

# SHERWIN

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# IRON

## SECOND ANNUAL TECHNICAL REPORT

**ML29584**

**08/07/2015 to 07/07/2016**

<b>Tenement</b>	ML29584	<b>1:250 000 Sheet Name</b>	Urapunga (SE5310) Hodgson Downs
<b>Holder</b>	Sherwin Iron Limited	<b>1:100 000 Sheet Name</b>	Chapman (5768)
<b>Manager</b>	Sherwin Iron Limited(Receivers and Administrators appointed)	<b>Datum</b>	GDA94-53
<b>Operator</b>	Sherwin Iron Limited		
<b>Commodity</b>	Fe		
<b>Elements Analysed</b>	Al <sub>2</sub> O <sub>3</sub> ,As,Ba,CaO,Cl,Co,Cr <sub>2</sub> O <sub>3</sub> ,Cu,Fe,K <sub>2</sub> O,HgO,Mn,Na <sub>2</sub> O,Ni,P,Pb,S,SiO <sub>2</sub> ,Sn,Sr,TiO <sub>2</sub> ,V,Zn,Zr,LOI		
<b>Keywords</b>	Feasibility Study, Stockpile sampling, Metallurgical Testing		
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<b>Approved</b>	Richard Tucker ( Kordamentha)		
<b>Report Date</b>	August 2016		
<b>Distribution</b>	Department of Resources – Minerals and Energy		(1)
	Sherwin Iron Limited		(1)

## **SUMMARY**

This is the Second Annual Technical Report for ML29584, which covers Sherwin's largest iron oxide resource - Deposit C. ML29584 is surrounded by Sherwin's Roper River Iron Ore Project as defined by an amalgamation of Sherwin's Exploration Licences, reported under separate Project authorization (GR260-12).

Before the ML grant on 8th July 2014 the area had been subject to an exploration bulk sample extraction operation of DSO grade iron oxide. This material was trucked to Darwin Port and shipped to customers in China under an Exploration MMP Authorisation. This extraction of some 270,000 tonnes of almost 59% Fe was carried out prior to ML grant within the underlying exploration licence EL24101. That operation was completed in June 2014 and details reported in the Roper River Iron Ore Project Third Annual Group Technical Report in March 2015.

On 10 July 2014, immediately after ML grant, the Directors of Sherwin Iron appointed voluntary administrators, and the secured creditor appointed Janna Robertson and Scott Kershaw as receivers.

All technical activity conducted on the ML during the first reporting period from 8<sup>th</sup> July 2014 to 7<sup>th</sup> July 2015 is contained within the First Annual Technical Report, and briefly outlined here.

During the current reporting period from 8<sup>th</sup> July 2015 to 7<sup>th</sup> July 2016, with Sherwin Iron continuing in Receivership, an intending purchaser Al Rawda Resources Australia Pty Ltd (Al Rawda) undertook limited technical activity as part of its due diligence on Sherwin's assets and future valuation. This programme included metallurgical testwork on two large samples of medium grade iron oxide from bulk sample pit stockpiles. The testwork at Nagrom Laboratories in Perth was undertaken to determine the optimum beneficiation process path for future iron ore production.

It should be noted that in this reporting period there has been no mineral production on this ML for the reporting period..

## **GEOLOGY**

Sherwin's Roper River Iron Ore Project lies within the Roper Group Stratigraphy of the broader Macarthur Basin and is focussed on exploration of the Sherwin Formation that contains iron ore units for potential economic extraction. Within the Sherwin Formation iron ore units are grouped into Upper Ironstone Unit and Basal Unit. The Upper ironstone unit is slightly more silica rich, sandy and less oolitic than the basal unit that is typically more silty to clayey alumina rich and typically densely and coarsely oolitic. Both units include low grade and DSO grade resources.

The ML is confined to stratigraphy of the Upper Ironstone Unit where at least three subset ironstone horizons are identified (The Upper, Middle and Lower Ironstone horizons). Within the ML the high DSO grade is confined to the Lower Ironstone horizon. This horizon varies from 6 to 10 metres in thickness and has been the subject of DSO extraction within an exploration bulk sample pit. The strata are near flat lying to very shallow dipping and locally faulted or offset, possibly a result of soft sediment slumping deformation within a basinal depositional environment. The Lower Ironstone Unit is the target for initial future mining, as it comprises DSO grade mineralisation.

