



## ASX & Media Release

Friday 30 September, 2011

### METALLICA RECOGNISES MAJOR BENEFITS OF SCANDIUM FOR NEW 2014 TRI-METAL MINE DEVELOPMENT NEAR TOWNSVILLE

Metallica Minerals Ltd (ASX:"MLM") recognises the considerable benefits of having high grade scandium ores added to the processing of its established nickel-cobalt resources. In addition, Metallica is evaluating larger scale production from between a minimum 500,000 tpa to a 1Mtpa maximum range high pressure acid leach (HPAL) operation to gain further benefits from economies of scale.

Targeted production start-up in late 2014 of a new tri-metal mine development in North Queensland has been announced, subject to completion of feasibility studies, by the project owner.

Initial marketing initiatives are also underway to secure maiden offtake agreements from high end aluminium master alloy and Solid Oxide Fuel Cell (SOFC) manufacturers for the project's high grade scandium content.

Scandium (Sc) alloyed with aluminium produces one of the lightest, strongest alloys in the world – one with significantly improved durability, plasticity, weldability and corrosion resistance. Scandia-stabilised zirconia has extremely high oxygen-ion conductivity for use as a high efficiency electrolyte in SOFC's.

Speaking in Perth on the second day of the **2011 Paydirt Australian Nickel Conference**, the annual business forum for the sector, Metallica's Chief Executive Officer, Mr Gavin Becker, said the Company was now undertaking feasibility studies on its proposed combined nickel-cobalt-scandium mining and processing operation at Greenvale, northwest of Townsville.

The studies would be based on a minimum annual throughput rate of around 500,000 tonnes, and topping out at one million tpa.

This minimum level is nearly three times the previously envisaged rate of up to 180,000 tonnes per annum, based on a previous scoping study completed in 2010 and revised upto April this year when it was decided to use HPAL processing.

The larger operation would benefit from its own acid and power plant, therefore delivering significant savings in operational costs while providing secure long-term acid supply.

The project capital cost would potentially be around A\$500 million or more although firm figures would be subject to Bankable or Definitive Feasibility Study outcomes.

A proven bankable technology and more conventional processing method - High Pressure Acid Leach (HPAL) – has been chosen for the project, which maximises scandium, nickel and cobalt extraction.

This will allow Metallica significant flexibility in adjusting the different mix of the three metals in the laterite ores through the plant to meet commodity price variations and customer demand.



The changes ensure in particular that Metallica can optimise the commercial opportunities to develop a high grade (>200g/t) scandium output through Greenvale.

Scandium (element 21 in the Periodic Table) is one of the 17 rare earth elements (REE). High grade deposits are extremely rare with scandium oxide currently priced in the US\$1,500-2,000/kg range (99.9% purity), making it one of the more valuable REEs.

It was only in March last year that Metallica acquired the former Greenvale nickel mine, located in the southern portion of the Company's major NORNICO nickel-cobalt project area.

Metallica had already proven up several nickel-cobalt deposits near Greenvale and nearer the northern area of NORNICO – notably Bell Creek, ahead of that acquisition.

A month after the acquisition, drilling by Metallica at Greenvale discovered shallow high scandium mineralisation, including a bonanza intercept of 27m at 882 g/t Sc from surface, around the old nickel-cobalt mine's workings at the Lucknow deposit.

As scandium can be co-produced with nickel and cobalt during processing, Metallica is focused on optimising the project to deliver initial output within three years.

Mr Becker said the plant size and proposed HPAL technology would ensure NORNICO's valuable high grade scandium ores are treated efficiently and using proven processing technology.

"Scandium as a co-product is a potential nickel laterite game changer for Metallica – especially at NORNICO, given the high scandium grades, and can add between 30-40% additional revenue to the project,"

"Nickel laterites are one of the few geological mineralisation environments hosting enriched to high grade scandium levels, and out of those, very few contain significant scandium associated with nickel-cobalt. We are very fortunate that not only do we have scandium (Sc) associated with Ni-Co, but also Ni-Co associated with the Sc resources. Being a Tri-metal project has considerable advantages, with potential for much higher revenues per tonne of the blended ore treated." Mr Becker said.

