# Northern Territory Department of Mines and Energy

## REPORT METADATA FORM

### (MINERAL EXPLORATION)

### PART A (DME USE ONLY)

<table>
<thead>
<tr>
<th>Report Number</th>
<th>Date Received</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Collation</th>
<th>figs</th>
<th>logs</th>
<th>maps</th>
<th>apps.</th>
</tr>
</thead>
<tbody>
<tr>
<td>pp.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Media</th>
<th>1.5&quot;</th>
<th>Exab.</th>
<th>DLT</th>
<th>vols</th>
</tr>
</thead>
<tbody>
<tr>
<td>CDs</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### PART B

<table>
<thead>
<tr>
<th>Tenure Number(s)</th>
<th>Company Report Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>EL27217</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Report Date</th>
<th>Anniversary Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>17 September 2010</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Group Project Name</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Report Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>Final Surrender Report for EL27217 (Period 20/04/2009 to 11/08/2010)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Author(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Moharana L</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Corporate Author(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BHP Billiton Minerals</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Maps 1 : 250 000</th>
<th>Gove SD5304</th>
</tr>
</thead>
</table>

### Tectonic Units

- Amadeus Basin
- Carpentaria Basin
- McArthur Basin
- Pine Creek Inlier
- Arafura Basin
- Daly Basin
- Money Shoal Basin
- Simpson Basin
- Arnhem Inlier
- Dunmarra Basin
- Murphy Inlier
- South Nicholson Basin
- Arunta Inlier
- Eromanga Basin
- Musgrave Block
- Tennant Creek Inlier
- Birrindudu Basin
- Fitzmaurice Mobile Zone
- Ngalia Basin
- Victoria Basin
- Bonaparte Basin
- Georgina Basin
- Ord Basin
- Warburton Basin
- Browse Basin
- Granites-Tanami Inlier
- Pedirka Basin
- Wiso Basin

### Stratigraphic Names

- Yirrakala Fm
- Walker River Fm

### AMF Thesaurus Terms – General

- Geological Mapping
- Regional Geology
- Stratigraphy
- Structural Geology
- Metallogenesis
- Remote sensing
- Imagery
- Landsat
- Petrology
- Lithology
- Literature reviews
- Metamorphism
- Lineaments
- Photogeology
- Reconnaissance
- Indicator minerals
- Other terms...
- Digital data review

### AMF Thesaurus Terms – Target Minerals

- Gold
- Silver
- Tin
- Diamonds
- Lead
- Copper
- Platinum Group Minerals
- Industrial Minerals
- Zinc
- Uranium
- Bauxite
- Others...
- Manganese

### AMF Thesaurus Terms – Mining
| Environmental impact surveys | Feasibility studies | Geostatistics | Metallurgy |
| Ore reserves | Resource assessment | Mineral resources | Mining geology |
| Mine design | Mine drainage | Mine evaluation | Pits |

**AMF Thesaurus Terms – Geophysical Surveys**

| Aerial magnetic surveys | Aerial radioactivity surveys | Aerial EM surveys | Ground EM surveys |
| Gravity surveys | Geophysical anomalies | Gravity anomalies | Bouger anomaly maps |
| Sirotom surveys | Ground magnetic surveys | IP surveys | Resistivity surveys |
| Seismic surveys | Magnetic anomalies | Geophysical interpretation | Geophysical logs |

**Other terms…..**

| Shuttle Radar | Thematic Mapper |

**AMF Thesaurus Terms – Geochemical Exploration – Surface Sampling**

| Geochemical sampling | Stream sediment sampling | Rock chip sampling | Bulk sampling |
| Soil sampling | Heavy mineral sampling | Geochemical anomalies | Assaying |
| Isotope geochemistry | Whole rock analysis | X-Ray diffraction | Sample location maps |

**Other terms…..**

**AMF Thesaurus Terms – Geochemical Exploration – Drill Sampling**

| Diamond drilling | RAB drilling | Percussion drilling | Air drilling |
| RC drilling | Rotary drilling | Vacuum drilling | Auger drilling |
| Drill core | Drill cuttings | Drill hole logs | Drill core analysis |

