



# METALLICA MINERALS LIMITED

ASX Release

28 March 2013

## SCONI SCANDIUM PROJECT POSITIVE PRE-FEASIBILITY STUDY (PFS)

Metallica Minerals Ltd (ASX: MLM), is pleased to announce the positive results (summarised in Table 1) of its PFS for the 100% owned SCONI Phase 1 scandium project ideally located within the historic Greenvale nickel mine area, north west of Townsville in Queensland, Australia.

### HIGHLIGHTS:

▶ PFS demonstrates SCONI Phase 1 (100% owned) is an economically and technically viable project with considerable upside

▶ The project will produce scandium oxide (“scandia”) at >99.9% purity

▶ Project has attractive economics, with an NPV of \$273M (8% discount rate, pre-tax, 100% equity, real terms) and a 20.6% IRR (pre-tax)

▶ Total capital cost is \$247 million (including 20% contingency)

▶ Project ideally located with access to roads, water, power, ports, and the existing regional industrial hub of Townsville (see Figure 2 & 3)

▶ The PFS estimates average production of 51 tpa of scandia over a 20 year period, delivering a long project life and reliable supply

▶ Simplified scandium only flowsheet requiring no initial acid plant or power plant

▶ Scandia production to supply a portion of Bloom Energy’s requirements under the Heads of Agreement, and expected demand from other solid oxide fuel cell and aluminium alloy customers

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## SCONI Phase 1 Project

The PFS was based on a High Pressure Acid Leach (HPAL) processing plant treating 200,000 tpa of high-grade Lucknow scandium laterite resource from the Company's 100% owned Lucknow Deposit. The Lucknow scandium resource is near the surface (<35 meters depth) and situated just 12 kilometres by road from the proposed Greenvale HPAL plant (see Figure 3). The project will produce 50-65tpa of high-purity (>99.9%) scandia over a 20 year life operation. The resource will be processed utilising delivered acid in the initial stages of the operation with the view to constructing an acid and power plant after commissioning and ramp up of the project.

Managing Director Andrew Gillies said, *"The PFS supports the company's strategy of focussing on the SCONI project where it has the opportunity to potentially become the world's first, major long-term reliable producer of scandium from a primary scandium deposit"*.

Chief Executive Officer, Mr Becker added *"The SCONI Phase 1 Study has been performed expeditiously by our world class technical team and leading consultants. The majority of components in the mechanical equipment list included a high level of actual quotes for key items (over 60%)"*.

## Brownfields Expansion Opportunity - SCONI Phase 2

SCONI Phase 1 is designed to be a commercial stand-alone project as evidenced by the positive economic results from the PFS. Phase 1 may lead to the development decision for the much larger Phase 2 brownfields expansion at a later date, subject to economic conditions at that time. It is envisaged that Phase 2 will process 750,000 tpa (in addition to the SCONI Phase 1 of 200,000 tpa) producing Ni-Co & Sc products from the Company's SCONI Southern Resources (see Appendix 1 - Table 4 and 5). The tri-metal Ni-Co-Sc Phase 2 project may be of interest to already established companies active in nickel and speciality metal processing or markets.

Mr Gillies went on to say, *"The PFS has shown SCONI Phase 1 (scandium only) to have attractive economics with solid upside potential. In addition, it is an ideal precursor for the much larger potential full scale Phase 2 nickel-cobalt-scandium operation proposed as future major expansion seeking to maximise the utilisation of the SCONI nickel cobalt scandium resource base. Scandium production could then be substantially expanded and project life extended"*.



*Metallica Minerals, SGS, HRL Testing and Jacobs staff at SGS Lakefield Orestest Pilot Plant (September 2012)*

**Table 1: SCONI Phase 1 PFS - Assumptions & Outputs (Base Case)**

Description	Assumption / Output
Project Owner	Metallica Minerals Ltd (100%)
Processing Plant Throughput	200,000tpa (at full capacity)
Scandium Measured & Indicated Mineral Resource Base for Lucknow	High grade Resource of 5.7 Mt at 195 g/t Sc using 120 g/t Sc COG (see Table 3) within a resource of 9.0 Mt at 160g/t Sc using a 70g/t Sc COG (see Appendix 1 - Tables 1 & 2) (Note: associated low grade Ni & Co – not planned for recovery)
Feed tonnage & Grade (year 1 to 20)*	3.92 Mt at 209 g/t Sc
Scandia Production Target	50 tpa to 65 tpa (maximum)
Operational Life (Phase 1)	20 years (assumes stand alone Phase 1 - scandia only)
Average Sc Recoveries	81.5%
Average Annual Scandia Production	51 tpa Scandium Oxide (target start early 2016)
Long Term Average Price Assumptions	US\$2,000/kg Scandium Oxide (>99.9% purity)
Long term average Exchange Rate AUD:USD	0.85
Capital Expenditure	A\$209M (see Table 4)
Capital Contingency	A\$38M (+20%)** (see Table 4)
Total Capital Cost	A\$247M (see Table 4)
Average Total Operating Cost p.a.	A\$58M (see Table 5)
Average Annual Revenue	A\$120M
Net Present Value (NPV)	A\$273M (pre-tax), A\$155M (post-tax) (8% discount rate, 100% equity, real terms)
Internal Rate of Return (IRR)	20.6% (pre-tax), 15.9% (post-tax)
Payback Period	4.9 years (pre-tax), 5.7years (post-tax)
Average Annual EBITDA	A\$59M
Acid Plant	A\$48M acid and power plant operational after 3 years of operations
Commence scandium oxide production	Targeting early 2016 (subject to project financing)
Expansion Capacity	Potential SCONI (Phase 2) 750,000 tpa Ni-Co-Sc operation

\* Assumes no beneficiation or mill feed upgrading, with suitable pit selection and mining factors applied.

