Partial relinquishment report for the Brunchilly Phosphate Project

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Target Commodity:  Rock Phosphate

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Datum/Zone:  GDA94/ Zone 53

250K map sheets:  Helen Springs SE5310

100K map sheets:  Brunchilly 5760, Munkaderry 5860

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Contents

INTRODUCTION ....................................................................................................................................... 4
Location....................................................................................................................................................... 4
Access and Logistics .................................................................................................................................... 4
Climate ........................................................................................................................................................ 5
Physiography, Topography and Surface Hydrology .................................................................................... 5
Land Systems, Flora and Fauna ................................................................................................................... 6
HISTORY OF TENURE ............................................................................................................................... 7
EXPLORATION AND PROJECT RATIONALE ............................................................................................... 7
REPORTING UNDER THE MINERAL TITLES ACT ....................................................................................... 7
GEOLOGICAL SETTING ............................................................................................................................. 7
  Regional Geology ........................................................................................................................................ 7
  Local Geology .............................................................................................................................................. 8
AAPA REGISTER SEARCH ......................................................................................................................... 8
AREAS BEING RELINQUISHED.................................................................................................................. 8
SUMMARY
The Brunchilly Phosphate Project consists of three contiguous exploration licences, including EL 30222. The project originally covered a total area of 2,439 km$^2$ east of Bootu Creek Manganese Mine near Tennant Creek. Rum Jungle Resources undertook an AAPA Register search which resulted in the partial relinquishment of 35 sub-blocks from the project, including 14 sub-blocks from EL 30222. These blocks all contain AAPA sites and there has been no work on them.
INTRODUCTION
The Brunchilly Phosphate Project consists of three contiguous tenements: ELs 30222, 30223 and 30224.

Location
The Brunchilly Project is located approximately 90 km northeast of Tennant Creek at the nearest point and 235 km northeast of Tennant Creek at the northeastern-most corner. The Brunchilly project is located on the Helen Springs (SE53-10) 1:250,000 and Brunchilly 5760, and Munkaderry 5860 1:100,000 map sheets. Figure 1 is a map of the granted project ELs.

Access and Logistics
Access to the tenements is via the Stuart Highway and 72 km north from Tennant Creek (Figure 1), then east of Attack Creek for 26 km on the Brunchilly Station access road. Internal access is good.

Figure 1. Access to the Brunchilly Project area from Tennant Creek in the south.
**Climate**

The Brunchilly region is semi-arid with annual rainfall of 420.8 mm. The climate is characterised by distinct wet and dry seasons with the majority of rain falling between November and March (Figure 2). The predominant wind direction is from the east.

![Figure 2. Average rainfall for the project area.](image)

The average monthly relative humidity at 9 am (derived from data from 1957 - 2010) fluctuates between 35 to 65 percent with an average of 47 percent (Figure 3). The average monthly relative humidity at 3 pm is about 18 to 41 percent lower than the 9 am recorded humidity.

![Figure 3. Mean monthly relative humidity (%) at 9am (Red) and 3pm (Pink) at Brunette Downs, NT (BOM 2013).](image)

**Physiography, Topography and Surface Hydrology**

The Brunchilly Project consists of two physiographic divisions, differentiated on the basis of their topography and superficial deposits.

‘Sand plains’ with a superficial cover of red sand, supporting spinifex and low trees and shrubs occur in the westernmost third of the Brunchilly Project. These sand plains occur within the Brunchilly project to the east of the Ashburton and Whittington Ranges and the grassy downs to the east, on a surface sloping gently away from the ranges.
'Downs country, with swamps and lakes' occurs on the easternmost two thirds of the Brunchilly Project. The downs country is lower than nearby areas of sand plain and the ranges. It is largely covered by black soils supporting Mitchell and Flinders grass.

The project straddles both Davenport Murchison Ranges (DMR) and Mitchell Grass Downs (MGD) bioregions, which are further described below.

**Mitchell Grass Downs:** 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.

**Davenport Murchison Ranges:** 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).

Drainage within the tenements is dominated by ephemeral creeks - Attack Creek, Brunchilly Creek, Bullcamp Creek, Chow-Chowra Creek, Lirri-Lirri Creek, and Tooliganbilly Creek that drain into Tarrabool Lake to the north east or Lake Sylvester and Copella Lake to the east. The inner basin of Tarrabool Lake occurs outside the Project area (approximately 20 km northeast of the northeasternmost corner of tenement), however in exceptionally wet years the Tarrabool Lake floods and the extent of the flooded area (the outer basin) extends into the Brunchilly project area. During these exceptionally wet years, Lake Tarrabool joins with Eva Downs Swamp to the north (both outside the tenement area) and together they cover an area of over 2,750 km$^2$.

