BARKLY PROJECT

NORTHERN TERRITORY

TENEMENTS EL27197, EL27198, EL27199, EL27200

COMBINED ANNUAL REPORT

FOR THE PERIOD ENDING 25 OCTOBER 2011

GROUP REPORTING NO. 135/09

Submitted by: Vale Exploration Pty Ltd
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Brisbane Qld 4000

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Date: 23 November 2011

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Vale Library
<table>
<thead>
<tr>
<th><strong>Title Holder</strong></th>
<th>Vale Australia EA Pty Ltd</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Operator</strong></td>
<td>Vale Exploration Pty Ltd</td>
</tr>
<tr>
<td><strong>Titles</strong></td>
<td>Exploration Licences 27197, 27198, 27199, 27200</td>
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<tr>
<td><strong>Project Name</strong></td>
<td>Barkly</td>
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<td><strong>Report Title</strong></td>
<td>Combined Annual Report for period ending 25 October 2011, Barkly Project, ELs 27197, 27198, 27199, 27200</td>
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<td><strong>Group Reporting No.</strong></td>
<td>GR 135/09</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>
</tr>
<tr>
<td><strong>Date of Report</strong></td>
<td>23 November 2011</td>
</tr>
<tr>
<td><strong>250 000 K mapsheet</strong></td>
<td>Tennant Creek and Alroy</td>
</tr>
<tr>
<td><strong>100 000 K mapsheet</strong></td>
<td>Balmore, Barkly, Dalmore, Favenc, Frewena, Playford</td>
</tr>
<tr>
<td><strong>Contact details</strong></td>
<td>Vale Exploration Pty Ltd</td>
</tr>
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</tr>
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<td><a href="mailto:Lynne.odonnell@valeaustralia.com.au">Lynne.odonnell@valeaustralia.com.au</a></td>
</tr>
</tbody>
</table>
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Executive Summary

This is the second combined annual report for ELs 27197, 27198, 27199, 27200, Barkly Project for the period ended 25 October 2011. Year 2 50% relinquishments were lodged for all four tenements. 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 Barkly in 2011 consisted of a Flora and Fauna Desktop Study Report, geophysical interpretive targeting, line clearing and reconnaissance reverse circulation drilling and drillsite rehabilitation. A Geophysical Basin Modelling Study was completed over Vale’s Georgina Project, including Barkly, to gain a better understanding of the Georgina Basin and assist with phosphate drill targeting. Nine (9) holes for a total 993m and 525 composite drill samples were completed on ELs 27198 and 27199. Drilling was completed on ELs 27197 and 27200 in the previous reporting year and the 2010 assay results are provided in this report. Assay results for the 2011 RC drilling will be available in the next reporting period. Further drill targeting using RC drill results and geophysical modelling studies is planned for the 2011-2012 reporting period.
I  Introduction

1.1 Location and Access

The Barkly Project is located approximately 66 km east of Tennant Creek (Figure 1) and 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, Favenc 5958, Frewena 5959 and Playford 6059 1:100,000 map sheets. The 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 (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 under Authorization 0554-01. 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 subjected to Year 2 50% reductions at the end of the reporting period. Figures 2 and 3 show the relinquished areas.

<table>
<thead>
<tr>
<th>Tenement Number</th>
<th>Holder</th>
<th>Area (Blocks) as at 25.10.11</th>
<th>Date of Grant</th>
<th>Date of Expiry</th>
<th>Expenditure (Year 2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>EL27197</td>
<td>Vale Australia EA Pty Ltd</td>
<td>181</td>
<td>26/10/2009</td>
<td>25/10/2015</td>
<td>$70,000</td>
</tr>
<tr>
<td>EL27198</td>
<td>Vale Australia EA Pty Ltd</td>
<td>234</td>
<td>17/09/2009</td>
<td>16/09/2015</td>
<td>$80,000</td>
</tr>
<tr>
<td>EL27199</td>
<td>Vale Australia EA Pty Ltd</td>
<td>192</td>
<td>17/09/2009</td>
<td>16/09/2015</td>
<td>$65,000</td>
</tr>
<tr>
<td>EL27200</td>
<td>Vale Australia EA Pty Ltd</td>
<td>99</td>
<td>26/10/2009</td>
<td>25/10/2015</td>
<td>$60,000</td>
</tr>
</tbody>
</table>

Total Expenditure Commitment: $275,000
Figure 2: EL27197, EL27200 – Relinquished Area
Figure 3: EL27198, EL27199 – Relinquished Area
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 Traditional Owners of EL 27197 and EL 27200 was organized by the Northern Land Council (NLC) and held in Tennant Creek on 1 December 2009.

Aboriginal Areas Protection Authority (AAPA) Certificate C2010/0143, which covers tenements EL27198 and EL27199, and AAPA Certificate C2010/0144 which covers tenements EL27197 and EL27200 were obtained from the AAPA on 17 June 2010 and 22 June 2010 respectively.

Copies of the AAPA Certificates were provided in the 2010 Combined Annual Report.

