



## ASX Release

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# VERY SUCCESSFUL SCANDIUM PILOT PLANT TESTWORK PRODUCES HIGH PURITY SCANDIUM OXIDE

### HIGHLIGHTS:

- Metallica pilot plant produces maiden 1 kilogram scandium oxide at 99.99% purity
- High Pressure Acid Leaching (HPAL) processing followed by solvent extraction (SX) recovery testwork achieves overall scandium recoveries of approximately 85%
- Pilot testwork proves the NORNICO flowsheet & Metallica's proprietary technology is highly suited for scandium extraction, recovery and purification
- Patent applications in progress

Australian resource development company, Metallica Minerals Limited (**ASX: MLM**), is pleased to announce the completion of its first round of pilot scale metallurgical testwork relating to scandium extraction from laterite ore types sourced from the NORNICO "tri-metal" project. The results of the testwork have been very positive, confirming that Metallica's metallurgical flowsheet and proprietary scandium extraction and refining technology is highly effective and positions Metallica as a leader in terms of achieving successful scandium extraction and recovery of high purity scandium at a pilot plant level.

### Metallurgical Testwork Overview

The metallurgical testwork undertaken by Metallica was completed over a 5-6 month period commencing in February 2012. The testwork can be broken down into two stages:

- Stage 1: HPAL testwork for scandium-nickel-cobalt extraction from the NORNICO laterite ore types at SGS Lakefield Oretest (**SGS**) in Perth
- Stage 2: Scandium extraction and refining into scandium oxide at hrltesting in Brisbane

Scandium minerals occur within the NORNICO laterite ore types. In Metallica's recovery process, the scandium is leached via the HPAL process into solution, and then extracted and refined to scandium oxide ( $\text{Sc}_2\text{O}_3$ ) also called "scandia". Scandium oxide is the form in which scandium is typically purchased by end users and is currently priced between US\$3,000-8,000/kg for purities ranging between 99.9%-99.999%.

Metallica's pilot scale testwork achieved recoveries of approximately 85% of scandium from the scandium rich nickel laterite ore types into a scandium oxide product that exceeded the target purity level of over 99.9% ("Three Nines") and most of the product achieved 99.99% purity ("Four Nines")

Metallica Managing Director, Andrew Gillies, said:

"The results achieved by our metallurgical team are simply astonishing when taking into consideration that this is the very first pilot test run of a newly developed technology for extracting and refining scandium, all invented and designed by Metallica here in Brisbane. Achieving high scandium recoveries of approximately 85% and particularly the refinement into scandium oxide of a purity of 99.99% so soon, are results that exceeded our initial expectations."

"Congratulations, and a big thank you, to our dedicated metallurgical team and contractors who have worked enthusiastically and diligently to achieve this milestone"

"Based on our discussions with potential offtakers, the scandium oxide Metallica has produced should comfortably meet the specifications required by these consumers. We will be supplying samples of our scandium oxide product to various potential offtakers, for their evaluation, to confirm this."

Metallica CEO, Gavin Becker, said:

“In my 35+ years of metallurgical experience, this is one of the most remarkable breakthroughs that I have been involved with. In addition to the splendid results, the process is hydrometallurgically based, which makes it relatively straightforward to scale up for commercial development.”

