



**TECHNOLOGY**  
METALS AUSTRALIA LIMITED

**ASX Announcement**

**14 December 2021**

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#### Directors

Michael Fry:  
**Chairman**

Ian Prentice:  
**Managing Director**

Jacqueline Murray:  
**Director**

Sonu Cheema:  
**Director and Company Secretary**

#### Issued Capital

203,661,390 ("TMT") Fully Paid  
Ordinary Shares

20,513,167 – Unquoted Options –  
various exercise prices and dates

3,650,000 – Performance Rights

**ASX Code: TMT**

**FRA Code: TN6**



# MURCHISON TECHNOLOGY METALS PROJECT

## INTEGRATION STUDY UPDATE

- Work is progressing to integrate the expanded Yarrabubba Mineral Resource Estimate into the development of the Murchison Technology Metals Project (MTMP).
- Integration of Yarrabubba into the MTMP is expected to extend the project life beyond 25 years based on a Global Measured and Indicated Resource of 50.2Mt at 0.9% V<sub>2</sub>O<sub>5</sub>.
- Metallurgical testwork to confirm Yarrabubba ore operating parameters and product recoveries is underway, building on positive results from previous sighter testwork.
- A total of 120kg of magnetic concentrate produced from representative composites of Yarrabubba ore has been sent to the kiln vendor's testing facility in Pennsylvania.
- Downstream testwork on calcine from the earlier pilot kiln testing confirms +99.5% purity vanadium pentoxide and process efficiency improvements.
- Open pit mine scheduling is underway to optimise the integration of Yarrabubba into the MTMP and deliver an updated Ore Reserve estimate.
- Infill diamond drilling designed to collect a bulk sample from Yarrabubba to commence in early January 2022.
- Discussions with offtake and downstream vanadium electrolyte / VRFB partners are progressing.
- Project delivery professional, Mr David English, appointed to the new role of Chief Operating Officer.

The Board of Technology Metals Australia Limited (ASX: **TMT**) ("**Technology Metals**" or the "**Company**") is pleased to provide an update on the workstreams underway designed to integrate the updated Mineral Resource Estimate ("**MRE**") for the Yarrabubba Project ("**Yarrabubba**") into the enlarged Murchison Technology Metals Project ("**MTMP**").

The "Integration Study" is designed to optimise the integration of Yarrabubba ore, which was not included in the Gabanintha Vanadium Project ("**GVP**") definitive feasibility study ("**DFS**"), into the expanded MTMP. This study benefits from the detailed engineering and metallurgical testwork completed for the GVP DFS and will deliver optimised production, operating costs, capital costs and financial model to enable the progression of project financing.

Importantly, the integrated MTMP provides an opportunity to bring forward the delivery of vanadium production relative to the previously contemplated staged development strategy.

**Managing Director Ian Prentice commented:** "The TMT team is making significant progress towards the timely development of the low cost MTMP as a large scale, world class vanadium development project.

This will be furthered bolstered by the return of David English to the Company in the newly established role of COO."

The Murchison Technology Metals Project (“**MTMP**”) consists of the Gabanintha Vanadium Project (“**GVP**”) located on granted mining lease M51/883 and the Yarrabubba Project (“**Yarrabubba**”) located on granted mining lease M51/884. A very high quality definitive feasibility study (“**DFS**”), incorporating process engineering design and comprehensive pilot scale metallurgical testwork, has been completed on the GVP. Yarrabubba was not included in the GVP DFS.

The MTMP hosts a Global Mineral Resource Estimate<sup>1</sup> (“**MRE**”) (Inferred, Indicated and Measured) of 146.2Mt at 0.8% V<sub>2</sub>O<sub>5</sub>, including an outstanding high grade component of 79.8Mt at 1.1% V<sub>2</sub>O<sub>5</sub>. The Global Measured and Indicated MRE component of 50.2Mt at 0.9% V<sub>2</sub>O<sub>5</sub> (30Mt at 0.9% V<sub>2</sub>O<sub>5</sub> at GVP and 20.2Mt at 0.9% V<sub>2</sub>O<sub>5</sub> at Yarrabubba) includes only fresh mineralisation based on high metallurgical recovery factors. The generally shallow overlying oxide and transitional mineralisation is currently categorised as Inferred mineral resource.

