OM Manganese Ltd

Title holder / operator: OM (Manganese) Ltd (100%)

Tenement Manager: Australian Mining & Exploration Title Services (AMETS)

EL28843
Helen Springs Project

Annual Technical Report - Year 4
2nd March 2015 to 1st March 2016, and Final Technical Report

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Abstract

There was no exploration activity on EL28843 during Year 4 (2015/2016) due to budget constraints place on exploration expenditure.

Exploration activity over the 4 year life of EL28843 included an 18 hole (630m) RC drilling program, an 11.4 line km reconnaissance Gradient Array IP survey, rehabilitation of 2 costeans previously excavated by Neil Scriven, and a self-audit consisting of the location, rehabilitation, removal of sample bags and photography of all OMM RC drill collars and surrounds.
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1 Introduction

EL28843 was granted to OM Manganese Ltd (OMM) on 2nd March 2012 and consists of 39 blocks covering an area of 126.1 square kilometres. The EL area was applied for as a Substitute Exploration Licence over the area previously covered by EL23495 and EL23698 (both since expired) and is referred to by OMM as the Helen Springs Project.

The southwest corner of EL28843 is located 3 km due east of Stuart Highway and is located entirely within the Helen Springs pastoral station. Access is via a station track heading southeast from the Helen Springs homestead and then east, following McKinlay Creek to an area referred to as Milla Milla paddock.

![Location plan for EL28843 and access tracks.](image)

Figure 1. Location plan for EL28843 and access tracks.
Geology

The geological map published by the NTGS (Hussey et al, 2001) shows the eastern and northern areas of EL28843 (previously covered by EL23495) to be dominated by a north-south striking sandstone and dolomite formations interpreted to be part of the Tomkinson Group (Bootu and Attack Creek Formations) with rocks belonging to the Carruthers Formation (Namerinni Group) and Gleeson Formation (Renner Group) located to the west and east respectively.

Mapping along the western and eastern margins of the Bootu and Attack Creek Formations indicate that these units form an anticline with a possible shallow southerly plunge. The sandstone is largely eroded in the northern part of the licence and a recessive valley has formed, hosting McKinley Creek.

RC drilling within the valley has intersected minor, relatively shallow manganese mineralisation within dolomites of the Attack Creek Formation, with overlying manganiferous gravels at the interface with shallow alluvial cover (see Figure 2). This suggests close proximity to an eroded contact between Bootu Formation (sandstone) and Attack Creek Formation (dolomite and siltstone), the contact which hosts the strata-bound manganese ore horizon mined at Bootu Creek, located 30km to the south.

The western and southern part of EL28843 (previously covered by EL23698) is dominated by rocks of the Palaeoproterozoic Namerinni Group and the Mesoproterozoic Renner Group, overlain by minor occurrences of Cambrian aged Helen Springs Volcanics and Cretaceous sediments.

The potentially prospective Proterozoic rocks are covered in part by Cenozoic alluvium, colluvium and aeolian sand. There are no identified manganese outcrops within this area of the exploration licence.
Figure 2. Geology from the NTGS 1:250k Helen Springs sheet, Hussey et al 2001, with >15% manganese drill intersections shown in red dots.
3 Exploration Activity

There was no exploration activity on EL28843 during Year 4 (2015/2016) due to budget constraints placed on exploration expenditure.

Exploration activity over the 4 year life of EL28843 included an 18 hole (630m) RC drill program, rehabilitation of 2 costeans previously excavated by Neil Scriven, an 11.4 line km reconnaissance Gradient Array IP survey, and a self-audit consisting of the location, rehabilitation, removal of sample bags and photography of all OMM RC drill collars and surrounds.

3.1 Previous Exploration Activity

Exploration activity conducted on the two previous OMM exploration licences (EL23495, EL23698) includes,

- Ground EM surveys, excavation mapping and sampling of two costeans, and 12 hole RAB drill program by Neil Scriven, owner of EL23495 pre 2006/07.
- Interpretation and report on satellite borne ASTER spectral study by Amit Eliyahu, 2006/07.
- Helicopter borne SkyTEM geophysical survey, Ikonos satellite imagery and 18 hole RC drill program, 2007/08.
- Aerial aeromagnetic and radiometric geophysical survey by GPX, aerial photography and rectification, 2008/09.
- 1:20,000 scale regional alteration and structural mapping by Tim Blake and a 46 hole RC drill program, 2009/10.
- Gradient Array IP (GAIP) ground survey (1,200m x 700m) on 100m spaced east-west lines covering the Helen Springs prospect area, and one follow up dipole-dipole IP (DDIP) survey, 2010/2011.

Details of above exploration activities are discussed in the respective final technical reports for EL23495 and EL23698.