\*\* Contingency is based on 20% of direct and indirect capital costs

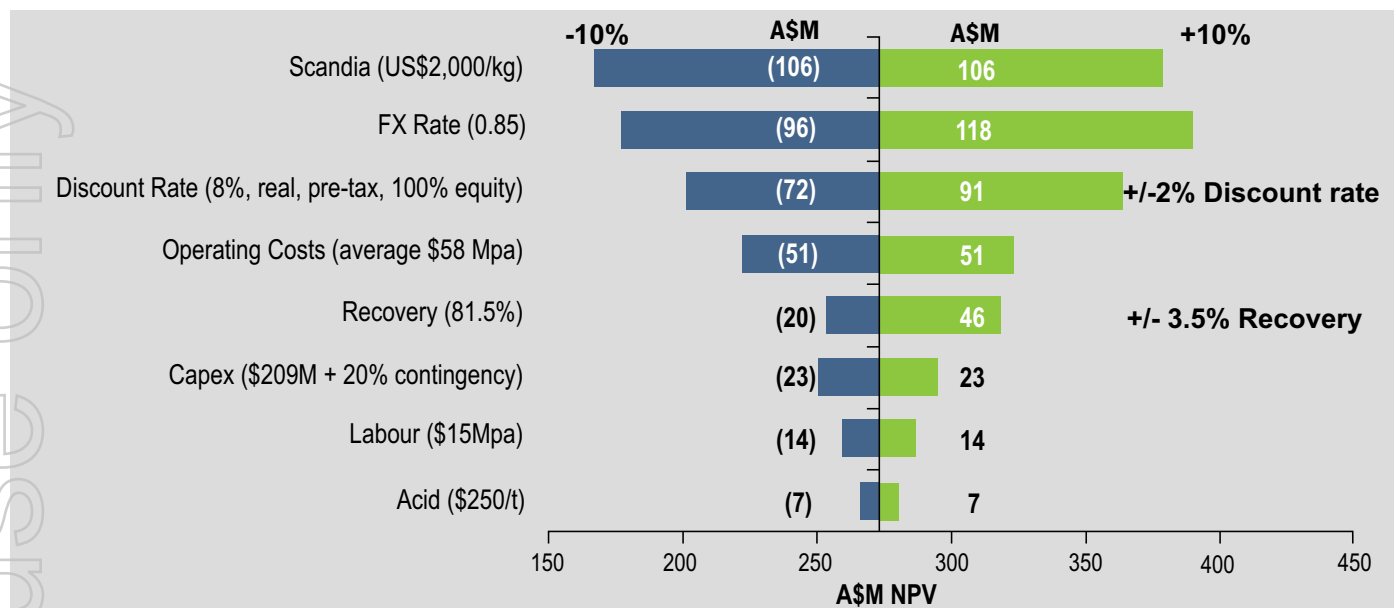
tpa = tonnes per annum, M = Million, Mt = Million tonnes, g/t = grams per tonne, COG = cut off grade

\$ are all Australian Dollars except where indicated

Scandium oxide = scandia = Sc<sub>2</sub>O<sub>3</sub>

# SCONI Phases 1 Base Case – Sensitivity Analysis

The below chart (Figure 1) demonstrates the sensitivities in relation to the pre-tax NPV of A\$273M. The project's economics are most sensitive to changes in the foreign exchange rate and the scandia price.



**Figure 1 - Sensitivity analysis for SCONI Phase 1 PFS**

There is additional upside to the base case in the event of improved extraction and recovery of scandium through optimised leaching. The PFS has used a conservative 81.5% recovery estimate, however, our metallurgical consultants are working to optimise recovery and after successful leaching trials now expect to be able to improve the rate with the potential of achieving 85%. The capital cost estimate was based on all new and readily sourced equipment. There is potential for substantial savings if equipment is sourced from a variety of competitive suppliers and countries and if the Australian dollar remains at the current or elevated levels.

## Scandium Market

Scandium is used in the Solid Oxide Fuel Cell (SOFC) market to produce green energy. This market demand has advanced substantially in recent times and has culminated in Metallica obtaining a binding Heads of Agreement (HOA) for scandia off-take for up to 30 to 60 tpa with SOFC manufacturer Bloom Energy (see ASX announcement 2 October 2012).

In addition, scandia has been historically used to improve the strength of aluminium alloys in the aerospace sector and more specifically in the Russian MiG fighter program. Scandium based aluminium alloys can improve fuel efficiency and increase power-to-weight ratios in the commercial aerospace sector. On 3 October 2012, Metallica entered into a non-binding Memorandum of Understanding (MOU) for a strategic alliance with KBM Affilips. KBM Affilips, based in the Netherlands, is Europe's leading supplier of master alloys including aluminium-scandium alloys to the aerospace industry and other transport industries.

The SCONI project is well placed to provide a long-term reliable supply of high purity scandia to the SOFC and aluminium alloy sectors (including downstream end users such as aerospace and automobile manufacturers).

High purity (99.9%) scandia currently sells at prices well in excess of US\$2,000/kg depending on product quantity and purity. The SCONI Phase 1 PFS has used an average long term scandia price of US\$2,000 per kilogram (assuming purity of at least 99.9%). A high proportion of the pilot scale testwork undertaken on scandium bearing solutions (from representative SCONI scandium resource samples) achieved 99.99% purity and it could reasonably be expected that a premium price would be paid by customers where extreme high purity is essential for their product's performance.

For further information on scandium in this release, refer to Page 15.

*“Metallica remains focussed on developing SCONI as the world’s first, major long-term reliable producer of scandia from a primary scandium deposit. This is a unique and highly strategic opportunity for the company and our arrangements with Bloom Energy and master alloy manufacturer KBM Affilips demonstrate the potential future demand for high purity scandia”*, Mr Gillies said.

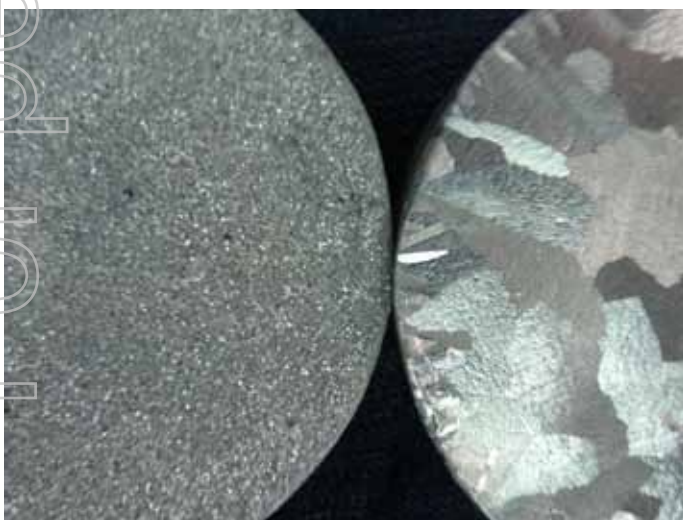
CEO, Mr Gavin Becker, added *“We don’t foresee any significant technical or permitting hurdles, it’s really going to come down to having sufficient scandia offtake to effect financing of the project – it’s now a case of right deposit, right location, right technology and right timing on the back of the expectation of a major expansion of scandium usage and demand, especially in aluminium alloys and fuel cells”*.