Work is progressing on an “Integration Study” designed to optimise the integration of Yarrabubba ore into the expanded MTMP. Benefitting from the very high quality GVP DFS, the “Integration Study” is expected to be completed in mid 2022 and will deliver optimised production, operating costs, capital costs and financial model to enable the timely progression of project financing. The MTMP Global Measured and Indicated MRE is expected to support a project life in excess of 25 years.

Importantly the integrated MTMP provides TMT with the opportunity to bring forward the delivery of vanadium production relative to the previously contemplated staged development strategy, supporting growth in vanadium consumption and the rapidly emerging Vanadium Redox Flow Battery (“**VRFB**”) industry. There is also the opportunity to produce a highly sought after titanium co-product whilst Yarrabubba ore is being processed.

Workstreams underway in support of the “Integration Study” include:

- Yarrabubba open pit mine design based on the updated MRE;
- Open pit mine scheduling to optimise the sequencing of ore sources across the MTMP;
- Infill diamond drilling at Yarrabubba to collect a bulk sample for metallurgical testwork / product generation and to convert a portion of the MRE to the highest confidence Measured category;
- Updated MRE and Ore Reserve estimate for the MTMP, incorporating the infill diamond drilling at Yarrabubba;
- Variability and grind liberation testwork on Yarrabubba ore to optimise both vanadium and titanium recoveries;
- Batch kiln roast – leach testwork at the kiln vendor’s testing facility in Pennsylvania to complement the pilot scale roast – leach testwork completed GVP magnetic concentrate;
- Pilot scale testwork on the bulk sampling being collected from Yarrabubba to generate a representative magnetic concentrate and sufficient non-magnetic tails to undertake titanium recovery testwork;
- Optimisation of the GVP DFS design work to “right size” the process plant throughput to ensure optimal production rates and operating parameters; and
- Engagement with engineering groups to progress the implementation strategy for the development of the MTMP.

### **Ongoing Metallurgical Work Programs**

The reassessment of comminution and beneficiation data (grind liberation and Davis Tube Recovery (“**DTR**”)) from the Yarrabubba iron – vanadium scoping work is underway to re-orient towards a primary vanadium focused project. The grind liberation characteristics of the Yarrabubba ore are being confirmed with a view to optimise both vanadium recovery from the magnetic concentrate and titanium recovery from the non-magnetics tailings stream.

A range of small scale roast-leach sighter / variability tests including varying salt dosages are being conducted at a metallurgical laboratory on the main ore lenses at Yarrabubba to support ore reserve assessments and financial modelling.

In parallel with the small scale sighter / variability tests a total of 120 kg of magnetic concentrates across varying grind sizes has been prepared from a representative composite of Yarrabubba ore. The material has been delivered to the kiln vendor's testing facility in Pennsylvania, with batch kiln roast – leach testing to commence imminently. This work is designed to complement the pilot scale roast – leach testwork completed on 7.5 tonnes of GVP magnetic concentrate and to enable progression of detailed design of the proposed roasting kiln. This will allow the timely placement of the order for the fabrication of the roasting kiln, a long lead item for the project development.

Titanium by-product recovery work will be completed on the non-magnetics tails material generated from the production of the 120kg of magnetic concentrates.

The representative bulk sample from the diamond drilling to commence at Yarrabubba in January 2022 will be processed through the optimal beneficiation (crush, grind, magnetic separation) circuit to generate a large tonnage of magnetic concentrate and sufficient non-magnetic tails material to undertake gravity separation (spiral) piloting and design investigations for the ilmenite (titanium) production circuit. This work will generate a significant volume of the titanium (ilmenite) product that will be provided to end-users for marketing and offtake discussions.

### **Yarrabubba Infill Diamond Drilling**

A program of large diameter diamond core drilling is scheduled to commence at Yarrabubba in early January 2022. This program will consist of up to 22 infill holes designed to collect a large representative bulk sample for metallurgical testwork / customer sample generation as well as upgrade a significant portion of the current Indicated MRE to the highest confidence Measured mineral resource category.

The program will also include up to 5 diamond holes to provide further data on the geotechnical parameters of the proposed open pit walls. This data will be used by the mining engineers to optimise open pit design parameters as part of the final design to be incorporated into the MTMP "Integration Study".

### **Gabanintha Kiln Pilot Calcine Work Program**

The calcine generated from the GVP kiln pilot testing in 2019 has been used to further refine the water leaching and vanadium precipitation design parameters. The P<sub>80</sub> 250 micron kiln calcine product was formed into three composites which were cyclically leached to generate liquor for downstream (refinery) testing and assess differences in the performance between the composites. The composites were cyclically leached to raise the leach tenor to the required levels prior to the downstream purification and precipitation processes.

