Partial relinquishment report for EL 24987, Karinga Lakes Potash Brine Project
## Contents

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>LOCATION, ACCESS AND LAND USE</td>
<td>4</td>
</tr>
<tr>
<td>HISTORY OF TENURE, JOINT VENTURES AND DME ADMINISTRATION</td>
<td>5</td>
</tr>
<tr>
<td>EXPLORATION AND PROJECT RATIONALE</td>
<td>5</td>
</tr>
<tr>
<td>JORC RESOURCE</td>
<td>6</td>
</tr>
<tr>
<td>GEOLOGICAL AND HYDROLOGICAL SETTING</td>
<td>6</td>
</tr>
<tr>
<td>WORK BY PREVIOUS OPERATORS</td>
<td>8</td>
</tr>
<tr>
<td>AREA BEING RELINQUISHED</td>
<td>8</td>
</tr>
<tr>
<td>WORK BY RUM JUNGLE RESOURCES ON RELINQUISHED PORTION</td>
<td>9</td>
</tr>
</tbody>
</table>
SUMMARY

EL 24987 is one of several substantially contiguous ELs in Rum Jungle Resources Ltd’s Karinga Lakes Potash Project. Exploration is targeting potassium- and magnesium- sulfate-salts in subsurface salt lake brine to eventually produce potassium sulfate (SOP) and/or potassium magnesium sulfate (schoenite) fertiliser probably using solar evaporation ponds and flotation. The project has a JORC resource of potash brine. A scoping study of the Karinga Lakes Project is being undertaken by CICCC and GHD. The 24 eastern-most sub-blocks of EL 24987 have been voluntarily relinquished as part of renewal of the EL. This reduces the EL from 132 to 108 sub-blocks. There has been no on-ground work on the relinquished blocks. There is no evidence of potash brine being present in the area relinquished.
LOCATION, ACCESS AND LAND USE

EL 24987 is located 150 km southwest of Alice Springs on the Kulgera 1:250 000 and Ebenezer 1:100 000 map sheets. It is on Erldunda and Lyndavale Perpetual Pastoral Leases which run cattle. Temperatures can reach extremes of freezing cold nights in winter and days above 40°C in summer. Rain is infrequent and largely unpredictable. Access to EL 24987 is from the Lasseter Highway which runs east-west through the project area (Figure 1). The EL is serviced by numerous station tracks and exploration tracks maintained by Rum Jungle Resources (Figure 2). Mount Ebenezer Station and roadhouse was used as a logistic base before a temporary transportable “donga” camp was established. This camp serviced the project until it was removed in 2014. Although the lakes on EL 24987 are, in general, a lot drier than the lakes further west towards Curtin Springs, lake access for the overall project requires specialist equipment. It was necessary to purchase tracked AWD amphibious vehicles and a trailer with a ground footprint of less than one psi. Drilling contractors used hovercraft to move personnel. Helicopter support and equipment lift have also been used extensively throughout the duration of exploration.

Figure 1. Location map of EL 24987 along with other contiguous potash joint venture tenements to the north. The boundary between Lyndavale Station in the west and Erldunda Station in the east corresponds to the north-south black line east of Mygoora Bore.
HISTORY OF TENURE, JOINT VENTURES AND DME ADMINISTRATION

EL 24987 is one of several ELs in Rum Jungle Resources’ Karinga Lakes Potash Project which formerly included a JV under Rum Jungle Resources’ operatorship as well as ELs held and operated wholly by Rum Jungle Resources. EL 24987 was applied for on 11/10/2005 and was granted on 10/10/2006 for a period of six years. During the fourth year of tenure, a deal between Rum Jungle Resources and Abrar Malik gave Rum Jungle Resources the rights to operate and acquire the tenement. It then became 100% Rum Jungle Resources’. The tenement originally covered 850 km\(^2\) or 274 sub-blocks. On 10/10/2011, EL 24987 was reduced to 186 sub-blocks or 577.28 km\(^2\). It was again reduced at renewal in 2012 by dropping the eastern portion; leaving 132 sub-blocks or 409.59 km\(^2\). The EL was renewed on 09/04/2013 for a further two years. The former JV with Reward Minerals/Tyson Resources ceased in 2014, when Rum Jungle Resources acquired 100% control of the project. The transfer of titles is being held up by the Territory Revenue Office and Stamp Duty. The latest renewal is shown in TIS as being effective 10/10/2014 for another two years. This was accompanied by this voluntary partial relinquishment of 24 sub-blocks leaving 335.2 km\(^2\).

The Karinga Lakes Project is being worked as a single project under DME Authorisation 0565-02 and the associated MMP. However, DME will not grant formal project status under the Mineral Titles Act while the ELs are in different company names. In practical terms, Rum Jungle Resources works the Karinga Lakes as sole operator of a single project. Clearly, individual lakes and the brine resource extend over many ELs and the company’s work straddles EL boundaries.