High purity scandium oxide produced in pilot testing by processing Metallica's material from SCONI, July 2012



KBM Affilips representative presenting aluminium scandium waffle utilising scandium oxide produced by Metallica in it's pilot testing



Scandium is a potent aluminium grain refiner, allowing for smaller equigranular crystallisation (see left side) which enhances strength and weldability



Business sized Solid Oxide Fuel Cell (BloomBox EnergyServer™) creating efficient green electricity using natural gas in California, USA

## Location

The SCONI project is in an excellent location (see Figure 2), centered on the large historic Greenvale mine site where high grade nickel ores were mined from 1974 to 1992. The proposed SCONI project is approximately 250km by road from Townsville (population ~190,000).

Townsville is a major regional centre that supports a number of large scale refineries such as the QNI's Yabulu nickel refinery, Xstrata's copper refinery and Sun Metals zinc refinery. Local service industries for these existing industrial plants include electrical, mechanical and civil engineering contractors, plant hire, metal fabrication, machine shops and other service providers. A skilled workforce exists in the Townsville to support the major industrial activity in the region.



Figure 2 – SCONI Project Locality & Regional Setting

Below (see Figure 3) is the proposed site layout of the SCONI Phase 1 project. It has two mining lease application(s) (MLA's) covering Ni-Co and Sc resources and the proposed mining and development sites close to the township of Greenvale.

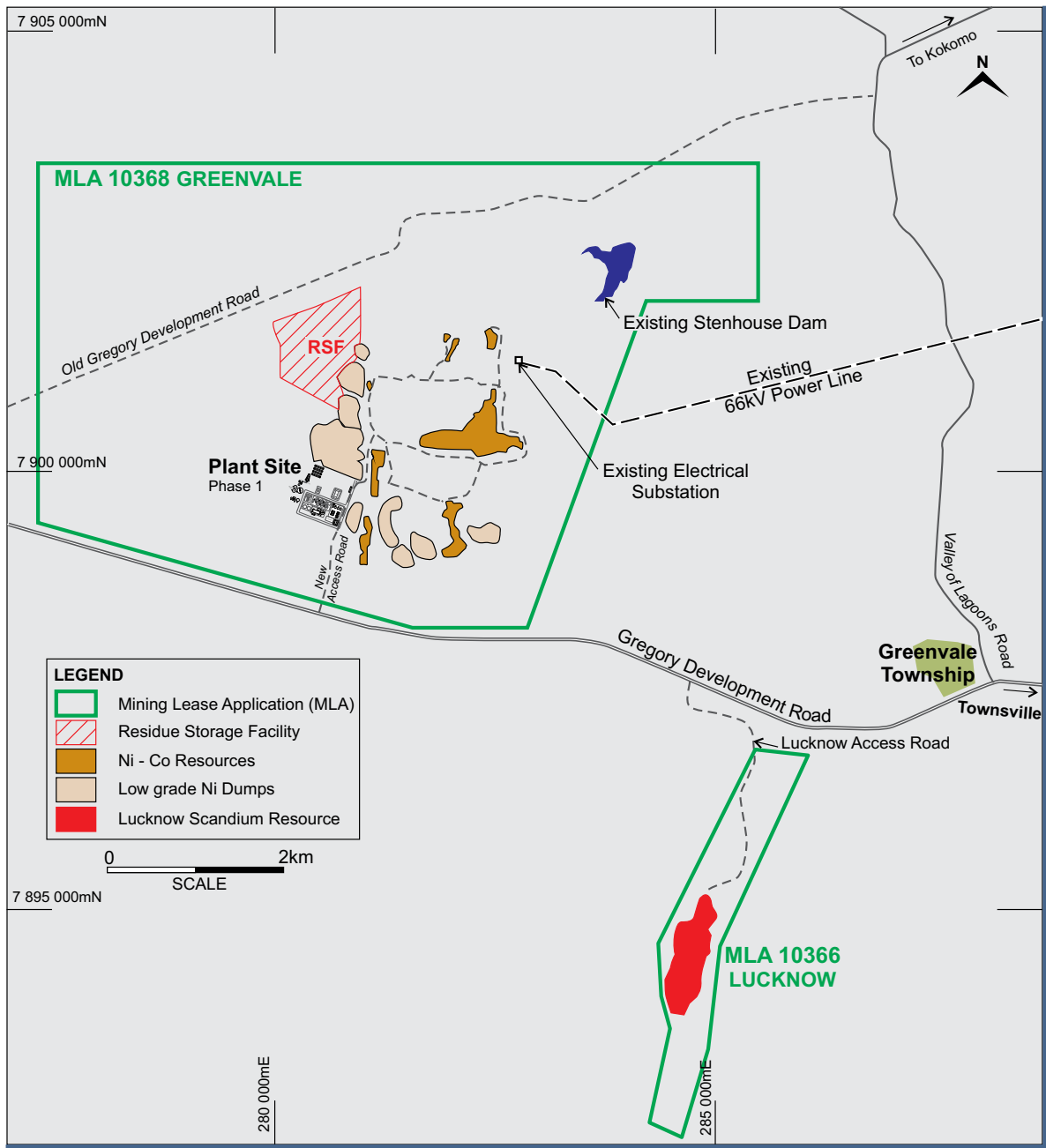


Figure 3 – SCONI Phase 1 proposed site layout including MLA's

The advantages of the proposed site location include:

- Low sovereign risk country (which is critical for end-users of scandium which require highly reliable and secure supply),
- readily available water adjacent to the proposed SCONI Phase 1 plant,
- less than a three hours' drive on sealed roads from Townsville, a major regional centre,
- access to existing port facilities in Townsville,
- access to existing industrial services in Townsville,
- strong community support,
- access to power within 3 kilometers of the proposed plant site, and
- close to the purpose built township of Greenvale which previously supported the historical mining activities.