This test work has enabled the undertaking of engineering design test work and the accurate sizing of filtration and thickening equipment in the downstream (refinery) sections of the process plant. As a result of this testing, several engineering improvements to the flowsheet have been identified that improve the efficiency of the unit operations. These engineering improvements will be incorporated into the final design of the MTMP processing plant.

The leach liquors from all the composites were taken through the flowsheet to produce final product in the form of V<sub>2</sub>O<sub>5</sub>. All composites yielded vanadium pentoxide that graded of 99.5% purity or greater.

## **Chief Operating Officer Appointment**

As a key component of the timely progression of the development of the MTMP Mr David English, a mining project delivery professional, has been appointed to the newly created role of Chief Operating Officer. David was previously engaged by the Company as Project Director to support the GVP DFS, with his return to the Company as COO ensuring the knowledge he gained from his earlier involvement will be fully utilised as the MTMP "Integration Study" progresses.

David brings a wealth of project development and operational experience gained from nearly 40 years working in the mining industry including some of Western Australia's major recent project developments. His experience includes:

- Project Manager for IGO Limited's Nova Nickel Project including, overseeing the project's Definitive Feasibility Study, environmental approvals and ultimately delivery of construction safely, on-time and on-budget;
- Project Manager for Sandfire Resources' DeGrussa Project, overseeing the design, construction, commissioning and handover of all processing and infrastructure facilities;
- General Manager Operations at the Windimurra Vanadium Project from February 2008 until February 2010, involved in the process of re-developing the project, including environmental approvals and permitting, commissioning and project ramp up;
- Project Consultant to the Oz Minerals' West Musgrave Project;
- Project Director for the Covalent Lithium feasibility study;
- Project development and operations leadership roles in various commodities including iron ore, gold, nickel, copper, vanadium, lithium and lead.

David's track record of project delivery combined with his experience at the Windimurra Vanadium Project will be invaluable as it is applied to the timely progression of the MTMP "Integration Study" and subsequent design and implementation of the project development strategy.

David commences in his role as COO in early January 2022.

This announcement has been authorised by the Board of Technology Metals Australia Limited.