**Other terms…..**

**Drilling Type**

| No. of Holes | Hole Name(s) |
| Diamond |
| Percussion |
| Vacuum |
| RAB |
| Auger |
| Air core |
| RC |
| Rotary |

**Other….**

**Mine/Deposit/Prospects**

| Location – AMG | Location - Datum |
| Mines |
| Deposits |
| Prospects |

**Other…**
BHP Billiton Minerals Pty Limited
ABN 93 008 694 782
A member of the BHP Billiton Group

Final Surrender Report for EL27217
(Period 20/04/2009 to 11/08/2010)

Gove Special SD5304
Northern Territory

Datum/Zone: GDA94 / MGA Zone 53
Target Commodity: Manganese
Date of Report: 17 September 2010

Title Holder: BHP Billiton Minerals Pty Ltd
Project Operator: BHP Billiton Minerals Pty Ltd
Prepared by: Lambodar Moharana (Lambodar.Moharana@BHBPBilliton.com)
Submitted by: Tim Richards (Tim.Richards@BHBPBilliton.com)

Distribution: Department of Resources, NT
Northern Land Council
BHP Billiton Information Research Centre
LIST OF CONTENTS

SUMMARY ......................................................................................................................................... 1

1.0 INTRODUCTION.......................................................................................................................... 2

2.0 TENURE ....................................................................................................................................... 2

3.0 PREVIOUS EXPLORATION ........................................................................................................2

4.0 GEOLOGY ................................................................................................................................... 2

5.0 EXPLORATION WORK ............................................................................................................... 3

6.0 EXPLORATION EXPENDITURE ................................................................................................. 3

7.0 REFERENCES ............................................................................................................................. 3

List of Maps

No.    | Title                                           | File Name                        |
-------|-------------------------------------------------|----------------------------------|
1.     | Tenement Location Map                           | EL27217_LocationMap.pdf          |
2.     | Interpreted Lithology Map                       | EL27217_LithologyMap.pdf         |
SUMMARY

EL27217 covers an area of 1.14 sq km (1 block) and is located in East Arnhem Land. It was not an original application but was created out of the larger EL24524 application. As this application is located within aboriginal freehold land, it was processed under the Aboriginal Land Rights Act. The site survey conducted by the Northern Land Council prior to grant resulted in creation of three non-contiguous consent lands. The largest of the three was retained as the main EL24524, but new tenement numbers, namely EL27216 and EL27217, were given to the other two consent lands. All three were granted simultaneously on 20 April 2009.

EL27217, though very small in area, was accepted as part of a land package in the East Arnhem Land. The tenements are being explored for sediment-hosted supergene-enriched manganese within the Cretaceous rocks. The paleogeographic and stratigraphic setting of the Cretaceous rocks in East Arnhem Land are similar to that of Groote Eylandt, which hosts a world-class manganese deposit.

Historical prospecting in East Arnhem Land undertaken during 1960’s had identified several manganese occurrences namely Peter John River, Caledon Bay and Lake Evella among others. The original EL24524 application, which included the current EL27217, was applied to explore the manganese potential at the Peter John River occurrence.

Desktop interpretation of geology and ground reconnaissance work revealed that EL27217 was mainly covered with Proterozoic basement rocks and Quaternary coastal sediments. So it did not warrant any exploration per se and all the exploration efforts including airborne geophysical survey and drill testing were therefore confined to EL24524 only.

The result of airborne electromagnetic survey and subsequent drill testing at a number of targets in the main EL24524 has completely downgraded the manganese potential of EL27217. Therefore it was decided to surrender the tenement in the second year itself.
1.0 INTRODUCTION

EL27217 is a small tenement covering 1.14 sq km (1 block) and is located in East Arnhem Land. It was not an original application but was created out of the larger EL24524 application. EL24524 was applied for by BHP Billiton Minerals Pty Ltd (BHPB) on 17 December 2004. As the application falls within aboriginal freehold land, it was processed under the Aboriginal Land Rights Act. A site survey was completed by the Northern Land Council prior to grant and the application area was divided into three non-contiguous consent areas and four non-contiguous non-consent areas. This resulted in creation of a total of 7 tenements. Tenement, EL24524, was retained for the largest area and EL27216 and EL27217 (refer EL27217_LocationMap.pdf attached) were the new tenements created to for the two smaller consent areas. All three were granted simultaneously on 20 April 2019.