## Study Consultants & Contractors

The PFS has been completed by a team of relevantly qualified and knowledgeable engineers and consultants as outlined below in Table 2, together with the SCONI Project's experienced in-house technical team.

**Table 2: Key Consultants & Contractors**

Area	Key Consultants & Contractors
<b>Mining Studies</b>	IMC Mining
<b>Resource Studies</b>	Golder Associates
<b>Engineering</b>	LogiCamms – Phase 1 Scandium only Study Hill Michael – Electrical Supply Infrastructure GHD – Dams & Water Infrastructure Jacobs – SCONI Tri-metals PFS (to Dec 2012)
<b>Process and Metallurgy</b>	SGS Lakefield Oretest (Perth, Western Australia) – Integrated HPAL Piloting HRL Testing Pty Ltd – Scandium SX Piloting
<b>Environmental Studies</b>	Enviro-Check Enterprises – Water Analysis AARC – Environmental Studies
<b>Cultural Heritage / Native Title</b>	Turnstone Archaeology Hopgood Ganim – legal and process advice
<b>Community Infrastructure</b>	Wolter Rolands Pty Ltd

## Lucknow Scandium Resource & Mining

Only the Lucknow scandium deposit was incorporated into the SCONI Phase 1 PFS. This deposit has a well-defined high grade Measured and Indicated Scandium Resource of 5.7 Mt at 195 g/t Sc using a 120g/t Sc cut-off grade (COG) (see Table 3). This high grade scandium resource is within a Measured and Indicated Resource of 9.0Mt at 160 g/t Sc using 70 g/t Sc COG (See Appendix 1, Tables 1 & 2). The Mineral Resource estimate is appropriate for selective open pit mining. Mining dilution and mining losses have been accounted for in the mine schedule prepared by IMC Mining Group.

The current Lucknow Scandium Resources were estimated in January 2012 based on 461 vertical drill holes covering an area approximately 1,700 m long by 300m wide. The Resources are within a few meters from surface (often at surface), reaching a maximum depth of 35 m and averaging 15 to 20m in thickness. The mineralised zones are well defined, broad, generally soft or friable allowing for bulk mining activities with minimal dilution and loss. Metallica's mining consultant, IMC Mining Group have developed a mining and stockpiling plan for the SCONI PFS which will provide feed for the proposed SCONI Phase 1 plant for 30 years.

The mining schedule is focused on delivering high grade scandium containing material to the plant. This results in a build-up of lower grade stockpiled material for processing in the later years of operation. The strip ratio over the first 20 years is 1.9 tonnes of stockpiled and waste material per tonne of feed to plant. At the end of the first 20 years there are two stockpiles of medium and lower grade material available for processing being 0.93 Mt at 134 g/t Sc and 2.7 Mt at 94 g/t Sc respectively.

Mining operations are expected to stop in year 15 and thereafter the plant will be fed with material reclaimed from stockpiles.



**Table 3:- Lucknow Scandium Resource Statement (using a 120g/t Sc COG)**

Classification	Tonnes (Mt)	Sc g/t	Ni (%)	Co (%)	Fe (%)	Mg (%)
Measured	0.6	231	0.30	0.08	31.6	1.6
Indicated	5.1	191	0.23	0.06	34.9	1.1
Inferred	0.04	130	0.10	0.01	29.5	0.5
<b>TOTAL</b>	<b>5.7</b>	<b>195</b>	<b>0.23</b>	<b>0.06</b>	<b>34.5</b>	<b>1.1</b>

For further information on the Lucknow Scandium Resource see Appendix 1

**Competent Person’s Statement**

The SCONI Scandium-Cobalt-Nickel project Mineral Resource estimate(s) is based upon and accurately reflects data compiled, validated or supervised by Mr John Horton, Principal Geologist FAusIMM (CP) who is a full time employee of Golder Associates Pty Ltd. Mr Horton has sufficient experience that is relevant to the style of mineralisation and the type of deposit under consideration and to the activity which he has undertaken to qualify as a Competent Person as defined in the 2004 edition of the ‘Australasian Code for the Reporting of Exploration Results, Mineral Resources and Ore Reserves’. Mr. Horton consents to the inclusion of this information in the form and context in which it appears in this document.



*Greenvale Nickel Mine - Open Pit Mining and Grade Control in the mid 1980s*



*Looking NE from Lucknow to Greenvale Township*

For personal use

# Metallurgy & Processing

In 2012, a large sample of representative high grade scandium resource sourced from the Lucknow deposit was sent to SGS Lakefield Oretest (Perth, Western Australia). This scandium rich laterite resource was processed through a High Pressure Acid leach (HPAL) pilot plant for a continuous 10-day period processing 4,400kg at a grade of 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. Scandium testwork extraction of 85% was achieved, contained in approximately 15,000 litres of pregnant leach solution (PLS).

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 product produced was high grade scandium oxide which exceeded the target purity level of 99.9% ("Three Nines") with most of the product achieving 99.99% purity ("Four Nines").

The SCONI Phase 1 PFS assumed a conservative overall recovery of 81.5% as opposed to the implied recovery from test work which was above 83%. Recent testwork has revealed the opportunity for further improvements