*For, and on behalf of, the Board of the Company*

Ian Prentice

Managing Director

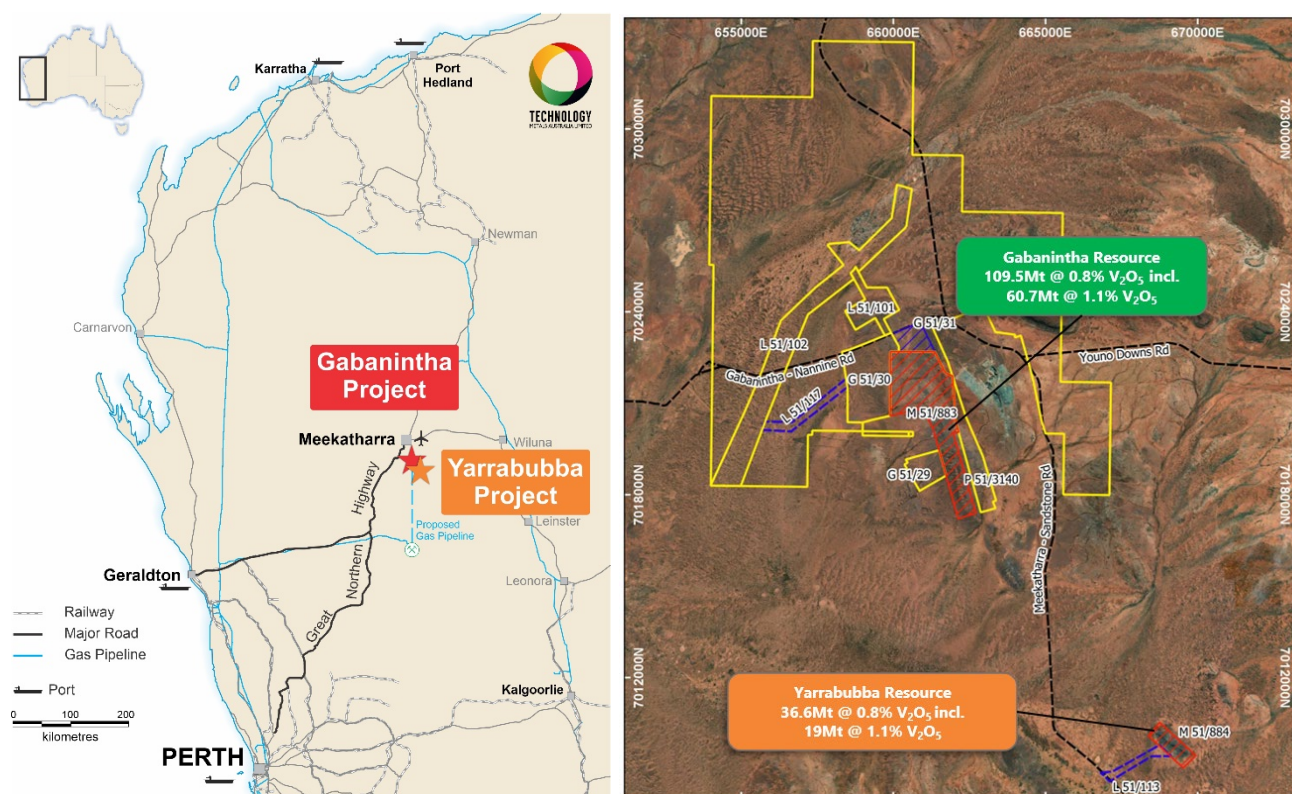
**Technology Metals Australia Limited**

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## About Technology Metals Australia Limited

**Technology Metals Australia Limited (ASX: TMT)** was incorporated on 20 May 2016 for the primary purpose of identifying exploration projects in Australia and overseas with the aim of discovering commercially significant mineral deposits. The Company's primary exploration focus has been on the Murchison Technology Metals Project located 40 km south east of Meekatharra in the mid-west region of Western Australia with the aim to develop this project to potentially supply high-quality  $V_2O_5$  flake product to both the steel market and the emerging vanadium redox battery (VRFB) market.

The Project consists of eleven granted tenements and three applications divided between the Gabanintha Vanadium Project (12 tenements) and the Yarrabubba Project (2 tenements). Vanadium mineralisation is hosted by a north west – south east trending layered mafic igneous unit with a distinct magnetic signature. A key differentiation between Gabanintha and a number of other vanadium deposits is the consistent presence of the high-grade massive vanadium – titanium – magnetite basal unit, which results in an overall higher grade for the Gabanintha Vanadium Project.



**Figure 1:** GVP and Yarrabubba Location and Tenure

Data from the Company's 2017, 2018 drilling programs, including 111 RC holes and 53 HQ and PQ diamond holes at the Gabanintha Project and 46 RC holes and 27 PQ sized diamond holes completed in late 2018 and 2020/21 at the Yarrabubba Project, has been used by independent geological consultants CSA Global to generate a global Inferred and Indicated Mineral Resource estimate, reported in accordance with the JORC Code 2012 edition, for the combined Projects. The Mineral Resource estimate confirms the position of the Murchison Technology Metals Project as one of the highest grade vanadium projects in the world.

