**ENIGMA MINING LTD**

**MOUNT HARDY PROJECT**

**PARTIAL SURRENDER REPORT**

**01/03/12 to 28/02/16**

**EL 28694**

<table>
<thead>
<tr>
<th>Tenement/s</th>
<th>EL 28694</th>
<th>1:250 000 Sheet Name</th>
<th>Mt Doreen (SF5212)</th>
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<td>Holder</td>
<td>Enigma Mining Ltd</td>
<td>1:100 000 Sheet Name</td>
<td>Yuendumu (5253) Doreen (5153) GDA94-52</td>
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<td>Manager</td>
<td>Enigma Mining Ltd</td>
<td>Datum</td>
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<td>Operator</td>
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**Commodity**

Cu, Au

**Elements Analysed**

**Keywords**

Previous Exploration, Lander Group, Cu, Reduction, EM, Soil Sampling

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**Distribution**

TNG Limited (1)

Department of Mines and Energy (1)
EXECUTIVE SUMMARY

Exploration Licence 28694 is part of Enigma Mining Limited’s Mount Hardy Project area. The tenement is situated near the Mt Hardy Copper Field where known copper mineralisation exists within the highly prospective Lander Group.

The Mount Hardy Project includes EL 27892 which purchased from Walla Mines in July 2012, EL 29219 which was granted on 17/09/2012 and the third licence, EL 28694 which was purchased from Tierra Rica Pty Ltd in February 2013. EL 28694 was granted to Tierra Rica Pty Ltd on 1/03/2012 and the transfer to Enigma Mining Ltd was completed on 1/03/2013.

A partial reduction of EL 28694, from 64 to 32 blocks was completed prior to its fourth anniversary and all areas of interest have been retained for further work.
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1. INTRODUCTION

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A partial reduction of the licence, from 64 to 32 blocks was completed prior to its fourth anniversary.

Figure 1: Location of Mount Hardy project area (EL28694 pre-reduction).
2. LOCATION AND ACCESS

The Mount Hardy Project is located approximately 300km north-west of Alice Springs in Northern Territory (Figure 1). The project currently comprises three exploration licences covering a total area of 731.46 km$^2$. The project area is accessed via the Tanami Road and is situated on the Mount Doreen pastoral lease (NT Portion 1947 under Perpetual Pastoral Lease 1035). Access within the licence area is via station tracks and fencelines.

The Yarunganyi Hills dominate the licence north of the Tanami Road with Mount Doreen being the highest point of the range at 860m. The surrounding plains lie about 700m above sea level. Much of the range has access restrictions as identified by the AAPA and CLC which will impact exploration in the area.

3. TENURE

Exploration Licence 28694 is part of the Mount Hardy Project along with EL 27892 and EL 29219. EL 28694 was granted to Tierra Rica Pty Ltd on 1/03/2012 and the transfer to Enigma Mining Ltd was completed on 1/03/2013. Tenure details for EL 28694 are summarised in Table 1. A partial relinquishment was undertaken on the tenement leading up to the second anniversary of grant and again at the fourth anniversary reducing the number of blocks to 32 (Figure 2; Table 2).

<table>
<thead>
<tr>
<th>TITLE</th>
<th>PROJECT</th>
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<td>32</td>
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<td>28/02/2018</td>
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<td>94</td>
<td>C, H, M, N, R, S, X</td>
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<tr>
<td>SF5218</td>
<td>66</td>
<td>C, D, E, K, P, U, X, Y, Z</td>
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</tr>
<tr>
<td>SF5219</td>
<td>40</td>
<td>F</td>
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4. GEOLOGY

The Mount Hardy Project area lies within the Aileron Province of the northern Arunta region. The oldest rocks in the area are metamorphosed Palaeoproterozoic siliciclastic sediments of the c.1840 Ma Lander Group (Rohde, 2005; Figure 3). These sediments were multiply deformed and variably metamorphosed during the c.1810 Ma Stafford Event and numerous subsequent events. The previously reported magmatic age of 1880 Ma for the Ngadarunga Granite and consequent older age for the Lander Group and proposed Yuendumu Tectonic Event (Young et al., 1996) has been re-evaluated and is now interpreted to be much younger (Jon Claoué-Long, personal comment; Rohde, 2005).

The Lander Group is interpreted to be stratigraphically equivalent to the Tanami Group, which hosts significant gold mineralisation at The Granites, Dead Bullock Soak and Coyote. As such, the Lander Group metasediments are considered prospective for gold mineralisation.

Rare amphibolite and metagabbro occurs within the Lander Group and are interpreted to be metamorphosed dolerite sills. Volcanic units have not been identified in the Lander Group. There are other Palaeoproterozoic volcanosedimentary successions in the Mount Doreen area,
including the ~1770-1790 Ma Reynolds Range Group, Patmungala and Nicker beds, but these are relatively insignificant (Rohde, 2005).

There have been two main periods of granite intrusion in the Mount Doreen area; the c.1780 Ma Carrington Suite and the c.1580 Ma Southwark Suite. The Southwark Suite has geochemical affinities with granite associated with Proterozoic Au-Cu mineralisation elsewhere in Australia (Wyborn, 1998). Correlatives of the 1820-1790 Ma granites in the Tanami region (Frederick and Grimwade Suites) are unknown in the Mount Hardy area and may have implications for mineralisation models (Rohde, 2005). Localities nearby have occurrences of uranium (Crystal Creek), tin-tungsten (Mount Doreen) and copper-lead-zinc (Mount Hardy).