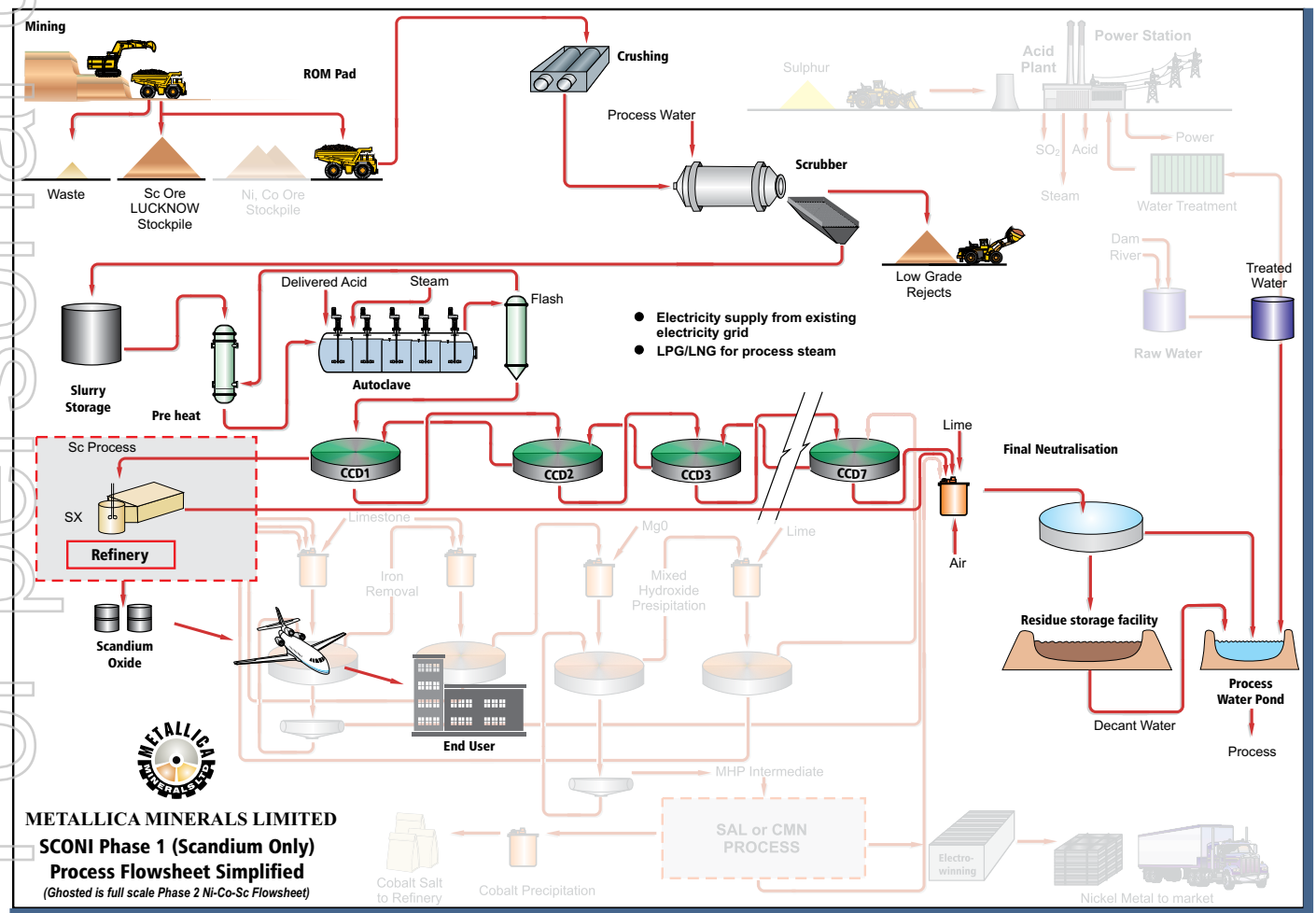


Figure 4 – SCONI Phase 1 Simple Flowsheet - Scandium only processing and production

## Capital Cost Estimates

In conjunction with other study consultants and Metallica, Australian based engineering firm LogiCamms estimated the PFS capital cost at A\$247M (including 20% contingency). The estimate was based on quotes obtained for around 60% of the mechanical equipment. The capital cost breakdown is shown in Table 4. The US\$:A\$ foreign exchange rate used in estimating the capital cost was conservatively assumed to be A\$0.90:US\$1.00.

**Table 4: SCONI Phase 1 Capital Cost Estimates**

Capital Cost Estimate by Area	A\$M
Ore Preparation	14
High Pressure Acid Leach	46
Counter Current Decantation	19
Solvent Extraction and Scandium Recovery	25
Neutralisation of Residue and Disposal	16
Reagents	18
Other Plant and Mine Infrastructure	18
<b>Total Direct Costs</b>	<b>155</b>
Indirect Costs (including EPCM)	35
Owners Cost	19
<b>Capital Cost excluding contingency</b>	<b>209</b>
Contingency (20% of Direct and Indirects)	38
<b>TOTAL CAPITAL COST ESTIMATE</b>	<b>247</b>

EPCM = engineering, procurement, construction and management

It is estimated that the construction period will take approximately 2 years.

In addition to the above capital cost, an acid and power plant is expected to be built in Year 3 of operations and hence will be operational in Year 4. In order to reduce the commissioning ramp up and execution risk of the project the decision was made to delay the acid and power plant until such time as the SCONI Phase 1 plant is proven to operate at or near full capacity. This allows for a simplified ramp up profile for the project. The construction of a small scale acid and power plant is estimated to cost approximately \$48M, which is planned to be funded from future cashflows. Initially, acid will be sourced from Townsville and trucked to site.

Sustaining capital of \$2.5M per annum has been included in the PFS to allow for such things as replacement of equipment and Residue Storage Facility (RSF) expansions during the first 15 operational years of the project.

## Operating Cost Estimates

Below is a summary of the estimated operating costs during operations when the project is purchasing acid (years 1-3) and when it is producing acid from its own acid plant from Year 4.

**Table 5: SCONI Phase 1 Operating Cost Estimates**

Operating Costs	Unit	Average	No Acid Plant	With Acid Plant
Mining	A\$M		5.5	5.5
Consumables and Reagents	A\$M		29.5	16.6
Power	A\$M		2.4	1.8
Labour (excluding mining)	A\$M		12.8	12.8
Maintenance	A\$M		7.4	7.4
Other General Costs	A\$M		5.8	5.8
Contingency of 5%	A\$M		3.2	2.7
<b>Total cash operating cost</b>	<b>A\$M</b>	<b>57.5</b>	<b>66.6</b>	<b>52.7</b>

The major component of the operating costs is due to the consumables and reagents. This cost includes; purchased acid (when there is no acid plant), sulphur (when there is an acid plant), limestone, lime and other flocculants

## Scandium Purification Laboratory – Option of Greenvale or Townsville

SCONI Phase 1 studies assumed a Greenvale based laboratory. The Definitive Feasibility Study will consider and evaluate the alternative of having the scandium purification laboratory located at or near Townsville. This laboratory will process the planned high-value SCONI Phase 1 scandium product and potentially could process other scandium containing intermediates, into high purity (>99.9%) scandia using Metallica's 100% owned proprietary technology. The capability of processing intermediates in Townsville may create an additional business opportunity that could add to project and shareholder value.