**Table 1:** Global Mineral Resource estimate for the Murchison Technology Metals Project as at 09 November 2021

Material Type	Classification	Mt	V <sub>2</sub> O <sub>5</sub> %	Fe%	Al <sub>2</sub> O <sub>3</sub> %	SiO <sub>2</sub> %	TiO <sub>2</sub> %	LOI%	P%	S%
Massive Magnetite	Measured (North)	1.2	1.0	44.7	6.2	10.4	11.4	0.0	0.009	0.2
	Indicated (North)	18.5	1.1	49.1	5.2	5.8	12.9	-0.1	0.007	0.2
	Indicated (South)	12.0	1.1	48.2	5.4	7.4	12.5	1.8	0.010	0.3
	<b>Total Indicated</b>	<b>30.6</b>	<b>1.1</b>	<b>48.8</b>	<b>5.3</b>	<b>6.4</b>	<b>12.7</b>	<b>0.6</b>	<b>0.008</b>	<b>0.2</b>
	Inferred (North)	41.0	1.1	47.7	5.6	7.1	12.6	0.3	0.008	0.2
	Inferred (South)	7.0	1.1	47.4	5.7	8.3	12.3	2.1	0.010	0.3
	<b>Total Inferred</b>	<b>48.1</b>	<b>1.1</b>	<b>47.7</b>	<b>5.6</b>	<b>7.3</b>	<b>12.6</b>	<b>0.5</b>	<b>0.008</b>	<b>0.2</b>
	<b>Massive Global</b>	<b>79.8</b>	<b>1.1</b>	<b>48.1</b>	<b>5.5</b>	<b>7.0</b>	<b>12.6</b>	<b>0.6</b>	<b>0.008</b>	<b>0.2</b>
Disseminated / Banded Magnetite	Indicated (North)	10.3	0.6	28.6	13.1	25.5	7.5	3.0	0.030	0.2
	Indicated (South)	8.1	0.6	28.5	12.0	25.2	7.3	2.4	0.018	0.2
	<b>Total Indicated</b>	<b>18.4</b>	<b>0.6</b>	<b>28.6</b>	<b>12.6</b>	<b>25.4</b>	<b>7.4</b>	<b>2.7</b>	<b>0.025</b>	<b>0.2</b>
	Inferred (North)	38.5	0.5	27.1	12.7	27.4	6.9	3.3	0.027	0.2
	Inferred (South)	9.4	0.5	26.6	13.3	27.1	6.9	2.4	0.014	0.3
	<b>Total Inferred</b>	<b>47.9</b>	<b>0.5</b>	<b>27.0</b>	<b>12.8</b>	<b>27.4</b>	<b>6.9</b>	<b>3.1</b>	<b>0.025</b>	<b>0.2</b>
	<b>Diss / Band Global</b>	<b>66.3</b>	<b>0.5</b>	<b>27.4</b>	<b>12.8</b>	<b>26.8</b>	<b>7.0</b>	<b>3.0</b>	<b>0.025</b>	<b>0.2</b>
<b>Combined</b>	<b>Global Combined</b>	<b>146.2</b>	<b>0.8</b>	<b>38.7</b>	<b>8.8</b>	<b>16.0</b>	<b>10.1</b>	<b>1.7</b>	<b>0.016</b>	<b>0.2</b>

*\* Note: The Mineral Resources were estimated within constraining wireframe solids using a nominal 0.9% V<sub>2</sub>O<sub>5</sub>% lower cut-off grade for the massive magnetite zones and using a nominal 0.4% V<sub>2</sub>O<sub>5</sub>% lower cut-off grade for the banded and disseminated mineralisation zones. The Mineral Resources are quoted from all classified blocks within these wireframe solids above a lower cut-off grade of 0.4% V<sub>2</sub>O<sub>5</sub>%. Differences may occur due to rounding.*

Data from the previous global Mineral Resource estimate and the 2019 DFS on the GVP were used by independent consultants CSA Global to generate a Proven and Probable Ore Reserve estimate based on the Measured and Indicated Mineral Resource of 39.6 Mt at 0.9% V<sub>2</sub>O<sub>5</sub> located at Gabanintha and Yarrabubba (see ASX announcement dated 16 September 2020). Work is underway to update the Proven and Probable Ore Reserve estimate for the MTMP as part of the Yarrabubba integration work.

**Table 2:** Ore Reserve Estimate as at 15 September 2020

Reserve Category	Tonnes (Mt)	Grade V <sub>2</sub> O <sub>5</sub> %	Contained V <sub>2</sub> O <sub>5</sub> Tonnes (Mt)
Proven	1.1	0.96	0.01
Probable	37.9	0.90	0.34
<b>Total</b>	<b>39.0</b>	<b>0.90</b>	<b>0.26</b>

- Note: Includes allowance for mining recovery (98% for massive magnetite ore and 95% for banded and disseminated ore) and mining dilution applied as a 1 metre dilution skin; resulting in a North Pit dilution for massive magnetite ore of 13% at 0.45% V<sub>2</sub>O<sub>5</sub>, and North Pit dilution for banded and disseminated ore of 29% at 0.0% V<sub>2</sub>O<sub>5</sub>; a Central Pit dilution for massive magnetite ore of 10% at 0.46% V<sub>2</sub>O<sub>5</sub>, and Central Pit dilution for banded and disseminated ore of 20% at 0.0% V<sub>2</sub>O<sub>5</sub>; a Southern Pit dilution for massive magnetite ore of 12% at 0.49% V<sub>2</sub>O<sub>5</sub>, and Southern Pit dilution for banded and disseminated ore of 15% at 0.21% V<sub>2</sub>O<sub>5</sub>)
- Rounding errors may occur