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 the Barkly East project area (EL27197, EL27200). The NLC representative and Traditional Owners were satisfied with all proposed ground disturbance and a good relationship with the NLC and Traditional Owners has been established.
Table 2: Barkly Project 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 3: Climate Statistics – Tennant Creek Airport\(^1\) (BOM 2009)

<table>
<thead>
<tr>
<th></th>
<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>
</tr>
</thead>
<tbody>
<tr>
<td>Mean Maximum</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>
<td>37.3</td>
</tr>
<tr>
<td>Temperature °C</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Highest</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>
<td>45.4</td>
</tr>
<tr>
<td>Temperature °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>
<td>6.3</td>
</tr>
<tr>
<td>Mean days ≥ 40 °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>
<td>24.9</td>
</tr>
<tr>
<td>Mean Minimum</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>
<td>15.7</td>
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<tr>
<td>Temperature °C</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Lowest</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean Rainfall</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>
<td>67.6</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>
<td>7.6</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, silstone 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).

### 1.6.1 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><em>Acacia nilotica</em></td>
<td>Prickly acacia</td>
<td>Barkly Highway</td>
<td>Occurrences</td>
</tr>
<tr>
<td><em>Parkinsonia aculeata</em></td>
<td>Parkinsonia</td>
<td>Lake Sylvester (further north)</td>
<td>Infestation</td>
</tr>
<tr>
<td><em>Prosopis sp</em></td>
<td>Mesquite</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

² Figure 3 Produced with Digital Vegetation Mapping data purchased from NRETAS October 2009.
Figure 4: Barkly Project – Vegetation Plan
1.6.2 Fauna

A search of NRETAS\(^3\) 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>Table 5: Vulnerable Fauna Species Recorded within the Project Area</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Species Name</strong></td>
</tr>
<tr>
<td>-------------------</td>
</tr>
<tr>
<td><em>Macrotis lagotis</em></td>
</tr>
<tr>
<td><em>Ardeotis australis</em></td>
</tr>
<tr>
<td><em>Melanodryas cucullata</em></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></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>Table 6: Threatened Species (Protected Matters Search tool, 2009)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Species Name</strong></td>
</tr>
<tr>
<td>-------------------</td>
</tr>
<tr>
<td>Birds</td>
</tr>
</tbody>
</table>

---

3 NRETAS - NT Department of Natural Resources, Environment, the Arts and Sport
4 Environmental Protection and Biodiversity Conservation Act 1999
5 Territory Parks and Wildlife Conservation Act
Figure 5: Barkly Project – 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 A2H, 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.

---

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 (Figures 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 overly 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 7 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 7: Schematic west to east stratigraphic transect across Wiso and Georgina Basins (Khan et al., 2007)](image-url)
Figure 7: Barkly Project – 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 pisolith 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 NTGS4676\(^8\) (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 458 ft 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:

<table>
<thead>
<tr>
<th>Depth Range</th>
<th>Sample Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 to 6m</td>
<td>Aeolian sand</td>
</tr>
<tr>
<td>6 to 24m</td>
<td>Clayey Siltstone</td>
</tr>
<tr>
<td>24 to 54m</td>
<td>Calcilutite</td>
</tr>
<tr>
<td>54 to 116.5m</td>
<td>No sample return (end of RC precollar)</td>
</tr>
<tr>
<td>116.5 to 149.9m</td>
<td>Cambrian limestone with minor sandy bands (start of coring)</td>
</tr>
<tr>
<td>149.9 to 180.3m</td>
<td>Antrim Plateau basalt</td>
</tr>
<tr>
<td>180.3 to 346.2m</td>
<td>Proterozoic sediments and metamorphics</td>
</tr>
</tbody>
</table>

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.
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 Exploration Previous Reporting Period

Work completed by Vale during the previous reporting period included:

- AAPA Register search and AAPA Certificates; meeting with NLC and Traditional Owners in Tennant Creek.
- Open file literature review; acquisition and reprocessing of geophysical data; and acquisition of NRETAS environmental data.
- CSIRO commissioned to undertake XRF analysis of 75 water bore chip samples from 4 historic water bore holes within Barkly.
- Review of regional water bore analyses to assist in phosphate horizon targeting.
- Helicopter-supported field mapping.
- Rock chip sampling – 175 samples on ELs 27197, 27198, 27199 and 27200.
- In-house depth to basement gravity modelling to assist first pass drill targeting.
- 7 Reverse Circulation (RC) drill holes (VGRC015-021) for 1080m and 399 composite drill samples – 6 holes for 930m on EL27197; and 1 hole for 150m on EL27200.
- 22.5 line km of access track; 7 drill pads and 7 sumps – total ground disturbance 7.31 ha and rehabilitation pending next reporting period.