## Environmental & Permitting

The Company is seeking environmental approvals for a 1Mtpa processing capacity which will ensure that both phases of the SCONI project can proceed. The Company will be well positioned to fast track SCONI Phase 2 development, as a potential future brownfields expansion.

The Company has mining lease applications over the SCONI Phase 1 and Phase 2 Resources. The granting of the mining leases is subject to the environmental approvals being obtained.

The Company does not expect there to be significant delays or issues in relation to environmental permitting of the project due to strong community and Government support.

## Further Enhancements to the SCONI Phase 1 project

Further enhancements to SCONI Phase 1 include one or more of the following potential opportunities:

- Potential to proceed into a Phase 2 Expansion (full scale with acid & power plant) to produce Ni-Co-Sc products. Combined, Phase 1 and 2, annual scandia production would then be in the order of 120tpa, to match an expected growing market, with considerable additional nickel and cobalt revenues.
- Improved metallurgical recoveries.
- Anticipated treatment of Scandium Containing Materials (SCM) from other sources in our proposed Townsville Scandium Laboratory (TSL) using Metallica's scandium recovery and purification technology.
- Utilisation of our Sc Intellectual Property (IP) in other metal processing projects in partnership with third parties.
- In addition to scandia (the primary market form of scandium) there may be the opportunity to produce additional Sc products which are likely to be sought for electronics and metal alloy component manufacturers.

## SCONI Phase 2 Resources

The SCONI Ni-Co-Sc Measured and Indicated Mineral Resource estimate for all three southern deposits (Greenvale, Kokomo and Lucknow) is 28.3 Mt at 0.60% Ni, 0.09% Co and 91 g/t Sc using a 1.0 % Ni Eq cut-off, containing approximately 2,500 tonnes of scandium, 169,000 tonnes nickel and 25,000 tonnes cobalt. Further details of the SCONI southern deposit resources at two cut-off grades are shown in Appendix 1 - Table 4 and 5. These resources include the Lucknow scandium resource as detailed in Appendix 1 – Tables 1 to 3. In addition, to the Southern Deposits, the Company has Ni-Co Measured and Indicated Mineral Resources in the Northern Deposits (Bell Creek & Minnamoolka) totalling 17.5 Mt at 0.89% Ni and 0.05% Co at a COG of 0.7% Nickel Equivalent (NiEq), containing 155,000 tonnes of nickel (see Appendix 1, Table 6).

For further information, please contact,

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

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### Company Disclaimer

Forward-looking statements are based on assumptions regarding Metallica Minerals Limited ("Metallica"), business strategies, plans and objectives of the Company for future operations and development and the environment in which the Metallica may operate.

Forward-looking statements are based on current views, expectations and beliefs as at the date they are expressed and which are subject to various risks and uncertainties. Actual results, performance or achievements of Metallica could be materially different from those expressed in, or implied by, these forward-looking statements. The forward-looking statements contained in this presentation are not guarantees or assurances of future performance and involve known and unknown risks, uncertainties and other factors, many of which are beyond the control of Metallica, which may cause the actual results, performance or achievements of Metallica to differ materially from those expressed or implied by the forward-looking statements. For example, the factors that are likely to affect the results of Metallica include general economic conditions in Australia and globally; ability for Metallica to fund its activities; exchange rates; production levels or rates; demand for Metallica's products, competition in the markets in which Metallica does and will operate; and the inherent regulatory risks in the businesses of Metallica. Given these uncertainties, readers are cautioned to not place undue reliance on such forward looking statements.

The SCONI Project is at a medium to advanced evaluation and feasibility stage and reasonable care has been taken to ensure that the facts stated in this announcement are accurate and or that the opinions expressed are fair and reasonable. However, actual results may differ materially from those expressed or implied by these forward looking statements depending on a variety of factors.

A key conclusion of the PFS which is based on forward looking statements is that the SCONI Project is considered to have positive economic potential. Further detailed studies are required to increase the confidence in the project parameters, economics and scandium market.

# Metallica Minerals Ltd

Metallica Minerals Ltd is an Australian mining development company with its two development projects being the flagship SCONI project (scandium, nickel and cobalt project, 100% owned) and the Weipa mineral sands project (100% owned). The Company's vision is to be the world's first major long-term and reliable supplier of scandium.

## 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 with favourable metallurgy and location are scarce, making it a commodity that is difficult to obtain in commercial 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, automobiles and transport generally (seeking better range and fuel efficiency without compromising performance) and high performance sporting equipment. Scandium-strengthened aluminium alloys produce lighter-weight, higher-strength components and structures with superior weldability, better thermal and corrosion resistance, plus greater durability.

Scandium is also used in the production of solid oxide fuel cells (SOFCs) by companies such as Bloom Energy. As the western world transitions towards green energy, SOFCs will become more widely used, providing clean and efficient energy that is driven by the massive worldwide expansion of natural gas usage and distribution infrastructure.

Scandium is used in SOFCs to enhance the efficiency of the zirconia electrolyte for generating electricity and recoverable heat through an electro-chemical process that converts fuel (typically natural gas, methane) and air (oxygen 20%) into electricity and heat without combustion, noise or moving parts. Scandium stabilised zirconia electrolyte provides very high ionic conductivity and efficiency which is not readily achievable with other elements.

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 metals and industrial processes. High purity scandium oxide currently sells at prices well in excess of US\$2,000/kg depending on product quantity and purity. However, as evidenced by the Company's Heads of Agreement with Bloom Energy the potential market for scandium is poised for a step change in demand.

To learn more about the SCONI project and scandium, see Metallica's last Quarterly Report 31 January 2013 and the 4 page summary – **'A New Spice Metal to Enhance Industry & Life'** on the Metallica website.

## Appendix 1

The SCONI Mineral Resources are quoted on Sc cut-off and on a Nickel Equivalent (NiEq) basis. For the purposes of the Lucknow and Scandium focused Phase 1 project described in this announcement, the Lucknow Mineral Resource is quoted on a Sc cut-off grade basis at 70 g/t Sc and 120 g/t Sc as shown in Table 1 and 3.