"Feasibility studies into these options are being commenced and we are now seeking Expressions of Interest for scandium offtake agreements," he said.

Metallurgical testwork, mine planning and scheduling, environmental studies and scandium market development activities are underway.

"The scandium opportunity precipitated a reappraisal on how to optimise 3 metal revenue streams, an excellent project location and best available proven technology in the quickest and most efficient way," Mr Becker said.

"The decision to go with the larger-scale operation allows optimal inclusion of the 2010 scandium discovery ores in our maiden Ni-Co production runs and on a larger scale than possible under former project considerations.

"The larger plant is expected to generate significant economies of scale as well as substantial savings in operating costs for NORNICO from having its own acid and power plant," he said.

"Importing acid is one of the largest external costs in processing. On-site acid production (requiring sulphur import) and its heat, steam and electricity by-products will give major offsets to running costs and provide that all important security of acid supply.



“An HPAL system will allow Metallica to reap full commercial benefit from start-up by allowing all typical Greenvale and iron rich ores from NORNICO to be treated simultaneously, particularly the high scandium ores from the project’s Lucknow and Kokomo deposits,” Mr Becker said.

Baseload ore feedstock will initially be selectively mined from nickel-cobalt laterites within the historic Greenvale mine site area and supplemented by high grade, cobalt-scandium-rich nickel laterites trucked in from the nearby Lucknow deposit. Later, the Kokomo deposit in the centre of the NORNICO project area, has further capacity to deliver.

The larger start-up operation is estimated to produce around 6,000-9,000t of nickel-cobalt contained metal and at least 40,000 kilograms of scandium oxide per annum.

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**What is scandium?**

**Scandium** (Sc) is element 21 in the Periodic Table. A, silvery-white metallic transition metal, often classified as a rare earth element (REE), together with yttrium and the 15 lanthanides. The positive effects on aluminum alloys were discovered in the 1970’s and its use in such alloys remains its main application. Low levels (5-15g/t) of Sc are not uncommon but it rarely occurs above 30g/t. Mineable deposits averaging 200g/t Sc are scarce. Only three such known resources have been defined globally, two of which are within Metallica’s NORNICO project. Sc is a key ingredient in the new solid oxide fuel cell (SOFC) market and in applications in lighting and aerospace. The main application of scandium by weight is in aluminium-scandium alloys for select aerospace industry components. These alloys contain between 0.1% and 0.5% of scandium. They were used in the Soviet military aircraft, specifically the MiG-21 and MiG-29 and missiles. Global usage is small, around 5 tpa because of its rarity, scandium supply has been severely constrained due lack of exploitable scandium deposits and long term supply from existing sources. This absence of reliable, secure, stable and long term production has limited major commercial applications of scandium. Despite this low level of use, scandium offers significant benefits. Particularly promising is the strengthening of aluminium alloys and welded frames with as little as 0.5% scandium. Scandium-stabilized zirconia (SSZ) enjoys a growing market demand for use as a high efficiency electrolyte in solid oxide fuel cells (SOFC).

Some items of sports equipment, which rely on high performance materials, have been made with scandium-aluminium alloys, including baseball bats and bicycle frames and components. Lacrosse sticks are also made with scandium-titanium alloys to take advantage of the strength of titanium. The American gunmaking company Smith & Wesson produces revolvers with frames composed of scandium alloy and cylinders of titanium or carbon steel. Scandium iodide along with sodium iodide, when added to a modified form of mercury-vapor lamp, produces a form of metal halide lamp. This lamp is a white light source with high color rendering index that sufficiently resembles sunlight to allow good color-reproduction with TV cameras.