Further detailed descriptions of the geology are included within the GR260 Project Annual Exploration Reports.

### 1.1 PREVIOUS ANNUAL REPORT: SUMMARY

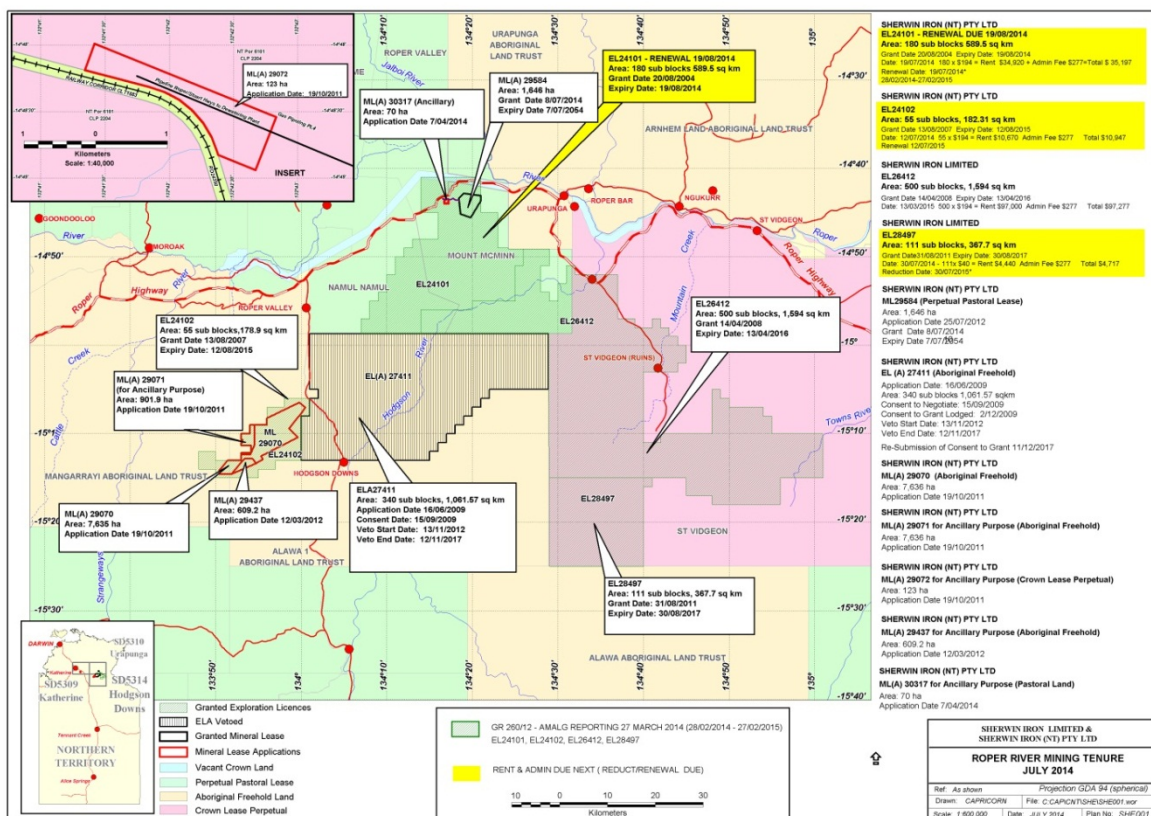
ML 29584 covers the Deposit C Resource in the area of proposed DSO mining and associated infrastructure.

Activity on ML29584 during the previous reporting period 2014/15 was focussed on achieving Federal and State Government Approvals for the DSO Mining Operation, in particular addressing questions on any outstanding issues.

As an example of gaining such approval an audit of acid mine drainage potential was conducted following an initial DME Review and feedback of Sherwin’s Draft Mining MMP. That audit, conducted by an Independent Specialist Consultant using Sherwin’s existing sample data, concluded that acid mine drainage risk was low, once appropriate risk reduction measures were incorporated into the proposed mining operation.