The complete SCONI project resources are reported on a consistent NiEq basis in Tables 4, 5 and 6. The Lucknow Scandium mineral resource is a subset of these NiEq resources.

The Measured, Indicated and Inferred Scandium Mineral Resources for Lucknow total 9.3 Mt @ 157 g/t Sc at a 70 g/t Sc cut-off grade (see Table 1). Over 95% of the Lucknow Scandium Mineral Resource is classified as Measured or Indicated.

**Table 1:- Lucknow Scandium Mineral Resource (Using a 70g/t COG)**

Classification	Tonnes (Mt)	Sc g/t	Ni (%)	Co (%)	Fe (%)	Mg (%)
Measured	0.9	183	0.32	0.08	30.3	2.0
Indicated	8.2	157	0.22	0.05	34.5	1.2
Inferred	2.3	99	0.14	0.02	32.5	0.8
<b>TOTAL</b>	<b>9.3</b>	<b>157</b>	<b>0.23</b>	<b>0.05</b>	<b>34.0</b>	<b>1.2</b>

The Lucknow Scandium Mineral Resource contains over 1,400 tonnes of scandium metal (see Table 2) or approximately 2,100 tonnes of scandium oxide.

**Table 2:- Scandium Mineral Resource base for Lucknow**

Lucknow Scandium Resource	Tonnes (Mt)	Sc Grade (g/t)	Sc Metal (t)
Measured	0.9	183	160
Indicated	8.2	157	1,278
Inferred	0.3	99	27
<b>TOTAL</b>	<b>9.3</b>	<b>157</b>	<b>1,464</b>

The Lucknow Scandium Mineral Resources at an elevated cut-off grade of 120 g/t Sc is shown in Table 3. This cut-off corresponds roughly to the cut-off grade considered for the mine study production schedules.

**Table 3:- Lucknow Scandium Mineral Resource (Using a 120g/t Sc COG)**

Classification	Tonnes (Mt)	Sc g/t	Ni (%)	Co (%)	Fe (%)	Mg (%)
Measured	0.6	231	0.30	0.08	31.6	1.6
Indicated	5.1	191	0.23	0.06	34.9	1.1
Inferred	0.04	130	0.10	0.01	29.5	0.5
<b>TOTAL</b>	<b>5.7</b>	<b>195</b>	<b>0.23</b>	<b>0.06</b>	<b>34.5</b>	<b>1.1</b>

Additionally, Lucknow also has a modest size Ni-Co Mineral Resource with low grade Sc. This adds to the total resource base reported in Table 4.

The Mineral Resource estimates conform to JORC guidelines for the reporting of Mineral Resources and have been classified as Measured, Indicated and Inferred based primarily on geological continuity, sample intervals and drill hole spacing. The Measured and Indicated Mineral Resources are considered appropriate for preliminary pit design and mine scheduling, but do not account for mining dilution or mining losses

Notes to Tables 1 to 3

1. Scandium is typically sold as an oxide product. Hence the equivalent scandium oxide has been calculated at 1.5 times contained scandium.
2. The Lucknow scandium Mineral Resources are reported at a cut off grade (COG) of 70 and 120 g/t Sc, excluding the Ni-Co Mineral Resource.
3. Variations in total may be present due to rounding factors.
4. Additional resources for other deposits in the SCONI project are included in the following Tables (4 to 6).



## SCONI Ni-Co-Sc Resource Tables

**Table 4: Mineral Resource Statements for the SCONI Project Southern Deposits using a cut-off grade of 0.7% NiEq (Ni + 1.5 Co + 0.01 Sc)**

Deposit	Million Tonnes (Mt)	Nickel (Ni) %	Cobalt (Co) %	Scandium (Sc) g/t	Ni Metal (kt)	Co Metal (kt)	Sc Metal (t)	Sc Oxide (t)
<b>Kokomo</b>								
Measured	2.2	0.57	0.11	80	12.2	2.5	173	260
Indicated	17.2	0.56	0.09	49	95.8	15.5	843	1,264
Inferred	10.2	0.36	0.04	59	36.7	4.5	603	905
<b>TOTALS</b>	<b>29.5</b>	<b>0.49</b>	<b>0.08</b>	<b>55</b>	<b>144.7</b>	<b>22.5</b>	<b>1,619</b>	<b>2,429</b>
<b>Greenvale Mine Site</b>								
Measured	4.8	0.78	0.06	38	37.8	3.0	186	279
Indicated	9.5	0.71	0.05	38	67.0	4.9	360	541
Inferred	1.9	0.71	0.05	34	13.3	0.9	65	97
<b>TOTALS</b>	<b>16.2</b>	<b>0.73</b>	<b>0.05</b>	<b>38</b>	<b>118.1</b>	<b>8.8</b>	<b>611</b>	<b>917</b>
<b>Lucknow</b>								
Measured	1.7	0.45	0.10	103	7.9	1.8	180	271
Indicated	10.6	0.27	0.07	128	28.5	7.2	1,357	2,035
Inferred	1.5	0.40	0.07	41	5.8	1.0	60	90
<b>TOTALS</b>	<b>13.8</b>	<b>0.31</b>	<b>0.07</b>	<b>116</b>	<b>42.2</b>	<b>10.0</b>	<b>1,597</b>	<b>2,396</b>
<b>Combined SCONI Southern Deposits Resource</b>								
Measured	8.7	0.66	0.08	62	57.9	7.2	539	809
Indicated	37.3	0.51	0.07	69	191.3	27.6	2,560	3,840
Inferred	13.5	0.41	0.05	54	55.9	6.4	728	1,092
<b>TOTALS</b>	<b>59.5</b>	<b>0.51</b>	<b>0.07</b>	<b>64</b>	<b>305.1</b>	<b>41.1</b>	<b>3,827</b>	<b>5,741</b>

**Table 5: Updated Mineral Resource Statement SCONI Southern Deposits using a cut-off grade of 1.0% NiEq (Ni + 1.5 Co + 0.01 Sc)**