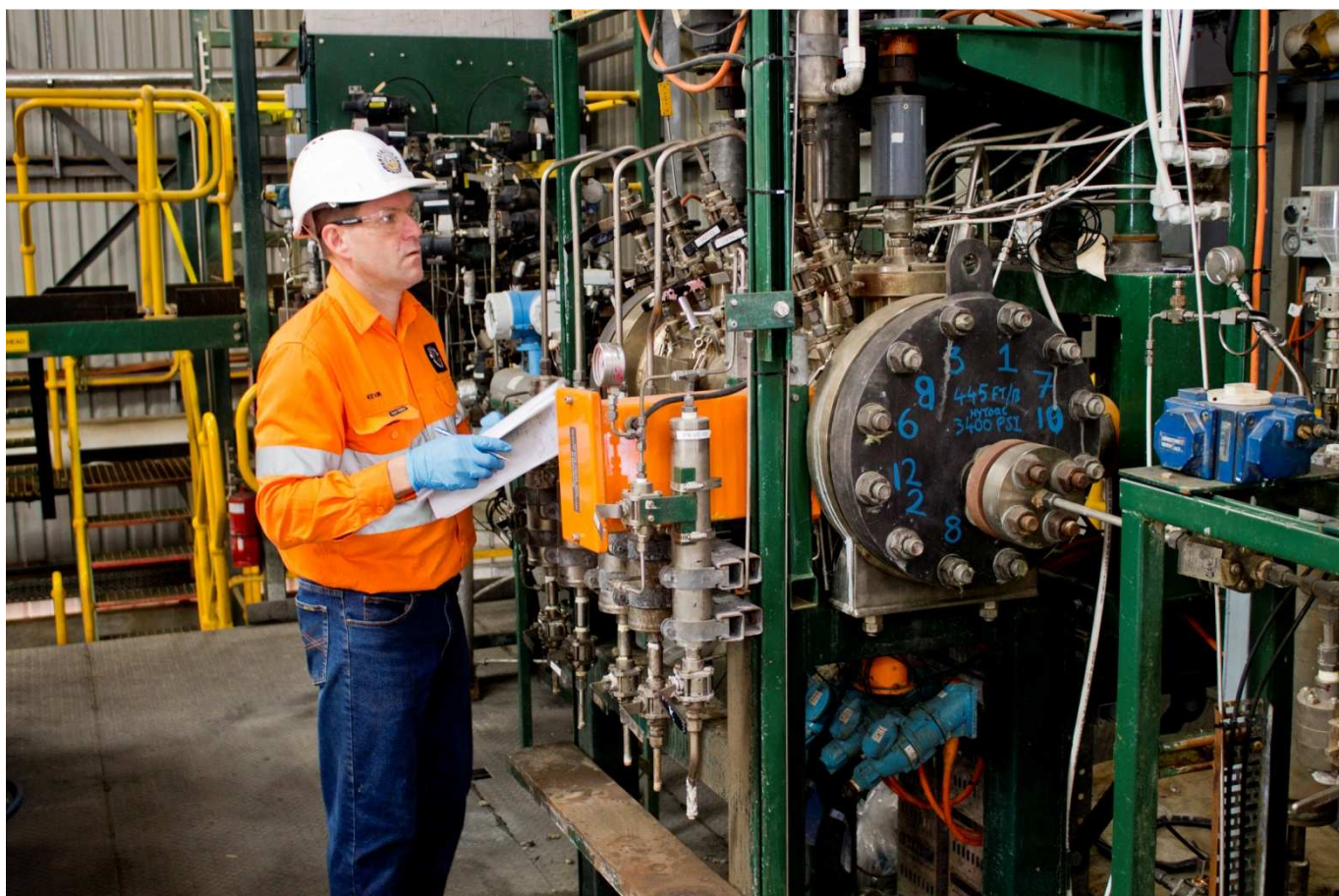
### Stage 1: HPAL Testwork

Metallica collected a suite of large representative samples from its NORNICO laterite (oxide) resources. 4,400kg was selected from those samples for this testwork campaign - grading 276g/t scandium, 0.36% nickel and 0.07% cobalt. This feed blend was selected to maximise scandium production for the purpose of market evaluation.

This material was transported to Perth to be processed through the SGS HPAL pilot plant (**See Figure 1**). The scandium-nickel-cobalt target metals in the sample were HPAL leached providing a pregnant leach solution (PLS) of 15,000 litres.

For more information on the HPAL testwork, please see Metallica's ASX announcement 8 March 2012.

**Figure 1:** Metallica's Process Manager Kevin Pery observing the HPAL pilot plant at SGS



### Stage 2: Scandium Recovery & Refining

The PLS produced at SGS was transported to Brisbane where a purpose built pilot plant for scandium extraction had been constructed by Metallica. This plant was designed to recover scandium from the PLS into a more concentrated solution (**Scandium Rich Solution**) using solvent extraction techniques which form part of Metallica's proprietary technology. Scandium recovery from the PLS into the Scandium Rich Solution averaged 98%.

The Scandium Rich Solution was then refined under clean laboratory conditions to ensure high purity scandium oxide could be produced. Using proprietary recovery and refining techniques, approximately 1 kilogram of high purity scandium oxide was produced.