A DSO Mining MMP was accordingly finalised and submitted for Federal and NT DME approval. The DSO Mining Operation within Deposit C proposes initial high grade iron ore production. The Mining MMP has been submitted and currently awaits final approval, awaiting resolution of the sale of Sherwin assets.

**Figure 1: Location of ML29584 within area of Roper River Iron Ore Project**



**Figure 2 : Location of ML29584 within Sherwin Creek Area**

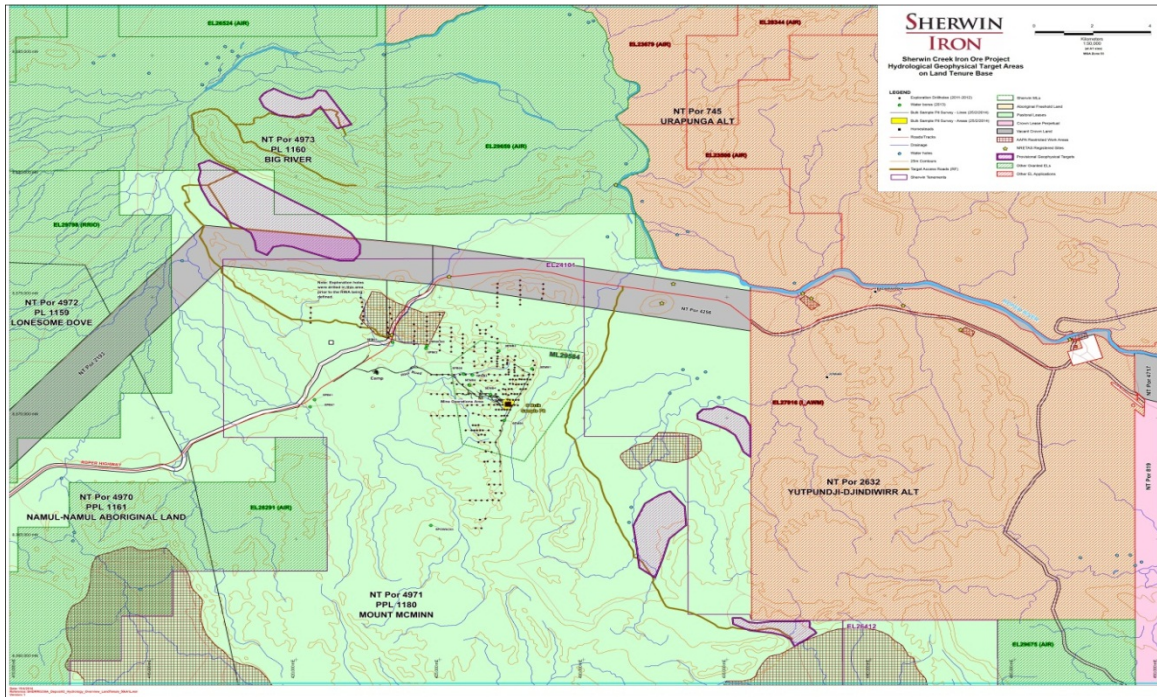
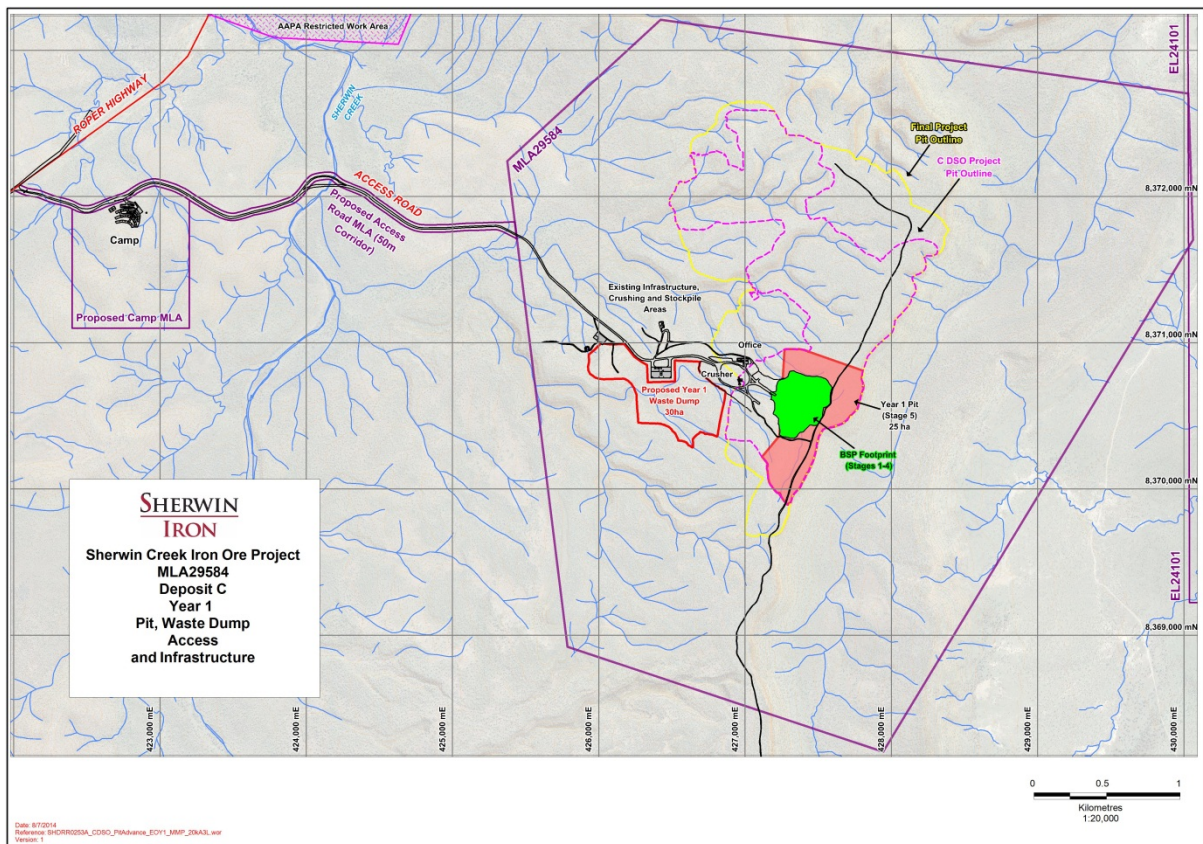


