure 10.

Drill hole data and assay results are located in Appendix 4.

5.5 Rehabilitation
Rehabilitation of the (3) 2010 drill pads/sumps/collars and access tracks on the relinquished area has been completed. Drill holes were plugged after each hole was drilled. Revegetation involved scarifying compacted surfaces and respraying topsoil (and its contained seedbank) over the disturbed surfaces. Any vegetation stockpiled during the clearing process was spread/placed on top of the topsoil to allow the seedbank to germinate naturally during the wet season.

6 Conclusion
The surrendered area was relinquished due to a lack of priority phosphate targets identified from geophysical modelling studies.
Figure 8: Barkly Project – Basement Depth Plan - Partial Surrendered Portion
Figure 9: Barkly Project – Rock Chip Location Plan – Partial Surrendered Portion
Figure 10: Barkly Project – Drill Hole Location Plan – Partial Surrendered Portion
7 References


APPENDIX 1

FLORA AND FAUNA DESKTOP STUDY REPORT

SUSTAINABILITY – MAY 2011
APPENDIX 2

GEOPHYSICAL BASIN MODELLING

GEO-REFERENCED TIF IMAGES
APPENDIX 3

ROCK CHIP DATA
APPENDIX 4

DRILL HOLE DATA AND ASSAY RESULTS
APPENDIX 5

PDF FILES FOR REPORT FIGURES