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Contents

INTRODUCTION........................................................................................................................................4
LOCATION, ACCESS AND LAND USE.......................................................................................................4
  Location..................................................................................................................................................4
  Access and Logistics .............................................................................................................................4
  Climate ..................................................................................................................................................6
  Physiography, Land Systems, Flora and Fauna .....................................................................................7
  Land Use................................................................................................................................................7
  Aboriginal Sites of Significance .............................................................................................................8
  Heritage Sites .........................................................................................................................................8
  Mineral Titles Act Reporting ................................................................................................................8
  Mining Management Act ......................................................................................................................8
  WorkSafe..............................................................................................................................................9
HISTORY OF TENURE ................................................................................................................................9
EXPLORATION AND PROJECT RATIONALE ........................................................................................9
GEOLOGICAL SETTING ..........................................................................................................................9
  Regional Geology ................................................................................................................................9
  Local Geology and Prospectivity ..........................................................................................................12
RESOURCES ...........................................................................................................................................12
AREAS SURRENDERED ..........................................................................................................................12
WORK ON SURRENDERED ELs ..........................................................................................................13
FINAL EXPENDITURES 18/01/2014 to 20/10/2014 ...............................................................................14
CONCLUSION AND RECOMMENDATIONS .........................................................................................15
SUMMARY
The Ammaroo Phosphate Project is located 240 km southeast of Tennant Creek. The project area contains the 40 km long, billion-tonne Ammaroo Phosphate Deposit which is currently Australia’s largest JORC rock phosphate resource, the satellite Ammaroo South resource, the Rockhole prospect, and, as yet untested, greenfields potential in the east. The overall Ammaroo Phosphate Project prefeasibility has been announced. This report describes the final surrender of five ELs (EL 26196, EL 28978, EL 28979, EL 28980 and EL 29267) that were drilled during 2013 as part of reconnaissance phosphate exploration between the Ammaroo Resource and the railway. During the life of these ELs, 15 RC holes for 667 m and 127 aircore holes for 6,314.5 m were drilled at nominally 1 km spacing. The maximum hole depth was 78 m. Of the 142 holes, eight were on areas previously relinquished earlier in 2014. 1,833 samples were assayed and the highest phosphate was only 0.81% P₂O₅. All the ELs surrendered have been adequately drill tested as best was possible within the constraints imposed by CLC cultural exclusion zones and to the maximum prospective depths achievable with the rigs used. No significant phosphate or further leads were found. Admissible expenditures for the period 18/01/2014 to 20/10/2014 total $42,619 across the five ELs. Non-admissible compensation payments made to the CLC in this period were in excess of $30,000.
INTRODUCTION
The Ammaroo Phosphate Project tenements are located 280 km northeast of Alice Springs and 240 km southeast of Tennant Creek, on the Barrow Creek, Elkedra, Bonney Well and Frew River 1:250,000 mapsheets. Rum Jungle Resources has been exploring for Cambrian rock phosphate in this area since 2009 resulting in the discovery of Barrow Creek 1 deposit (on EL 25184) and the Ammaroo South (on EL 25185). Rum Jungle Resources also acquired the Arganara Phosphate deposit, which is the eastern part of Barrow Creek 1, by taking over Central Australian Phosphate. The flagship deposits have been combined into Australia’s largest rock phosphate resource now called Ammaroo Phosphate and the satellite Ammaroo South deposit has been elevated to Inferred Resource status with surrounding defined exploration potential.

LOCATION, ACCESS AND LAND USE

Location
ELS 26196, 28978, 28979, 28980 and 29267 were located in the central-western part of the Ammaroo Phosphate Project (Figure 1). The surrender of these ELs is part of a greater round of voluntary partial reductions and surrenders across the entire western two-thirds of the project area.