Figure 3: ML 29584 Outline -Showing Proposed Infrastructure



1.2: 2016 WORK PROGRAMME

### **1.2.1 Background**

Sherwin had completed extensive metallurgical beneficiation testing at Nagrom Laboratories on the coarsely oolitic Deposit W iron oxides in 2010. However limited testwork had been done on Deposit C iron oxide mineralisation, which is notably different in character.

Iron oxide at Deposit C, within the Sherwin Lower Ironstone Unit, is different in chemical (assay) and physical character from the basal ironstone unit at Deposit W, which is typically coarse, dense oolitic, alumina rich (finer grained) and higher in phosphorous. At Deposit C the ironstone is silica rich, distinctly lower phosphorous, more sandy textured with finer grained and less dense contained oolites.

The focus of resource delineation at Deposit C shifted in late 2011 from low grade to DSO grade only, with the intention of extracting and shipping DSO from an exploration bulk sample pit. This selective mining schedule had deferred any beneficiation testing of lower grade stockpiled material until some period of time after full scale DSO mining commencement.

### **1.2.2 Metallurgical Testing Programme**

Al Rawda, as intended new project owner, commissioned Nagrom in the current reporting period to provide beneficiation testing options of Deposit C medium grade iron oxide as part of due diligence for future value and risk assessment.

Two large drummed samples were collected from relevant grade stockpiles within the exploration bulk sample extraction area and forwarded to Nagrom for metallurgical testing.

### **1.2.3 Testwork- Scope**

The testwork conducted on the two bulk samples is included in a separate excel spreadsheet in Appendix 1.

Scope of work on the samples included:

- Full Iron Ore suite Assaying
- Sizing test analyses
- Magnetic separation
- Wet Screen Analysis
- Dense Media Separation (DMS)
- Wilfley Wet table Separation (WHGMS)
- Rougher- Cleaner Wet High Gradient Magnetic Separation

### 1.2.4 Observations and Conclusions

Again scope of Nagrom's testwork is detailed in Appendix 1.