**Land Systems, Flora and Fauna**

**Flora**
Vegetation communities within the project area are Astrebla low tussock grassland, with smaller pockets of Chenopodium open chenopod shrubland and Eucalyptus low open woodland. *Parkinsonia aculeata*, an introduced weed, is known to occur within the north east portion of Lake Tarrabool and may also occur within the Brunchilly project area.

**Fauna**
No fauna species covered by the EPBC Act 1999 have been recorded in surveys completed within the Brunchilly Project.
In 1993, an exceptionally wet year when Lake Tarrabool was flooded, a single Yellow Chat (*Epthianura crocea*) was recorded outside of the tenement area (at Lat: -18.59855, Long: 134.84121).
The Australia Bustard (*Ardeotis Australis*) has been recorded within the Brunchilly Project tenemen.. 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.
Tarrabool Lake, which in exceptionally wet years overlaps the tenement area, is recognized as a Site of Conservation Significance by the NT Government as it supports internationally significant numbers of two significant waterbird species (the Australian pelican and the straw-necked ibis) and one shorebird, the black-winged stilt (Jaensch and Bellchambers 1997 as cited by NRETAS, 2009).
Major waterbird breeding events typically occur after flooding, then receding waters provide habitat for migratory shorebirds.
A search of the Australian Government Department of the environment, water, heritage and the areas website, ‘protected Matters Search tool’ identified 3 threatened species and 8 migratory bird species within a rectangular search area encompassing the tenements. 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 Tarrabool or within Lake Sylvester and Corella Lake further east. The search tool indicates that it is likely that the Mulgara is likely to occur within the tenement area, however it has not been recorded on the tenements to date.
HISTORY OF TENURE
EL 30222 was applied for on 13/12/2013 and granted 15/10/2014.

EXPLORATION AND PROJECT RATIONALE
The Brunchilly Project is being explored for Cambrian rock phosphate.

REPORTING UNDER THE MINERAL TITLES ACT
The Brunchilly phosphate Project has group technical reporting as GR355, but DME requires individual partial relinquishment reports.

GEOLOGICAL SETTING

Regional Geology
The Brunchilly Project is located in the Georgina Basin which contains the largest sedimentary rock phosphate deposits in Australia. The Georgina Basin includes rocks of Neoproterozoic to Devonian age, with Cambrian platform carbonate rocks dominating basin fill.
The Brunchilly Project covers a sequence of Cambrian sedimentary rocks of the Georgina Basin which unconformably overlie basement composed of rocks of the Early Proterozoic Hatches Creek and Warramunga Groups and their equivalents.
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 4 shows the schematic stratigraphic relationship of formations across the Wiso Basin and Georgina Basins. 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).

Figure 4. Schematic northwest to southeast stratigraphic transect across Wiso and Georgina Basins from Khan et al 2007. Several of the deposits and occurrences including Ammaroo deposit have been assigned to incorrect stratigraphy on the column.
**Local Geology**

The 1:250,000 Helen Springs geological map indicates that Anthony Lagoon beds outcrop in the NW corner of the Brunchilly Project as well as along a small section of Brunchilly Creek and in the northern and southern portions of EL 30222 and EL 30223. Gum Ridge Formation has also been mapped, to the east of Brunchilly Homestead. A small amount of Pts (possible Tomkinson Creek Beds – Hayward Creek Formation) has been mapped to the west of Gum Ridge Formation approximately 6 km to the north west of Brunchilly Homestead. Alluvial, aeolian and residual sediments of Cenozoic age blanket most of the remaining project area.

**AAPA REGISTER SEARCH**

An AAPA Register Search was undertaken by Rum Jungle Resources. All the sites identified within the project are being relinquished.

**AREAS BEING RELINQUISHED**

DME was informed of the reduction on 16/02/2015. It was actioned in STRIKE on 26/02/2015 and backdated to 25/02/2015. As shown below, 14 sub-blocks, are being relinquished from EL 30222, reducing it from 813.83 km$^2$ to 768.25 km$^2$ or 236 sub-blocks.

![Figure 5. Sub-block location map of the 14 sub-blocks being relinquished from EL 30222 in red.](image-url)