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Northern Mining Limited
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## Figures

- **Figure 1** Location of EL 28256 ‘Brittania. Background: 1:5M topography
- **Figure 2** EL 28256 over published 1:250,000 geology map
- **Figure 3** EL 28256 over NT-wide uranium channel
- **Figure 4** ASTER MgOH content (colour) over false colour (grey scale)
- **Figure 5** ASTER FeO content in MgOH (colour) over false colour (grey)
1.0 Summary

EL 28256 is part of Northern Mining Limited’s Amadeus Basin project and was pegged to cover possible extensions of exposed manganese mineralisation discovered by Northern Mining Limited on adjacent tenement EL 24961 in September 2010.

The exploration plan for the entire tenement package was based on understanding the depth extent and expression of the manganese mineralisation, and so a drilling programme was proposed. A Heritage Clearance application was lodged with the Central Land Council in January 2011, but after some discussions with the CLC it was decided to seek the Heritage Clearance through the Aboriginal Areas Protection Authority in March 2011. Unfortunately, this Heritage Clearance was not completed until the 25 July 2012. Mine Management and Risk Management Plans were immediately lodged and were finally granted 6 December 2012. Drilling at the adjacent tenement EL24961 was commenced on 13 December 2012 and was completed two days later. The results show that the manganese mineralisation extends to depth, but is thinner and contains more silica than predicted.

No field work was done in the third and final year of the tenure.

A waiver to defer the reduction of blocks of EL 28256 at the end of the second year was granted on 7 July 2013.

2.0 Introduction

EL 28256 ‘Brittania’ is located 140 km southwest of Alice Springs and is cut by the Stuart Highway (Figure 1). Access is excellent with abundant station tracks and fence-lines crossing the tenement. This report covers the work completed on EL 28256 in the second year of tenure.

3.0 Tenure

EL 28256 was granted to Northern Mining Limited (100 %) on 5 April 2011 and comprised 473 sub-blocks. At the end of the first year a voluntary relinquishment of 202 sub-blocks was made and so EL 28256 retains 271 sub-blocks. A waiver to defer the reduction of blocks at the end of the second year was granted. The tenement overlies NT Portions 657, 1094, 2958, 1090, 1991 and 1140, which are part of the Henbury, Idracowra and Palmer Valley perpetual pastoral leases (Figure 1).

<table>
<thead>
<tr>
<th>Tenement</th>
<th>Ten no.</th>
<th>Blocks Granted</th>
<th>Blocks Relinqu.</th>
<th>Blocks Retain</th>
<th>Grant Date</th>
<th>Expiry Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brittania</td>
<td>28256</td>
<td>471</td>
<td>202</td>
<td>271</td>
<td>6 Apr 2011</td>
<td>5 Apr 2017</td>
</tr>
</tbody>
</table>

Table 1: Tenement details
4.0 Geology/Prospectivity

EL 28256 is located in the middle of the Amadeus Basin where many stratigraphic units are juxtaposed in a fold-fault setting. The greater area is prospective for many styles of sediment-hosted mineralisation including:

- stratabound copper-cobalt (Zambian-style),
- stratiform lead-zinc, manganese, phosphate and potash,
- unconformity uranium, and
- sandstone-hosted uranium (Angela-style).

In September 2010, significant outcrops of manganese were discovered by Northern Mining on EL 24961, which lies immediately north and west of EL 28256 (see Northern Mining ASX releases 2 September 2010 and 22 September 2010). At Area 1, surface grab samples show consistently elevated Mn contents up to 15.7 %. The high manganese corresponds with elevated silica, which is mostly due to the large fragments of white silica/chert within the unit. The high manganese is also associated with low P and Al, which is necessary for commercial manganese ore. The manganese occurs in at least two separate units sub-parallel to sedimentary layering (20-40° dips) and also in units that cut the sedimentary layering. The manganese-rich units are up to 5 m thick and can be traced discontinuously for over 1,200 m, are shallowly covered for approximately 70 % of this strike and disappear under shallow cover along strike.