EL27217, though very small in area, was accepted as part of a land package in the East Arnhem Land. The tenement package is being explored for sediment-hosted supergene-enriched manganese hosted in Cretaceous rocks. The paleogeographic setting of this rock package is considered similar to that of Groote Eylandt which hosts a world-class manganese deposit.

Historical prospecting undertaken during 1960’s in East Arnhem Land had identified several manganese occurrences like Peter John River, Caledon Bay, Lake Evella etc. The original EL24524, of which EL27217 was a part, was applied to explore for the manganese potential of the Peter John River occurrence.

A combined annual report for EL’s 24524, 27216, 27217, 10182 and 27249 (all part of the ‘East Arnhem Land Project’) was submitted in May 2010. This is the final surrender report for life of EL27217 from 20 April 2009 to 11 August 2010.

2.0 TENURE

<table>
<thead>
<tr>
<th>EL No</th>
<th>Holder and Operator</th>
<th>Application Date</th>
<th>Grant Date</th>
<th>Surrender Date</th>
<th>No of Blocks</th>
<th>Area in sq km</th>
</tr>
</thead>
<tbody>
<tr>
<td>EL27217</td>
<td>BHP Billiton Minerals Pty Ltd.</td>
<td>17-Dec-2004</td>
<td>20-Apr-2009</td>
<td>11-Aug-2010</td>
<td>1</td>
<td>1.14</td>
</tr>
</tbody>
</table>

3.0 PREVIOUS EXPLORATION

Previous exploration over this area is described in Report 13 of the Northern Territory Geological Survey (Ferenczi, 2001).

In the mid 1960’s, parts of the eastern Arnhem Land area was explored for sedimentary-diagenetic manganese after the discovery of the Groote Eylandt deposit. A variety of exploration campaigns were completed, including helicopter reconnaissance work, regional mapping, pitting and regional drilling at some prospects (e.g. Caledon Bay, Peter John River, Lake Evella).

4.0 GEOLOGY

Several areas of the East Arnhem Land are covered by Cretaceous transgressive marginal-marine and terrestrial units developed on an irregular basement terrain formed on resistant Precambrian sediments. The Cretaceous strata are often covered by remnants of a regional laterite profile that forms a distinctive flat plateau surface. The two main Cretaceous units are the upper Yirrkakula Formation and lower Walker River Formation. The Yirrkakula Fm is mainly thick-bedded marginal marine or terrestrial sandstone. The Walker River Fm is mainly marine
quartzose sandstone and interbedded clayey-siltstone, resting upon terrestrial basal conglomerate. The rocks are generally flat-lying with some locally moderate dips due to reactivation tectonics.

The geologic and paleogeographic settings are similar to those on Groote Eylandt which hosts a world-class manganese deposit. Therefore East Arnhem Land is considered highly prospective for the Groote Eylandt style sedimentary-diagenetic manganese mineralisation.

5.0 EXPLORATION WORK

A desktop interpretation of the geology using available published geological maps and Landsat images was first completed as part of the regional targeting work. Some amount of ground truthing was also attempted using existing roads.

It was found that EL27217 was covered mainly by Quaternary coastal sediments and Pre-Cambrian basement rocks (refer to EL27217_LithologyMap.pdf attached). As such the geology was considered un-prospective for hosting manganese mineralisation. So it did not warrant any exploration per se and all the exploration efforts including airborne geophysical survey and drilling testing were therefore directed to EL24524 only.

The result of airborne electromagnetic survey and follow up drill testing at a number of targets in the main EL24524 has completely downgraded the manganese potential in EL27217. Therefore it was decided to surrender the tenement early on in the second year itself.

6.0 EXPLORATION EXPENDITURE

An amount of $3,000 was expended towards exploration activities in EL27217. The Expenditure Report in the format prescribed for Northern Territory Exploration Expenditure for Mineral Tenement has been submitted separately.

7.0 REFERENCES


Map showing location of EL27217
(Base - 1:250,000 Topo Map)