Access and Logistics
Access to the project area is via the sealed Stuart Highway and the partly sealed Plenty and unsealed Sandover Highways from the south and the Taylors Road / Murray Downs road from the north (Figure 2). Construction of

Figure 1. The Ammaroo project area showing only those surrenders and partial relinquishments in this round that have been actioned by DME to 21/10/2014. The ELs that are the subject of this report are labelled in red. The black polygons are the defined JORC resources.
Rum Jungle Resources’ exploration tracks and line clearing are generally done by the local pastoralist or a Tennant Creek based earthmoving contractor. The 20-person Rum Jungle Resources’ Ammaroo base camp and fly-camps are used for exploration. Bores are used for drinking water. A medical clinic is located at the Ampilatwatja Aboriginal Community. Bulk fuel is carted from Alice Springs on an as-needs basis. The nearest airstrips are at Ampilatwatja and Ali Curung. The Rum Jungle Resources’ Ammaroo base camp has an emergency helipad and JetA1 and AvGas.

Figure 2. Access to the Ammaroo Project area from Alice Springs in the south and Tennant Creek in the north. The ELs being surrendered in this report are labelled in red.
Climate

The climate is described as arid tropical by Baker et al 2005. The year is notionally divided into two main seasons, a short, hot summer featuring the bulk of the annual rainfall and a longer mild to cold and dry winter. These two dominant seasonal patterns are separated by short (1-2 months) transitional periods. The summer rains are somewhat influenced by the monsoonal rain patterns from the north, particularly cyclones which cross the Western Australian coastline.

Rainfall figures over a 30 year period (1981 – 2010) indicate an annual average rainfall of 383 mm (BOM 2012). However, rainfall is highly variable and unpredictable and annual records range from 86.4 mm to 914 mm. As shown below, much of 2010 and the start of 2011 were atypically wet while the rainfall for 2012 was more typical (Figure 3).

![Figure 3. Average rainfall for the project area.](image)

The average monthly relative humidity at 9 am (derived from data from 1988 - 2010) fluctuates between 31 to 52 percent with an average of 42 percent (Figure 4). The average monthly relative humidity at 3 pm is about 11-21 percent lower than the 9 am recorded humidity.

![Figure 4. Mean monthly relative humidity (%) at 9am (Green) and 3pm (Orange) at Ali Curung, NT (BOM 2013).](image)

The mean monthly maximum and minimum temperature over a 30 year period (1981 – 2010) indicate that the summer temperatures can fluctuate between 21 and 38 degrees Celsius and the winter temperatures can flux
between 7 and 27 degrees Celsius. Sub-zero temperatures occur occasionally during July and August and there have been instances of surface water freezing at night. Figure 5 shows the mean monthly maximum and minimum temperatures recorded at Ali Curung.

Figure 5. Mean maximum (red) and minimum (blue) monthly temperatures (°C) at Ali Curung, NT (BOM 2013).

Physiography, Land Systems, Flora and Fauna

Figure 1 (previous) shows the physiography. The project is located in the Tanami Bioregion south of the Davenport Ranges. This bioregion is comprised mainly of red sand plains with underlying rock strata occasionally exposed as hills and ranges. The sand plains are vegetated with mixed shrublands of Acacia, Eucalyptus or Hakea over Triodia hummock grasslands. On the ranges, Acacia shrublands occur over hummock grasses. This bioregion contains many plant taxa that are endemic to the region or the Northern Territory and several flora and fauna species that are of conservation significance.

Using the system devised by Perry, the area contains two major land systems; the Alinga and Singleton. The Alinga Land System can generally be described as a system of undulating plains interspersed by low rounded ridges with shallow stony soils, red earths and red clayey sands. The land system is dominated by Acacia aneura (Mulga) or Acacia georginae (Gidgee) woodlands over short grasses and forbs. On shallow stony soils, sparse shrublands occur over Triodia sp (Spinifex). The Singleton land system includes red sands forming undulating plains and sand rises, separated by moderately wide, flat swales. Alluvial flats and drainage floors may also be present. Vegetation is dominated by sparse shrublands over Triodia (Spinifex), with Acacia woodlands also being present.