Only two samples were collected from a 40 m long exposure at Area 2, but they returned 45.6 % and 28.6 % Mn with much lower silica and slightly higher P than at Area 1. This manganese-rich unit is sub-parallel to sedimentary layering (65-80° dips), 2-3 m wide with a few small white silica/chert fragments. The outcrop is surrounded by shallow cover. Extensions of these manganese outcrops are the main target on EL 28256.

Drilling at Area 1 and 2 revealed that the manganese mineralisation continues to depth and is not just a surface feature. Moreover, much of the manganese is associated with silica. The manganese-silica mineralisation cross-cuts the stratigraphic units and is related to faults and breccias. Therefore, a better understanding of the distribution of faults will greatly assist future exploration. In general, the presence of silica with manganese downgrades the value of the manganese. Therefore, areas where the manganese is more concentrated, and by inference, the silica less concentrated, will be required to form economic deposits.

The only published detailed geological maps of the area (Henbury & Rodinga 1:250,000-scale maps) were compiled by the Bureau of Mineral Resources (Geoscience Australia) in 1963/64 (Figure 2). EL 28256 is mostly covered by a thin veneer of aeolian sand with outcrops of Amadeus Basin sediments poking through. There are also remnants of deposits when Central Australia was covered by a Tertiary inland sea.
Various remote sensing methods have covered EL 28256 including magnetics, gravity and radiometrics. The magnetics and gravity show no detail over EL 28256, but the radiometrics show areas with thinner aeolian cover over the Amadeus Basin sediments and even define some stratigraphic units (Figure 3).

More recently a set of multispectral ASTER images have been released. The data for these images were collected by the ERSDAC satellite which records the spectral reflectance of sunlight from the ground and hence the surface mineral composition. These data have yet to be field tested in all geological settings, but their potential to find mineral deposits is significant. There are some artifacts in the data with the most obvious being differences between adjacent swathes because they were collected at different times of day or seasons. Two examples are shown. Figure 4 shows the MgOH content (read abundance) over the grey-scale false colour image. Within EL 28256, the MgOH content probably maps carbonate lithologies – weathering or stratigraphic. Figure 5 shows the FeO content in MgOH, which should discriminate between various carbonate species. These images show some contrast but, along with the other images, need to be field tested.

Only four historic tenements are documented to overlie parts of EL 28256:

- **AP1604 Magellan Petroleum** – base metal potential of the Amadeus Basin stratigraphy; huge tenement covering the northern to central part of the Amadeus Basin and all of EL 28255. No work completed within EL 28256.
- **AP 2850 Le Nickel** – base metal exploration with rock chip and stream sediment sampling throughout various ranges in the Amadeus Basin. No work on EL 28256.
- **EL 6949 CRA Exploration** – diamond and base metals in Amadeus Basin; regional aeromagnetic survey followed by drilling; one target within EL 28256 failed to return any kimberlitic material or evidence of base metal mineralization.
- **EL 25594 Atom Energy** – uranium exploration in Amadeus Basin, flew hyperspectral over tenement. No work on EL 28256.

### 5.0 Northern Mining Limited Work

#### 5.1 Year 1 - 2

In the first and second years of tenure, only office-based work was completed. The main reason that no field work was completed was that Northern Mining were waiting for the Aboriginal Areas Protection Authority to provide clearance over the original manganese discovery so that drilling can determine whether these are viable targets.
5.3 Year 3 Final

No field work done, other than interpretation of geological information and report preparation. The tenement was surrendered on 12 February 2014.

<table>
<thead>
<tr>
<th>Item</th>
<th>Expenditure</th>
</tr>
</thead>
<tbody>
<tr>
<td>interpretation of geological information and report preparation</td>
<td>3,500</td>
</tr>
<tr>
<td>Overheads (15 %)</td>
<td>500</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$4,000</strong></td>
</tr>
</tbody>
</table>

*Table 3: Expenditure for third year of tenure.*

6.0 Environmental

No ground disturbing work has been undertaken on EL 28256.