3.2 EL28843 – Year 1 Activity

Exploration activity conducted in Year 1 included an

- 18 hole (630m) RC drill program, and
- Rehabilitation of all remaining RC drill collars and both costeans previously excavated by Neil Scriven.
3.3 **EL28843 – Year 2 Activity**

An 11.4 line km reconnaissance Gradient Array IP ground geophysical survey, extending 2.0 km north of the earlier 2011 Helen Springs GAIP survey. The survey consisted of 10 x 200m spaced lines with 25m spaced station.

The survey did not delineate any significant strike extensive chargeability anomalies, though several medium intensity (>12 mV/V) spot chargeability anomalies need ground checking, particularly on line 7962900mN.

The Helen Springs (Northern Extension) IP survey was conducted by GPX Surveys in October/November 2013, to the following specifications.

- **Configuration:** Gradient Array
- **Line Spacing:** 200m
- **Line Direction:** east-west
- **A space:** 25 m
- **Transmitter:** GDD
- **Tx current:** variable
- **Tx frequency:** 0.125 Hz
- **Receiver:** GDD 16
- **Rx readings:** Minimum 2/station
- **Field Data**
- **Processed Data:** AMIRA format

The following two Chargeability and Resistivity images are merged with the earlier 100m x 25m spaced Helen Springs GAIP survey from 2011.

The main Helen Springs manganese prospect anomaly is the north-south centrally located anomaly extending from 7960400mN to 7960900mN.
Figure 3. Helen Springs Merged Gradient Array IP ‘Chargeability’ image
Figure 4. Helen Springs Merged Gradient Array IP ‘Resitivity’ image
3.4 **EL28843 – Year 3 Activity**

EL28843 exploration activity for 2014/2015 was limited to a self-audit consisting of the location, repair and/or rehabilitation of all OMM RC drill collars and surrounds, including plugging of hole collars 30cm below ground level, removal of all sample bags and rubbish, raking of collar spoils and photography.

All 82 RC holes drilled by OMM on EL28843 (BCRC prefix) were located during the self-audit, repaired and/or rehabilitated as required and photographed. Updated photographs were also taken of the two previously rehabilitated costeans.

Only 2 of the 12 earlier open percussion holes drilled by the previous EL owner (EUPC prefix) were located, rehabilitated and photographed. Collars from this earlier phase of drilling were poorly surveyed and three of the missing collars are believed buried by subsequent drill access clearing and/or costean rehabilitation, and are no longer visible. The missing collars may have been rehabilitated earlier, but not marked.

The current revegetation status of drill access tracks was recorded during the self-audit and around 10% of the original tracks failed to revegetate.

3.5 **EL28843 – Year 4 Activity**

There was no exploration activity on EL28843 during Year 4 (2015/2016) due to budget constraints place on exploration expenditure. EL28843 is recommended for surrender at the expiry of its current 4 year term.
Figure 5. Helen Springs Exploration Drill Collar Plan
4 Conclusions and Recommendations

The Helen Springs Prospect was originally identified from NTGS mapping of manganese float adjacent to McKinlay Creek. Two costeans excavated by Neil Scriven in 2007 exposed around 1-2m of manganiferrous gravel covered by a thin veneer of sand.

Several phases of exploration drilling, EM and IP ground surveys subsequently outlined an area of low grade manganese gravel and one small pod of manganese mineralisation located adjacent to the northern costean.

The 2011 Gradient Array IP survey identified one significant north-south anomaly, around 100m in strike length (7950800-7950900mN). Closely spaced RC drilling has since outlined a narrow, steeply dipping moderate grade, north-south striking manganese pod extending to a depth of around 20m. This mineralisation is interpreted as a small keel like structure, possibly the remnant of an earlier larger mineralised structure.

Tonnage potential of this manganese pod is estimated at between 5,000 to 10,000 tonnes of 20-25% Mn. Further expansion of this small pod is restricted by close spaced, adjacent drilling. It is not considered to be economic to extract.

RC drilling at the Helen Springs Prospect had intersected 1 to 3m of alluvium (with occasional manganese gravels) before drilling into dolomite. The manganese gravels are interpreted as an eroded remnant of a mineralised contact between the Bootu Formation (sandstone) and underlying Attack Creek Formation (dolomite and siltstone), the host contact for strata-bound manganese mineralisation at the Bootu Creek mine site, located 30km to the south.

The 2013 Gradient Array IP survey was intended as a broader reconnaissance survey with 200m spaced lines. No significant strike extensive ‘chargeability’ anomalies were identified in this survey.

Rehabilitation of all 82 RC holes, and surrounds, drilled by OMM has been completed and photographed. The 2 costeans previously excavated by Neil Scriven have since been backfilled and rehabilitated.

No significant exploration potential for manganese mineralisation is considered to remain and no further exploration activity is proposed. EL28843 is recommended for surrender at the expiry of its current 4 year term.
5 References