The project has been the subject of several baseline fauna and flora surveys commissioned by Rum Jungle Resources. These, a Threatened Species Report, and a report on weed species have been provided with MMPs and are not repeated here. These topics are dealt with even more comprehensively in the NOI.

Land Use

The area is sparsely settled. The largest permanent habitations are the indigenous communities at Ampilatwatja (population approx. 500) and Ali Curung (population quoted variously as 960 or 535 of which over 95% are Indigenous persons). The dominant Aboriginal languages spoken are Warlpiri and Alyawarr with English as a second or third language.

The ELs in this report are located on Murray Downs and Ammaroo pastoral leases. The area supports an active beef cattle industry and stocking numbers vary seasonally. Cattle are generally not seen near the Ammaroo Phosphate Resource because of a lack of both surface and ground water. In contrast, Ali Curung has irrigated market gardens using the plentiful groundwater there.
Aboriginal Sites of Significance
An AAPA register search was undertaken before Rum Jungle Resources began work on ELs in the Ammaroo Project.

EL 26196 was covered by a CLC agreement with Spinifex Uranium which Rum Jungle Resources has continued to honour.

EL 28978, EL 28979 and EL 29280 were part of the Rum Jungle Resources Murray Downs agreement with the CLC executed in 2013.

EL 29267 was included in a newly renegotiated agreement signed in 2014.

All the ELs being surrendered have numerous CLC sites of cultural significance within them, bordering them, or impinging upon them. The exact details of these areas cannot be disclosed under the terms of the agreements.

The CLC agreements also provide for monetary compensation to the CLC and Traditional Owners in proportion to the exploration expenditure. The most recent CLC on-country meeting, dealing with broader Ammaroo Project, was held with Traditional Owners on 03/10/2014 (Figure 6).

Heritage Sites
A search of the NT Heritage Register held by NRETAS shows no Declared Heritage Sites in the area covered by this report.

Mineral Titles Act Reporting
All the ELs reported on here were part of reporting group GR055 under the Mineral Titles Act and as such, this is a combined surrender report.

Mining Management Act
The NT Mining Management Act (MMA) allows for different reporting groups to the Mineral Titles Act (MTA). Under the MMA, all the ELs reported on here were part of the amended Ammaroo Authorisation 609-04.
**WorkSafe**

As part of an NT-wide move by Worksafe to improve its monitoring and inspections of exploration and mining projects, Worksafe required Rum Jungle Resources to redo its Safety Management System and update its Risk Management Plans for each project including Ammaroo. Consultants Switched on to Safety were engaged to completely update Rum Jungle Resources WHS&E. The most recent Worksafe inspection of the Ammaroo project was undertaken in March 2014.

**HISTORY OF TENURE**

EL 26196 was granted on 22/07/2008, but for only five years. It was acquired from Spinifex Uranium Pty Ltd in March 2012 in exchange for the issue of up to 2,000,000 shares in Rum Jungle Resources Ltd. The deal also gave Spinifex Uranium a per tonne royalty on any direct shipping phosphate rock or beneficiated phosphate rock found. EL 26196 was halved from the original 1,053 km$^2$ to 528.03 km$^2$ on 22/07/2013. It was renewed 30/08/2013 until 21/07/2015, then reduced again to 147 sub-blocks or 470.41 km$^2$ on 26/08/2014.

EL 28978 was granted to Rum Jungle Resources on 11/04/2012 for six years. It covered 224.1 km$^2$ or 70 sub-blocks at grant. It was partially reduced earlier in 2014 to 51 sub-blocks or 163.26 km$^2$.

EL 28979 was applied for at the same time as the above EL but was actually granted earlier, on 06/03/2012 for six years. It originally covered only 127.96 km$^2$ or 40 sub-blocks. It was partially reduced earlier in 2014 to 36 sub-blocks or 115.16 km$^2$.

