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MAJOR PROJECTS

Ammaroo Rock Phosphate Karinga Lakes Brine Potash

Titleholder:	Territory Phosphate Pty Ltd
Operator:	Rum Jungle Resources Ltd
Tenement Manager:	Complete Tenement Management
Tenement:	EL 30223
Project Name:	Brunchilly Phosphate
Report Title:	Partial relinquishment report for EL30223, Brunchilly Phosphate Project
Author:	John Dunster
Corporate Author:	Rum Jungle Resources Ltd
Target Commodity:	Rock Phosphate
Date of Report:	26/09/2015
Datum/Zone:	GDA94/ Zone 53
250K map sheet:	Helen Springs SE5310
100K map sheets:	Brunchilly 5760, Munkaderry 5860
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SUMMARY3
INTRODUCTION4
Location4
Access and Logistics4
Climate4
Physiography, Topography and Surface Hydrology5
Land Systems, Flora and Fauna6
HISTORY OF TENURE
EXPLORATION AND PROJECT RATIONALE7
REPORTING UNDER THE MINERAL TITLES ACT7
GEOLOGICAL SETTING7
Regional Geology7
Local Geology8
WORK ON RELINQUISHED PORTION
BLOCKS BEING RELINQUISHED9
CONCLUSIONS AND RECOMMENDATION

Contents

SUMMARY

The Brunchilly Phosphate Project consists of three contiguous exploration licences, including EL 30223. After an assessment of the previous drilling by Vale and an in-house waterbore study by Rum Jungle Resources, it has been decided that the southeastern portion of the Brunchilly Project area has been adequately tested for phosphate. Voluntary partial relinquishments are being made to both EL 30223 and EL 30224. Eighty blocks are being relinquished from EL 30223 taking it to 156 blocks.

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 then east of Attack Creek for 26 km on the Brunchilly Station access road (Figure 1). Internal access is good.



Figure 1. Access to, and in, the Brunchilly Project area. The area shown corresponds to the Helen Springs 250K sheet. Note the proximity to the sealed Stuart Highway (solid red), gas pipeline (purple) and the railway west of the project area.

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.

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).

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, and is peripheral to, the Davenport Murchison Ranges (DMR) and Mitchell Grass Downs (MGD) bioregions, which are further described below.

Mitchell Grass Downs: Lies over the Georgina and Dunmarra Basins containing sedimentary rocks which are overlain by soils with 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) may extend 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 km².

Flora and Fauna

<u>Flora</u>

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.

<u>Fauna</u>

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 tenements. 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.

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 (a small marsupial carnivore in the genus Dasycercus) is likely to occur within the tenement area, however it has not been recorded on the tenements to date.

HISTORY OF TENURE

EL 30223 was applied for on 13/12/2013 and granted 15/10/2014 as 250 blocks. On 25/02/2015, EL 30223 was voluntarily reduced by 14 blocks, taking it from 812.75 km² to 767.24 km² or 236 blocks. The relinquished blocks covered AAPA sites.

A further voluntary reduction of another 80 blocks is being reported here. This will take EL 30223 to 156 blocks or 62% of the original area at grant.

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 for the period 15/10 to 14/10, 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 Georgina Basin is contiguous with the Wiso Basin to the west.

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. 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. The stratigraphic assignation of several of the deposits is uncertain.

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 including almost all of the area being relinquished.

WORK ON RELINQUISHED PORTION

Rum Jungle Resources has undertaken an assessment of the previous work in the Brunchilly Project area and an inhouse waterbore study. The relevant previous work consists of:

- a 2007 NTGS waterbore study in which selected chip samples from only a few bores were analysed for P₂O₅ in the laboratory
- a CSIRO waterbore study conducted for Vale which used a handheld XRF to test waterbore chips for phosphate (reported as weight-corrected P) in a wider selection of bores
- percussion drilling of numerous holes by Vale
- a soil sampling program by Minemakers, shown as pink dots in Figure 5 below.

The red and yellow bores in the diagram below have >10% weight corrected P and between 5% and 10% weight corrected P (not P_2O_5) respectively from the CSIRO study.

The VG series of holes are the previous Vale drilling. In the assessment of Rum Jungle Resources, the Vale drilling density, depths and the lack economic phosphate intersected suggests that the potential of the southeast of the Brunchilly Project area has been adequately tested.

The black stars in Figure 5 are the waterbores used in Rum Jungle Resources' study. The main objectives of this study were to identify the depth to prospective stratigraphy relative to basement and relative to the standing water level. The previous NTGS and CSIRO studies had been purely geochemical and ignored the possibility that any phosphate present might be below the watertable and therefore very difficult, if not impossible, to mine.



Figure 5. Previous work in the Brunchilly Project area. The symbols are explained in the text above.

BLOCKS BEING RELINQUISHED

The eighty blocks being relinquished from EL 30223 are plotted below.