In summary the following processes and observations were reported by Nagrom.

- Grind Sample to P80 0.125mm via Rubber Rods
  - Sub-Sample P80 0.125mm for reverse Si flotation testwork – have seen positive results in previous hematite testing for quartz removal via Si flotation
  - Wet Screen ground sample at 0.045mm – based on the below results should be able to achieve ~57-58% Fe in the -0.045mm fraction at ~60% recovery
  - Conduct magnetic separation on the +0.045mm fraction – based on the below should be able to achieve ~57-58% in the ~3000 gauss magnetics at ~90% recovery. The low Al in this stream should also dilute the -0.045mm Al content
  - The material did not respond well to Wet Magnetics via WHGMS
- 
- DMS upgrading the ore but with high Fe losses to the rejects
  - The Scrubbing with the rubber rods has preferentially broken down the friable Fe minerals and left the more competent Si minerals in the coarse fraction. Considered optimising this process to segregate the Fe and Si minerals with a simple scrub and screen process which is very positive
  - **Sizing analysis included one sample scrubbed and the other crushed.**
  - **From similar calculated headgrades of 51.6% Fe (scrubbed) and 51.4% Fe (crushed) the scrubbed sample returned 57.7% Fe with 25%Fe yield at -0.045mm screen sizing. The crushed sample returned 56.9%F with 17.9% yield at the same sizing.**
  - **The above result, particularly scrubbed, represents a significant grade recovery improvement at the reported screen sizing.**

Low Grade P80 0.125mm Size by Analysis							
PRODUCT	Yield	Fe		SiO <sub>2</sub>		Al <sub>2</sub> O <sub>3</sub>	
Size (mm)	%	%	dist.	%	dist.	%	dist.
+1	0.00%	<0.001	0.00%	<0.001	0.00%	<0.001	0.00%
+0.5	0.06%	21.184	0.02%	68.327	0.17%	0.328	0.02%

+0.25	8.31%	21.184	3.44%	68.327	24.02%	0.328	2.36%
+0.125	11.10%	33.138	7.18%	50.728	23.82%	0.439	4.22%
+0.075	18.04%	55.149	19.43%	18.913	14.43%	0.628	9.82%
+0.045	9.97%	54.762	10.66%	19.284	8.13%	0.684	5.91%
-0.045	52.52%	57.799	59.27%	13.246	29.43%	1.706	77.67%
<b>Calculated Head</b>	<b>100.00%</b>	<b>51.217</b>	<b>100.00%</b>	<b>23.639</b>	<b>100.00%</b>	<b>1.154</b>	<b>100.00%</b>

<b>Low Grade P100 6.3mm Scrubbed -0.25+0.125mm Magnetic Characterisation</b>							
<b>PRODUCT</b>	<b>Yield</b>	<b>Fe</b>		<b>SiO2</b>		<b>Al2O3</b>	
Magnetics	%	%	dist.	%	dist.	%	dist.
1000G Magnetic	38.78%	58.531	42.41%	14.434	26.27%	0.576	35.70%
1760G Magnetic	19.37%	55.872	20.23%	18.270	16.61%	0.542	16.78%
3550G Magnetic	26.47%	58.091	28.74%	14.994	18.63%	0.554	23.44%
4300G Magnetic	4.72%	54.649	4.82%	18.618	4.13%	0.707	5.34%
7110G Magnetic	4.17%	38.172	2.98%	38.415	7.52%	1.406	9.38%
14900G Magnetic	2.47%	12.089	0.56%	79.358	9.19%	1.390	5.48%
14900G Non Magnetic	4.02%	3.559	0.27%	93.570	17.66%	0.603	3.88%
<b>Calculated Head</b>	<b>100.00%</b>	<b>53.510</b>	<b>100.00%</b>	<b>21.307</b>	<b>100.00%</b>	<b>0.626</b>	<b>100.00%</b>

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## **REFERENCES**

Ferenczi, P.A., 1997. Geological Investigation of the Roper River Iron Deposits Northern Territory Geological Survey Technical Report GS97-004.

Sherwin Iron: GR260 Roper River iron ore Project Annual Technical Reports