EL 28980 was applied for on 29/08/2011 and granted 11/04/2012 over 54 sub-blocks or 172.75 km$^2$. It had not been reduced prior to surrender.

EL 29267 was applied for on 12/12/2011, granted on 03/08/2012 as 12 sub-blocks or 38.38 km2. It was halved to 6 sub-blocks or 19.19 km$^2$ earlier in 2014.

The surrenders being reported here were applied for on 13/10/2014, actioned by DME in TIS on 22/10/2014, and back-dated to 20/10/2014.

**EXPLORATION AND PROJECT RATIONALE**

The Ammaroo Project is being explored for rock phosphate, principally within the Arthur Creek Formation which hosts the Ammaroo Phosphate Resource and the Ammaroo South deposit. Exploration is directed at locating phosphate where it is shallow (low strip ratios), not entirely weathered (predictable rock properties amenable to mining), and highest grade and thickest (palaeo-coast and potentially draped over palaeo-highs). Rum Jungle Resources’ approach, which has worked successfully to date, is to initially undertake reconnaissance RC or air core drilling on existing tracks and fences. Samples are analysed in the field with a handheld XRF and potential phosphate is sent for laboratory analysis. Depending on success, follow-up drilling usually involves cleared drill lines and/or grid RC drilling.

Since the discovery of economic grades of phosphate in 2010, Rum Jungle Resources has moved to rapidly prove them up to JORC 2012 standard including a significant component in the Measured category. The company has also completed Scoping and Prefeasibility Studies.

**GEOLOGICAL SETTING**

**Regional Geology**

The Ammaroo 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 southern Georgina Basin is contiguous with the Wiso Basin to the west (Figure 7).
Figure 7. Rum Jungle Resources and subsidiaries phosphate projects. The regional geological setting shows the Ammaroo Phosphate deposit on the northern “shore” of the connection between the southern Georgina Basin in NT and the Wiso Basin. Rum Jungle Resources has no holdings in Queensland portion of the Georgina Basin (not shown).

The southern Georgina Basin includes a thick sequence of Cambrian-Ordovician sediments, deposited within the Dulcie Trough and on the adjoining Elkedra Shelf. Work by previous explorers and NTGS identified an extensive area of shelf-facies marine carbonate and clastic sediments of the Middle Cambrian Arthur Creek Formation within the southern Georgina Basin (Figure 8,9). This area is prospective for sedimentary phosphate mineralisation.
Figure 8. Simplified Cambrian lithostratigraphy of the southern Georgina Basin, from NTGS.

Figure 9. Regional geological setting showing simplified geology from NTGS. The northern-most edge of pale pink unit is the target stratigraphy.

Cambrian sediment outcrop is generally restricted to the central north of the project area, along the flanks of the Davenport Range. Several formations contain very similar carbonate and recessive shale units that can be very difficult to tell apart without palaeontology and some published maps show incorrect formation assignation. Indeed, the outdated published Elkedra 250K map shows the Arthur Creek Formation as being partially laterally equivalent to the Chabalowe Formation and partially underlying it, whereas the actual Chabalowe Formation is laterally equivalent to the younger Arrin thrunga Formation not the Arthur Creek Formation. The Chabalowe Formation can directly and conformably overlie the Arthur Creek Formation, but they are distinctly different ages, and this should be the relationship on the Elkedra mapsheet. The former Errarra Formation shown on published maps is now recognised as Red Heart Dolostone. In addition, it has recently been recognised that the so-called Thorntonia Limestone mapped over large areas of the Northern...
Territory is actually the older Hay River Formation and the former name should be restricted to its type area in Queensland. This change is yet to be reflected on any NT maps or publications.