SE532405F	+ 242 SE532405G	SE532405H	SE532405J	SE532405K	SE532406F	SE532406G	SE532406H	SE532406J	SE532406K	SE532407F	SE532407G	SE532407H	SE532407J	5E532407K	SE532408F	SE532408G	SE532408H	SE532408J	SE532408K	SE532409F	SE532409G	SE532409H
SE532405L	SE532405M	SE532405N	SE5324050	SE532405P	SE532406L	SE532406M	SE532406N	SE5324060	SE532406P	SE532407L	SE532407M	SE532407N	SE5324070	SE532407P	SE532408L	SE532408M	SE532408N	SE5324080	No 5 SE532408P	Bore SE532409L	SE532409M	SE532409N
SE532405Q	SE532405R	SE5324055	SE532405T	SE532405U	SE532406Q	SE532406R	SE5324085	SE532406T	SE532406U	SE532407Q	SE532407R	SE532407S	SE532407T	SE332407U	SE532408Q	SE532406R	SE532408S	SE\$32408T	SE532408U	SE532409Q	SE5324098	/965524099
SE532405V	SE532405W	SE532405X	SE532405Y	EL30224 SE532405Z	SE532406V	SE532406W	SE532406X	SE532406Y	SE532406Z	SE532407V	SE532407W	SE532407X	SE532407Y	SE532407Z	SE532406V	SE532408W	SE532408X	SE532408Y	SE532408Z	SE532409V	SE532409W	SE532409X
SE532ATTA	SE532477B	SE532477C	SE532477D	SE532477E	SE532478A	SE5324788	SE532478C	SE532478D	SE532478E	SE532479A	SE532479B	SE532479C	252 SE532479D	SE532479E	25.3 SE532480A	SE532480B	SE532480C	SE532480D	SE532480E	SE532481A	SE532481B	SE532481C
6E532477F	SE532477G	SE532477H	SE532477J	SE532477K	SE532478F	SE532478G	SE532478H	SE532478J	SE532478K	SE532479F	SE532479G	8E532479H	SE532479J	SE532479K	SE532480F	SE532480G	SE632480H	SE532480J	SE532480K	SE532481F	SE532481G	SE532481H
SE532477L	SE532477M	SE532477N	SE5324770	SE532477P2	se632478L	SE632478M	SE532478N	SE5324780	SE532478P	SE532479L	SE532479M	BE532479N	SE5324790	SE532479P	SE532480L	SE532480M	SE532480N	SE5324800	SE532480P	SE532481L	SE532481M	SE532481N
SE532477Q	SE532477R	SE532477S	SE532477T	SE532477U	SE532478Q	SE532478R	SE532476S	SE532478T	se532478U	SE532479Q	SE532479R	SE5324795	SE532479T	SE532479U	SE532480Q	SE532480R	SE532480S	SE532480T	SE532480U	SE532481Q	SE532481R	SE532481S
SE532477V	SE532477W	SE532477X	8E532477Y	SE532477Z	SE532478V	SE532478W	SE532478X	SE532478Y	SE532478Z	SE532479V	SE532479W	SE532479X	No 15 Bo SE5324794	SE532479Z	SE532480V	SE532480W	SE532480X	SE532480Y	SE532480Z	SE532481V	SE532481W	SE532481X
SE532549A	SE532549B	SE532549C	SE532549D	SE532549E	SE532550A	SE532550B	SE532550C	SE532550D	SE532550E	SE532551A	SE532551B	SE532551C	SE532551D	8E532551E	SE532552A	SE5325528	SE532552C	SE532552D	SE532552E	SE532553A	SE532553B	SE532553C
58532546F	SE532549G	SE532549H	SE532549J	SE532549K	SE532550F	SE532550G	SE532550H	SE532550J	SE532550K	SE532551F	SE532551G	SE532551H	SE532551J	SE532551K	SE532552F	SE532552G	SE532552H	24.9 SE532552J	SE532552K	SE532553F	SE532553G	SE532653H
SE532549L	5E532549M	SE532549N	SE5325490	SE532549P	SE532550L 3	SE532550M	SE532550N	SE5325500	SE532550P	SE532551L	SE532551M	SE532651N	SE5325510	SE532551P	SE532552L	SE532552M	SE532552N	SE532552O	SE532552P	SE532553L	SE532553M	8E532553N
SE532549Q	SE532549R	SE532549S	SE532549T	kilome SE532549U	tres SE532550Q	SE532550R	SE532550S	SE532550T	SE532550U	SE532551Q	SE532551R	SE532551S	SE532551T	SE532551U	SE532552Q	SE532552R	SE532552S	SE532552T	SE532552U	SE532553Q	SE632553R	SE532553S
SE532549V	SE532549W	SE532549X	SE532549Y	SE5325492	SE532550V	SE532550W	SE532550X	SE532550Y	SE532550Z	SE532551V	SE532551W	SE532551X	SE532551Y	SE532551Z	SE532552V	SE532552W	SE532552X	3.2 SE532552Y	SE532552Z	SE532553V	SE532553W	2 86532653X

Figure 6. Block ID map of the area being relinquished from the Brunchilly Project outlined in pink, including 80 contiguous blocks from southeastern EL 30223.

CONCLUSIONS AND RECOMMENDATION

In the opinion of Rum Jungle Resources, the 80 blocks being relinquished from EL 30223 have little potential for economic grades of phosphate above the watertable.