6 Exploration Current Reporting Period

Exploration in the current reporting period consisted of:

- Flora and Fauna Desktop Study.
- Geophysical modelling and drill targeting.
- Line and pad clearing – 62 line km access tracks (18.6 ha), 9 pads and 9 sumps (0.72 ha).
- RC Drilling (9 holes, 993m, 525 composite samples) and rehabilitation of drill sites.

| EL27198 | 7 holes | 731 metres | 387 drill samples |
| EL27199 | 2 holes | 262 metres  | 138 drill samples |

- Rehabilitation of drill pads, sumps and drill collars completed; access tracks pending next reporting period.

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

6.1 Geophysics

Geophysical basin modelling was completed by MIRA Geoscience (Brisbane). This modelling study assisted phosphate targeting by generating detailed images of depth/basement, gravity and magnetics. A report entitled ‘Regional 3D Inversion Modelling of Gravity and Magnetic Data, Georgina Project, Northern Territory’ accompanied this work and is attached as Appendix 2.
6.2 RC Drilling

Reverse Circulation (RC) drilling (VGRC073-081, 9 holes, 993m, 525 samples (Figure 8 Appendix 3) was completed by Kennedy Drilling (Kalgoorlie, WA). The drill rig used was a KD180 with 900cfm @ 350 psi onboard air coupled to a Sullair auxiliary (1150 cfm @ 350 psi) and Hurricane booster (700 psi).

The 2011 drilling was designed to follow up 2010 phosphate in drill-hole anomalism and test new targets generated from geophysical (magnetic, gravity, basement depth) interpretive studies.

The 2011 drilling program was completed in a safe and timely manner and all holes reached their target depth. Drilling conditions, sample recovery and quality and drilling rate of penetration (ROP) were of a satisfactory standard and drilling activities completed in a shorter timeframe than last year due to the use of a smaller, more mobile drilling rig, less support vehicles and shallower holes. Due to the remote nature of the terrain and lack of any existing tracks, a single east-west access track of 62 km length was cleared to access the 9 drill sites.

All holes were drilled vertical with a planned depth range of 100-140 metres, although several holes were stopped once interpreted Lower Cambrian (or older) underlying formations were encountered and were therefore considered to be no longer phosphate prospective.

This first pass reconnaissance drilling in the western part of the Barkly project area targeted geophysical basin depth targets along with subtle phosphate rock-chip samples collected in the 2010 reporting period. The regional drilling traverse revealed a sequence of dominant carbonate-rich (mainly dolomite-lesser limestone) rocks with minor chert and siltstone/sandstone units. Depth to fresh rock varied from 27-~70m. The dolomite logged consisted of a mainly grey-cream coloured uniform textured, massive fine-grained rock.

The most important units that relate to potential phosphate mineralisation are interpreted to be the siltstones and fine-grained sandstones (now quartzites) which rest conformably on the massive quartzite sandstone Meso Proterozoic basement rocks. The Barkly RC drilling recorded only minor siltstone/sandstone units.

The 2011 drill campaign included RC holes with a much shallower average depth (114m) than the 2010 RC drilling (154m). Apart from two holes completed in saprock, all the Barkly 2011 holes were stopped in a carbonate (dolomitic) lithology.

All 2010 drill assay results are located in Appendix 4. No 2011 assay results were received in the reporting period and a more detailed review of drilling data will be made once all drill-hole assay results have been received.
Figure 8: Barkly Project – 2011 Drill Hole Plan
6.3 New Disturbances

Vale cleared 62 line km (18.6 ha) of access track approximately 3 m wide and cleared 9 drill pads on which 9 sumps were excavated (total pad area 0.72 ha; individual pad size approximately 20m x 40m). The requested 50m x 25m area as described in the MMP in the case of a larger rig being used by the drilling contractors did not eventuate and as a smaller drill rig setup was used, a smaller drill pad size was cleared in the 2011 field season. The total ground disturbance for the Barkly Project for 2011 field season was approximately 19.3 ha. Rehabilitation of drill pads, sumps and drill collars was completed shortly after the drilling was completed in the reporting period.

6.4 Rehabilitation Completed

Rehabilitation of 2011 drill pads, sumps and collar was completed during the reporting period. Permission was granted by the NT DoR to keep the only access track to the 2011 drill holes open as results are not expected till late in the December 2011 quarter and more drilling would be planned early in the New Year if results indicate infill drilling is warranted.

As a rule, drill holes will be plugged after each hole is drilled. Access tracks will be ripped and topsoil respread at the end of each campaign, or where infill drilling is warranted, at the end of exploration activities.

Revegetation will involve scarifying compacted surfaces, and respreading topsoil (and its contained seedbank) over disturbed surfaces. Any vegetation stockpiled during clearing processes will then be spread/placed on top of the topsoil. The seedbank will be allowed to germinate naturally.
7 References


APPENDIX 1

BARKLY PROJECT FLORA AND FAUNA DESKTOP STUDY REPORT

SUSTAINABILITY – MAY 2011
APPENDIX 2

GEOPHYSICAL BASIN MODELLING REPORT

MIRA GEOSCIENCE – MAY 2011
APPENDIX 3

2011 DRILL HOLE DATA

DIGITAL COLLAR, SURVEY, LITHOLOGY
APPENDIX 4

2010 DRILL ASSAY RESULTS