EXPLORATION AND PROJECT RATIONALE

EL 24987’s salt lakes and sub-surface aquifers are being explored for potassium- and magnesium-rich sulfate brines as part of Rum Jungle Resources’ Karinga Lakes Potash project. It is hoped to produce potash and/or schoenite fertiliser by simple solar evaporation and/or other onsite treatments such as flotation. Australia has no producing potash mines. Around 350,000 tonnes of potash is imported into Australia annually from Canada and is worth around $200 million. Potash of sulfate and schoenite are utilised as high-end fertiliser products globally, as they have a lower salt index than muriate of potash and are often
preferred in crops sensitive to chloride or susceptible to fertiliser burn. Sulfate of potash and schoenite attract premium pricing in comparison to the more common muriate of potash. The Karinga Lakes Potash Project is strategically well located adjacent to the Lasseter Highway and within close proximity of the Central Australian Railway line, providing access north to the port of Darwin and proximity to Asian markets and south to domestic markets. The Karinga Lakes Project is currently in pre-feasibility.

**JORC RESOURCE**

EL 24987 is part of a JORC 2012 Brine Resource of 8,400,000 tonnes of $\text{K}_2\text{SO}_4$ (potash) with an average grade of 4,760 mg/L. Of this resource, 5.8MT is in the Measured category.

**GEOLOGICAL AND HYDROLOGICAL SETTING**

EL 24987 overlies the southwestern sector of the Amadeus Basin in the Northern Territory. The Amadeus Basin covers approximately 150,000 km$^2$ and extends into Western Australia. It is comprised of a Neoproterozoic to mid-Palaeozoic succession of predominantly shallow marine sedimentary rocks and attains a thickness of up to 14,000 m. The siltstones of the central Amadeus Basin have weathered into a modern topographic low. This depression contains a chain of Cenozoic playa salt lakes. Quaternary sand dunes, up to 30 m high, encroach onto the depression. The dunes are mostly vegetated and stable. The playas presently occupy only the lowermost topographic depressions in swales between dunes. Quaternary calcrete and silcrete duricrusts (of vadose origin) are characteristically superimposed on Amadeus Basin outcrops, forming escarpments, several metres high along the margins of some of the playa lakes. Low-relief gypsum-sand “islands” are also present in some of the playas.

The sediments in the modern playa lakes and their palaeo-drainages (Strat 1) contain brines formed by the evaporation of surface and near-surface water from infrequent and largely unpredictable rain and flooding events and, most importantly, from groundwater discharge in the Central Australian Groundwater Discharge Zone as described below.
Figure 3. Regional view of the Central Australian Groundwater Discharge Zone (outlined in light blue) running from Lake Hopkins in WA through to Karinga Lakes, nearest the railway. The blue arrows indicate sub-surface flow. Rum Jungle Resources Ltd granted titles are shown in green.

Figure 4. Schematic diagram of how the Central Australian Groundwater Discharge Zone works.

The Devonian Horseshoe Bend Shale (Strat 2) forms low mesas around many of the lakes and constitutes the lake “floor”. Where it is fractured and/or deeply weathered, the Horseshoe Bend Shale is a brine aquifer in its own right; being the local discharge point for the Central Australian Groundwater Discharge Zone. It is hydraulically connected to the brine in the modern lake sediments, so effectively there is a single aquifer which extends across both basement and the modern lake sediments. The basement Horseshoe Bend Shale was/is evaporitic, containing sulfate and chloride evaporites. It also contains locally abundant
detrital biotite. The evaporites have been leached out over geological time and have almost certainly contributed to the brine, both within the shale and within the lake sediments. These migrating brines have also liberated additional potassium from the weathering biotite.

**WORK BY PREVIOUS OPERATORS**

Local pastoralists have exploited surface salt on a few of the Karinga Lakes (e.g., Swansons Lake) as a source of NaCl for cattle licks since the 1940s and there was some local exploitation of gypsum for domestic and commercial use. Small-scale commercial salt-crust scraping operations have operated sporadically over the decades, notably at Lake Suzi. There has been no exploitation of the subsurface lake brines except for road crews who dug pits and pumped brine for use in road works. The possibility of commercial exploitation was examined in 1960s and again by NT Evaporites during the late 1980’s and early 1990’s. In 1988, NT Evaporites and the Northern Territory Department of Industry and Development created a geological data base to assess the industrial mineral resources in the license areas. The investigation involved field mapping, sediment sampling and water sample collection. This work identified a variety of industrial minerals and brine resources including industrial clays, zeolites and evaporites. In 1992, Geo-Processors Pty Ltd conducted an assessment of resources and feasibility study of the Karinga Lakes area and concluded that the site was suitable for a commercial operation and technically feasible. These studies, and the reasons for their lack of success, have been summarised in previous reports and are not reproduced here.

**AREA BEING RELINQUISHED**

The 24 eastern-most sub-blocks of EL 24987 have been voluntarily relinquished as part of renewal of the EL. This reduces the EL from 132 to 108 sub-blocks.
WORK BY RUM JUNGLE RESOURCES ON RELINQUISHED PORTION

Other than desk-top studies and remote-sensing based on publically available data, Rum Jungle Resources has not undertaken any work on the 24 sub-blocks being relinquished. There is no evidence of potash brine being present in the area relinquished.