Neoproterozoic to Palaeozoic sedimentary rocks of the Ngalia Basin overlie the Palaeoproterozoic to Mesoproterozoic Arunta basement in the central part of the Mount Doreen 1:250,000 sheet (Rohde, 2005) and to the south of the tenement.

4.1 Local Geology and Mineralisation

The geomorphology at Mount Hardy is dominated by the rugged ranges of the Ngadarunga Hills, which comprise high quartzite ridges of the Reynolds Range Group, and lower rounded hills formed by schists and gneisses of Lander Group metasediments (Rohde, 2005), on the eastern edge of EL 28694. The Yuranganyi (Mount Doreen) hills in the central northern portion of the tenement expose rounded tors of Mount Doreen granite. Regolith is dominated by colluvial gravels and skeletal soils overlying relatively fresh bedrock on ridge-tops and hillsides, giving way downslope to deeper valley filling colluvial fans and fluvial gravels. To the north of the ranges are low flat grass plains with thick stands of mulga and occasional low ridges and hills of bedrock schist. The plains have a shallow transported cover of 1-5 m alluvial sand, gravel and clay overlying weather bedrock (Scrimgeour, 2013, Rohde, 2005).

The Mount Hardy copper workings are hosted within the Lander Group and are dominated by psammite and lesser pelite, which have been metamorphosed to amphibolite-facies mica schist and andalusite(?) porphyroblastic schist. Complex mesoscopic-scale folding of schistosity/bedding is observable. Greenschist facies Lander Group schists and Reynolds Range Group quartzites lie to the south of the workings separated from the higher grade schists by a major east-west fault. Dolerite and pegmatite stocks and dykes are common in the area, the pegmatites most likely related to granite plutons of the Southwark and Carrington suites lying to the west and south of the Ngadarunga Hills (Rohde, 2005).

The copper workings display strong structural controls, being hosted within quartz veined shear zones. Surficial mineralization comprises copper carbonates and gossans within sheared mica-schist wallrocks and boudinaged and brecciated quartz veins. Quartz veins range for tabular and consistently strike over 10 to 100’s of metres to complexly fractured and folded plunging rocks (Rohde, 2005).

Two main structural trends are event from the distribution of the workings and lineations observable in Landsat imagery and aeromagnetics: NW to WNW (parallel to trans-Tanami regional scale structures in the region), and ENE-WSW (Rohde, 2005).

The geomorphology of Exploration Licence 28694 is mainly plateau upland area and relatively flat, except for the eastern part which is a dissected upland area of higher relief. Much of the tenement area is occupied by Proterozoic granites and granite gneisses. The “granites” are structurally complex with various forms of igneous crystallization, chemical composition and texture as well as containing structures such as faults, shears, fractures and veins. In the east and west portions of the tenement the Lander Rock Beds are represented by greywacke, siltstone and shale as well as schist and gneiss.
5. PREVIOUS EXPLORATION

The following exploration has been carried out on the Mount Doreen mapsheet and around the Mount Hardy area:

- Mount Hardy copper prospects were discovered by W.W. Braitling in 1935.
- Uranium Development and Prospecting N.L. carried out diamond drilling in the area in 1956.
- Bureau of Mineral Resources (BMR) conducted aeromagnetic, radiometric and gravity surveys in the 1960s.
- Central Pacific Minerals held AP1722 in the Mount Hardy area from 1967-69
- NTGS assessed the economic feasibility of the Mount Hardy and Clarke copper deposits from 1968 to 1972.
- White Industries conducted exploration on EL 5688 from 1988-90. Rock chip and stream sediment sampling was carried out from Wolfram Hill through to Mount Hardy.
- Bruce and Mules’ explored the Silver King area for gold and base metals from 1988-1991.
• MIM/Roebuck Resources Joint Venture targeted magnetic highs in the early 1990s and explored the silver King deposit.
• Yuendumu Mining Company/Posgold explored the western parts of the Mount Doreen area from 1992 to 1996, particularly Terry’s Find, other targets were ‘Buger’ and ‘Grasshopper’.
• BMR completed airborne magnetic and radiometric surveys in 1993.
• BHP tested the northern Mount Doreen and southern Mount Theo mapsheets for Cu-Au in the late 1990s, but concluded that no major deposits were likely.
• Tanami Gold NL explored for Tanami-style gold mineralization and Tennant Creek-style copper mineralization in the Mount Doreen area from 2001 to 2005. The main target areas were the Terry’s Find, Mount Hardy and Pyramid Hill Prospects. 7 Rock chip samples returned copper assays of 7032 ppm to 217972 ppm.
• Deep Yellow conducted exploration for uranium in the Mount Hardy area in 2009 and 2010. No other commodities were investigated.

6. **EXPLORATION UNDERTAKEN ON THE RELINQUISHED AREA**

Very little targeted exploration has been carried out within the boundaries of EL 28694. Tierra Rica provided a brief summary to Enigma of exploration within the region and this was used in the compilation of the previous exploration section of this report. Enigma has reviewed all previous exploration and identified specific target areas for detailed exploration. Relinquished blocks have been chosen outside of these target areas (Figure 4).

![Figure 4: Retained blocks and areas of interest on EL 28694, overlying 250K geology.](image-url)
REFERENCES