Deposit	Million Tonnes (Mt)	Nickel (Ni) %	Cobalt (Co) %	Scandium (Sc) g/t	Ni Metal (kt)	Co Metal (kt)	Sc Metal (t)	Sc Oxide (t)
<b>Kokomo</b>								
Measured	1.5	0.64	0.14	97	9.8	2.2	149	223
Indicated	8.7	0.60	0.11	75	52.3	9.8	655	983
Inferred	3.7	0.42	0.06	83	15.3	2.2	304	456
<b>TOTALS</b>	<b>13.9</b>	<b>0.56</b>	<b>0.10</b>	<b>80</b>	<b>77.4</b>	<b>14.2</b>	<b>1,108</b>	<b>1,662</b>
<b>Greenvale Mine Site</b>								
Measured	3.2	0.98	0.08	39	30.8	2.4	123	185
Indicated	5.2	0.94	0.07	39	49.3	3.7	206	309
Inferred	1.0	0.94	0.06	35	9.3	0.6	35	52
<b>TOTALS</b>	<b>9.4</b>	<b>0.95</b>	<b>0.07</b>	<b>39</b>	<b>89.4</b>	<b>6.7</b>	<b>364</b>	<b>545</b>
<b>Lucknow</b>								
Measured	1.2	0.44	0.11	139	5.3	1.3	168	252
Indicated	8.5	0.26	0.07	149	21.8	5.7	1,265	1,897
Inferred	0.4	0.37	0.07	71	1.4	0.3	27	40
<b>TOTALS</b>	<b>10.1</b>	<b>0.28</b>	<b>0.07</b>	<b>145</b>	<b>28.5</b>	<b>7.3</b>	<b>1,459</b>	<b>2,189</b>
<b>Combined SCONI Southern Deposits Resource</b>								
Measured	5.9	0.78	0.10	75	45.8	5.9	440	659
Indicated	22.4	0.55	0.09	95	123.4	19.1	2,126	3,189
Inferred	5.1	0.51	0.06	72	26.0	3.1	365	548
<b>TOTALS</b>	<b>33.4</b>	<b>0.59</b>	<b>0.08</b>	<b>88</b>	<b>195.2</b>	<b>28.2</b>	<b>2,931</b>	<b>4,396</b>

**Table 6: SCONI Northern Deposits using a 0.7% NiEq (Ni + 1.5 Co) cut-off grade**

Deposit	Million Tonnes (Mt)	Nickel (Ni) %	Cobalt (Co) %	Ni Metal (kt)	Co Metal (kt)
<b>Bell Creek South</b>					
Measured	7.8	0.96	0.07	75.5	5.1
Indicated	0.1	0.81	0.05	1.2	0.1
Inferred					
<b>TOTALS</b>	<b>8.0</b>	<b>0.96</b>	<b>0.07</b>	<b>76.7</b>	<b>5.2</b>
<b>Bell Creek North</b>					
Measured					
Indicated	2.0	0.86	0.03	16.8	0.5
Inferred					
<b>TOTALS</b>	<b>2.0</b>	<b>0.86</b>	<b>0.03</b>	<b>16.8</b>	<b>0.5</b>
<b>Bell Creek Northwest</b>					
Measured					
Indicated	2.5	0.81	0.05	20.1	1.2
Inferred					
<b>TOTALS</b>	<b>2.5</b>	<b>0.81</b>	<b>0.05</b>	<b>20.1</b>	<b>1.2</b>
<b>The Neck</b>					
Measured					
Indicated	0.4	0.84	0.03	3.5	0.1
Inferred					
<b>TOTALS</b>	<b>0.4</b>	<b>0.84</b>	<b>0.03</b>	<b>3.5</b>	<b>0.1</b>
<b>Minnamoolka</b>					
Measured					
Indicated	4.7	0.82	0.05	38.3	2.1
Inferred	0.9	0.78	0.04	6.7	0.3
<b>TOTALS</b>	<b>5.5</b>	<b>0.82</b>	<b>0.04</b>	<b>45.0</b>	<b>2.4</b>
<b>Combined SCONI Northern Deposits Resource</b>					
Measured	7.8	0.96	0.07	75.5	5.1
Indicated	9.7	0.83	0.04	79.9	4.0
Inferred	0.9	0.78	0.04	6.7	0.3
<b>TOTALS</b>	<b>18.4</b>	<b>0.88</b>	<b>0.05</b>	<b>162.1</b>	<b>9.4</b>

Kt = kilo tonnes

#### Notes to Table 4 to 6:

1. Scandium is typically sold as an oxide product. Hence the equivalent scandium oxide has been calculated at 1.5 times contained scandium.
2. The Mineral Resources for the Southern Deposits of Lucknow, Greenvale and Kokomo are reported at a cut-off grade (COG) of NiEq 0.7% and NiEq 1.0% (Ni + 1.5Co + 0.01Sc). This NiEq COG formula has been calculated using commodity prices of US\$10/lb nickel, US\$15/lb cobalt and US\$1,500/kg scandium oxide, with recoveries of 90% for all three metals. Metallica indicates that the metallurgical testwork to date provides reasonable potential for the nickel, cobalt and scandium to be recovered at similar recoveries to those achieved in the testwork.
3. The Mineral Resources for the Northern Deposits of Bell Creek South, Bell Creek North, Bell Creek Northwest, Minnamoolka and The Neck are reported at a COG of NiEq 0.7% (Ni + 1.5Co). This NiEq COG formula has been calculated using commodity prices of US\$10/lb nickel, US\$15/lb cobalt and recoveries of 90% for both nickel and cobalt.
4. Variations in totals may be present due to rounding factors.
5. No scandium content was estimated in the Northern deposits as Sc assays are generally not available. From limited data there is a good indication the Northern deposits are relatively low in Sc (generally <20ppm Sc).

### Competent Person's Statement

The SCONI Scandium-Cobalt-Nickel project Mineral Resource estimate(s) is based upon and accurately reflects data compiled, validated or supervised by Mr John Horton, Principal Geologist FAusIMM (CP) who is a full time employee of Golder Associates Pty Ltd. Mr Horton has sufficient experience that is relevant to the style of mineralisation and the type of deposit under consideration and to the activity which he has undertaken to qualify as a Competent Person as defined in the 2004 edition of the 'Australasian Code for the Reporting of Exploration Results, Mineral Resources and Ore Reserves'. Mr. Horton consents to the inclusion of this information in the form and context in which it appears in this document.