The ability to produce high purity scandium oxide is essential for both Solid Oxide Fuel Cell (SOFC) and aluminium alloys end user specification requirements, with the highest purity scandia being much sought after by the SOFC sector.

Scandium oxide appears as a free flowing white powder, as seen in Figure 2 below:

**Figure 2:** Scandium oxide produced by Metallica



### Future Metallurgical Testwork

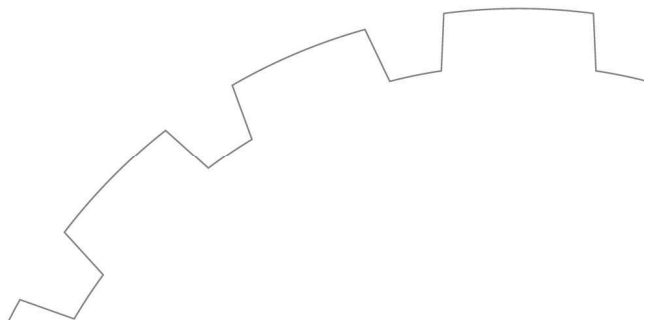
As part of its next round of activities on NORNICO, Metallica will be conducting further detailed metallurgical testwork. This will involve a fully integrated pilot plant that will allow both stages to run as one continuous process, and provide detailed process design criteria necessary for a future Definitive Feasibility Study.

Another large representative sample will be selected from various dominant ore types and grade ranges that would be typical of NORNICO's expected mining schedule and process plant feed in the first 5 years of operation. Typical metal grades will be in the order of 70g/t scandium, 0.8% nickel and 0.08% cobalt.

This testwork is expected to commence in September 2012.

### Patent Process

In order to protect its Intellectual Property, Metallica is in the process of submitting patent applications relating to its scandium extraction and refinement techniques. The patents will ensure that potential shareholder value derived from this breakthrough technology is protected.



**Conclusion**

The very successful metallurgical testwork undertaken by Metallica to date underpins the potential for NORNICO to produce commercial levels of scandium oxide that will allow that market to grow significantly from its current size (constrained by severe lack of supply) This technical success, coupled with the positive results from the NORNICO Scoping Study (see ASX announcement of 4 July 2012), ensures that Metallica is well positioned to become the world's first major, reliable, long term supplier of scandium oxide.

Metallica remains in discussions with potential scandium oxide offtake partners for NORNICO. Metallica will provide each of these potential offtakers with scandium oxide samples produced from its testwork for assessment. Metallica is at a crucial stage in these ongoing discussions and is confident that the specifications of its product will be very attractive for use in both the Solid Oxide Fuel Cell and Aluminium Alloy target market sectors.

**Scandium**

*Scandium (Element 21 of the periodic table) is considered one of the 17 rare earth elements (REE) and one of the most useful and valuable. High-grade, large tonnage, easily mineable scandium deposits are scarce, making it a commodity that is difficult to obtain in large quantities.*

*Scandium has unique properties that can enhance the world's technological future. Scandium is one of the most potent strengthening elements that can be alloyed with aluminium to create stronger master alloys with applications in aerospace, transport and high performance sporting equipment.*

*Scandium is also used in the production of the most efficient solid oxide fuel cells (SOFC's). As the western world transitions towards green energy, SOFC's will become more widely used, providing clean and efficient energy that is driven by natural gas.*

*The importance of scandium to the world market cannot be overestimated, especially with the massive worldwide expansion of natural gas usage and gas distribution infrastructure. Natural gas and fuel cells are the future, and Metallica believes scandium is going to be a part of that future by getting the most amount of electrical and thermal energy from the least amount of fuel – where efficient cleaner energy is the gateway to a more sustainable society.*

*The use of scandium has been limited by its scarcity and lack of reliable supply. The current total world supply of scandium is estimated to be around ten tonnes of scandium oxide per annum, all of which is sourced as a by-product from other strategic metal processing.*

*High purity scandium oxide currently sells at prices in the range of US\$3,000-8,000/kg depending on product purity.*

*To learn more about scandium, see Metallica's March 2012 Quarterly Report (**Pages 18 & 19**).*

For more information contact:

**Andrew Gillies (Managing Director) or Gavin Becker (CEO)**

Phone: +61 (7) 32493000

Email: [admin@metallicaminerals.com.au](mailto:admin@metallicaminerals.com.au)