Alluvial, aeolian and residual sediments of Cenozoic age blanket most of the remaining project area

**Local Geology and Prospectivity**

Within the overall project area, the Cambrian lithostratigraphy of the southern Georgina Basin includes units of the Shadow and Narpa Groups, of which two units are known to be phosphatic:

- **mid-Cambrian Thorntonia Limestone (now Hay River Formation)** – a limestone and dolostone unit (rarely containing a localised black shale) with phosphorite beds
- **mid-Cambrian Arthur Creek Formation** – deep-water anoxic organic-rich shales overlain by shallow-water aerobic calc- and dolo-siltstones with phosphorite beds

To date, the Thorntonia Limestone (Hay River Formation) phosphate in the study area is thought to be inferior to that in the Arthur Creek Formation in Rum Jungle Resources’ project area. In the opinion of Rum Jungle Resources, reports of phosphate in the Chabalowe Formation are erroneous and reflect the mismapping on published maps (see discussion above).

Drilling within the project area indicates that the Arthur Creek Formation target stratigraphy generally contains two distinct facies:

- an upper aerobic facies consisting of grey to brown siltstones, with minor brown chert bands or lenses; and
- a lower anaerobic facies consisting of dark green to black siltstones, with minor black chert bands or lenses.

The upper facies is the phosphate target and, where it is present, the lower facies serves as economic basement.

Other than patches of putative Chabalowe Formation and rare outcrop of Proterozoic basement in the Ilbumric Syncline, there is negligible Cambrian rock outcrop in the ELs being surrendered. Almost all the area is under Cenozoic cover.

**RESOURCES**

**Main Ammaroo Resource**

The current JORC 2012 resource for the main Ammaroo Project is over a billion tonnes at 14% P₂O₅ using a 10% cut-off. The pre-feasibility study for the project has been released.

**Ammaroo South Resource**

Ammaroo South is a satellite resource on EL 25185 approximately 70 km southeast of the main Ammaroo deposit. It is a JORC 2012 Inferred phosphate resource estimated at 70 Mt at 13% P₂O₅ using a 10% cut-off.

**AREAS SURRENDERED**

As shown below, the ELs being surrendered are all contiguous, except EL 29267.
WORK ON SURRENDERED ELs

During the life of the ELs, 15 RC holes for 667 m and 127 aircore holes for 6,314.5 m were drilled at nominally 1 km spacing. The maximum depth was 78 m. Of the 142 holes, eight were on areas previously relinquished earlier in 2014.
In all, 1,833 assays were conducted by Bureau Veritas using various combinations of:

- **IC4**: total fusion and analysis of majors
- **IC4M**: Whole rock analysis by total fusion with majors by ICPOES and traces by ICPMS
- **IC4P**: Whole rock analysis by total fusion and analysis of majors.

The maximum assay from any hole was 0.81% P₂O₅.

After these disappointing results, these five ELs were only retained for monitoring of rehabilitation and pending the results of 2014 drilling on adjacent ELs. When the 2014 drilling also failed intersect any significant phosphate, a major rationalisation of titles in the northwestern Ammaroo Project was begun. The surrenders reported here are the first of many surrenders and partial reductions.

During the period covered by the expenditures reported below, only rehabilitation monitoring, data compilation, desktop review and report writing was undertaken on ELs 26196, 28978, 28979, 28980 and 29267.

**REHABILITATION**

All rehabilitation of these ELs has been completed. DME are yet to acknowledge this.

**FINAL EXPENDITURES 18/01/2014 to 20/10/2014**

Admissible expenditures for the period 18/01/2014 to 20/10/2014 total $42,619 across the five ELs. Non-admissible compensation payments made to the CLC in this period were in excess of $30,000. Other non-admissible expenditures were Titles Agent’s fees and legal fees associated with the now aborted transfer of
these titles into a subsidiary company name and the work associated with assessment of stamp duty. Individual expenditure reports for each EL for the period 18/01/2014 to 20/10/2014 accompany this report.

Costs of the production of this report and its associated data exports were not claimed since they were after surrender.

CONCLUSION AND RECOMMENDATIONS
All the ELs being surrendered have been adequately drill tested as best was possible within the constraints imposed by CLC cultural exclusion zones and the depths achievable by the rigs used. No significant phosphate was detected.