<b>Capital Structure</b>	
Fully Paid Ordinary Shares on Issue	203.7m
Unquoted Options (\$0.20 – 10/05/23 expiry) <sup>1</sup>	8.00m
Unquoted Options (\$0.50 – 01/01/24 expiry) <sup>2</sup>	4.35m
Unquoted Options (\$0.25 – 15/06/22 expiry)	6.16m
Unquoted Options (\$0.60 – 30/06/25 expiry) <sup>3</sup>	2.00m
Class B Performance Rights <sup>4</sup>	1.825m
Class C Performance Rights <sup>5</sup>	1.325m
Class D Performance Rights <sup>6</sup>	0.50m

1. Director and employee options – 3.875m vested on grant of the mining licences, 4.125 million vest on Gabanintha FID
2. Employee options – 3.925million vest and subject to the Company making a final investment decision (FID) for the MTMP prior to 30 October 2023 and 0.425 million vest subject to the Company achieving first commercial production from the MTMP prior to 30 October 2023.
3. Employee options vest subject to the Company achieving first commercial production from the MTMP prior to 30 June 2025.
4. Each Class B Performance Right is a right to receive one fully paid ordinary share in TMT, subject to the terms of the employee incentive scheme and subject to the Company making a final investment decision (FID) for the MTMP prior to 30 October 2023.
5. Each Class C Performance Right is a right to receive one fully paid ordinary share in TMT, subject to the terms of the employee incentive scheme and subject to the Company achieving first commercial production from the Yarrabubba Project prior to 30 October 2023.
6. Each Class D Performance Right is a right to receive one fully paid ordinary share in TMT, subject to the terms of the employee incentive scheme and subject to the Company achieving first commercial production from the MTMP prior to 30 June 2025.

### Forward-Looking Statements

This document includes forward-looking statements. Forward-looking statements include, but are not limited to, statements concerning Technology Metal Australia Limited's planned exploration programs, corporate activities and any, and all, statements that are not historical facts. When used in this document, words such as "could," "plan," "estimate," "expect," "intend," "may", "potential," "should" and similar expressions are forward-looking statements. Technology Metal Australia Limited believes that it has a reasonable basis for its forward-looking statements; however, forward-looking statements involve risks and uncertainties and no assurance can be given that actual future results will be consistent with these forward-looking statements. All figures presented in this document are unaudited and this document does not contain any forecasts of profitability or loss.

### Competent Persons Statement

The information in this report that relates to Exploration Results are based on information compiled by Mr John McDougall. Mr McDougall is the Company's Exploration Manager and a member of the Australian Institute of Geoscientists. Mr McDougall has sufficient experience relevant to the styles of mineralisation and types of deposits which are covered in this report and to the activity which they are undertaking to qualify as a Competent Person as defined in the 2012 edition of the 'Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves' (**JORC Code**). Mr McDougall consents to the inclusion in this report of the matters based on his information in the form and context in which it appears.

The information in this report that relates to Mineral Resources is based on information compiled by Mr Aaron Meakin. Mr Aaron Meakin is a Principal Consultant of CSA Global Pty Ltd and is a Member and Chartered Professional of the Australasian Institute of Mining and Metallurgy. Mr Aaron Meakin has sufficient experience relevant to the style of mineralisation and type of deposit under consideration and to the activity which he is undertaking to qualify as Competent Person as defined in the 2012 Edition of the Australasian Code for the Reporting of Exploration Results, Mineral Resources and Ore Reserves (**JORC Code**). Mr Aaron Meakin consent to the disclosure of the information in this announcement in the form and context in which it appears.

The information that relates to Ore Reserves is based on information compiled by Mr Daniel Grosso an employee of CSA Global Pty Ltd. Mr Grosso takes overall responsibility for the Report as Competent Person. Mr Grosso is a Member of The Australasian Institute of Mining and Metallurgy and has sufficient experience, which is relevant to the style of mineralisation and type of deposit under consideration, and to the activity he is undertaking, to qualify as Competent Person in terms of the JORC (2012 Edition). The Competent Person, Daniel Grosso has reviewed the Ore Reserve statement and given permission for the publication of this information in the form and context within which it appears.

The information in this report that relates to the Processing and Metallurgy for the Yarrabubba project is based on and fairly represents, information and supporting documentation compiled by Mr Brett Morgan, a full-time employee of Technology Metals Australia. Mr Morgan is a Member of The Australasian Institute of Mining and Metallurgy and has sufficient experience, which is relevant to the style of mineralisation and type of deposit under consideration, and to the activity he is undertaking, to qualify as Competent Person in terms of the JORC (2012 Edition). The Competent Person, Brett Morgan consents to the inclusion in the report of the matters based on his information in the form and context in which it appears.