

# NEOMETALS SIGNS HIGH-GRADE VANADIUM RECYCLING AGREEMENT

## HIGHLIGHTS

- Collaboration Agreement signed with Critical Metals to jointly evaluate the production of high-purity vanadium products by recycling of high-grade vanadium-bearing steel by-product in Sweden and Finland
- Critical Metals has executed a 10-year slag supply agreement with Scandinavian steel producer SSAB to access at least 2 million tonnes of existing stores and future slag generated from three operating steel mills
- Slag purchase price is linked to prevailing vanadium prices and vanadium content referenced to a benchmark grade of 2.2% V (3.9% V<sub>2</sub>O<sub>5</sub>)
- Processing at-surface slag removes the traditional risks and costs of mining and beneficiation
- Successful evaluation will lead to a 50:50 incorporated joint venture between Neometals and Critical Metals to process and recover high-purity vanadium products suitable for aerospace alloys and energy storage applications.

Innovative project developer Neometals Ltd (ASX: NMT) ("**Neometals**" or "**the Company**") is pleased to announce that it has executed a collaboration agreement ("**Collaboration Agreement**") with unlisted Scandinavian mineral development company, Critical Metals Ltd ("**Critical**"), to jointly evaluate the feasibility of constructing a recycling facility to recover and process high-grade vanadium products from vanadium-bearing steel by-product ("**Slag**") in Scandinavia ("**Slag Recycling Facility**"). Neometals will fund and manage the evaluation activities, including the completion of Class 5, 4 and 3 AACE engineering cost and feasibility studies ("**Joint Studies**") up to consideration of an investment decision, which, if positive, will lead to a 50:50 incorporated joint venture ("**JV**"). Neometals is Critical's largest shareholder and holds 15.4% of its issued capital.

Critical has executed a conditional agreement ("**Slag Supply Agreement**") with SSAB EMEA AB and SSAB Europe Oy, subsidiaries of SSAB ("**SSAB**"), a steel producer that operates steel mills in Scandinavia. Slag is a by-product of SSAB's steel making operations. The Slag Supply Agreement provides a secure basis for the evaluation of a potential Slag Recycling Facility capable of processing 200,000 tonnes of Slag per annum without the need to build a mine and concentrator like existing primary producers.

Neometals has extensive experience in the metallurgical processing of vanadium bearing concentrates from its Barrambie Titanium-Vanadium project and has, through a wholly owned subsidiary Avanti Materials Ltd ("**Avanti**"), developed a proprietary hydrometallurgical (leaching) flowsheet. The flowsheet utilises conventional equipment and is subject to two Provisional Patent Applications, tailored to recover high-purity vanadium chemicals from Slag. Extensive due-diligence test-work completed by Neometals' contractor, Strategic Metallurgy in Perth on multiple SSAB Slag samples has confirmed up to 80% vanadium recovery from leaching under mild conditions.

The hydrometallurgical leaching process path has significant operational, cost and risk advantages over the traditional pyrometallurgical (salt-roast) process route, with eco-friendly hydroelectric powered leaching and solvent extraction and refining circuits replacing traditional large kilns that are fired by natural gas or coal.

Neometals has a consistent aim to build the inherent value of opportunities through downstream processing of materials for a sustainable future. This Collaboration Agreement complements the Company's existing responsible materials recovery initiative (lithium-ion battery recycling), a business model which addresses sustainability and security of supply chain issues, with a smaller environmental footprint than the conventional mine-sourced minerals and materials.

One of Neometals' key strategies relates to identification and disciplined evaluation of mineral and materials projects that have direct exposure to the energy storage and electric vehicle mega-trend. As it relates to energy storage, vanadium solutions are the storage medium in the Vanadium Redox Flow batteries ("VRFB's") which are a leading stationary storage technology. Approximately 75% of global vanadium supply is produced in China and Russia, and there exists a significant opportunity to supply the European and American markets from recycling SSAB's Scandinavian feedstocks.

Neometals Managing Director Chris Reed commented:

*"Neometals has been working with Critical for almost a year to secure this opportunity. We are delighted that Critical has been able to agree conditional supply with SSAB and we look forward to working together to evaluate this opportunity to commercialise these stockpiles of vanadium-bearing steel slag. We have supreme confidence in the consistency of the materials with more than 30 years of continuous operating history at Lulea. The risk/return benefits of not having to develop a mine and concentrator cannot be overstated, particularly in the current and foreseeable financial market."*

### Collaboration Agreement Key Terms

Key terms include:

- Neometals and Critical will form a steering committee, comprising two representatives from each party, to manage the conduct of the Joint Studies.
- Neometals will fund the Joint Studies and the sign-on payment due by Critical to SSAB under the Slag Supply Agreement (see further details below).
- Critical's responsibilities will include managing the relationship with SSAB and funding all tasks and activities in Sweden and Finland, including the site location study.
- Within 6 months after completion of the Class 3 feasibility study, Neometals and Critical must decide whether to form the JV (through 50:50 ownership of Critical's Swedish wholly owned subsidiary, Recycling Industries Scandinavia AB, the buyer party under the Slag Supply Agreement) for the construction of a Slag Recycling Facility in Sweden to produce vanadium chemical products.
- If a decision is made to form the JV, Neometals and Critical will negotiate in good faith a formal JV agreement (shareholders agreement) under which the parties will be entitled to maintain their relative equity by contributing capital in proportion to their respective ownership interests in the JV.
- Neometals' subsidiary, Avanti Materials Ltd, will enter into a processing technology licence agreement with the JV pursuant to which it will be entitled to a gross revenue royalty on sales of all recycled products.

### Slag Supply Agreement

Key terms include:

- Critical's Swedish subsidiary, Recycling Industries Scandinavia AB, is the buyer party.
- The product subject to the Slag Supply Agreement is defined as LD-Slag (<200mm) sourced from any of SSAB's sites (including Luleå or Oxelösund in Sweden and Raahe in Finland) and the typical grade of the product is between 2.68 and 4.11% V<sub>2</sub>O<sub>5</sub> ("Product").
- The reference grade for pricing the Product is 2.20% V (3.92% V<sub>2</sub>O<sub>5</sub>).
- The minimum volume of Product to be delivered to Critical in each contract year during the supply period is 200,000 dry metric tonnes ("dmt"). The supply period will begin on the commencement of commercial production at the Slag Recycling Facility (which must not be later than 31 December 2024).

- The Term of the Slag Supply Agreement is ten years from the commencement of commercial production.
- If the JV makes a positive investment decision to construct a Slag Recycling Facility, Critical must prepay SSAB for the first 700,000 dmt of Product to be supplied from Luleå.
- Prices for Product are variable depending on the Product grade and prevailing FeV80 vanadium price, with adjustments against a reference grade of 2.2% V (3.92% V<sub>2</sub>O<sub>5</sub>) for each shipment.
- Contemporaneous with Collaboration Agreement execution, Critical must pay a sign-on payment to SSAB. Pursuant to the terms of the Collaboration Agreement, Neometals has paid this sum on behalf of Critical.

**Forward Work**

The Joint Studies will include further metallurgical test-work programs and Association for the Advancement of Cost Engineering (“AACE”) Class 5, 4, 3 AACE engineering cost and feasibility studies to enable consideration of an investment decision.

Engineering firm Primero Group Ltd (“Primero”) is currently completing the AACE Class 5 (“Study”) on the Slag Recycling Facility. The Study will determine operating and capital costs based on existing Neometals bench-scale test-work and a mass/energy balance calculated by Strategic Metallurgy.

Neometals anticipates approximately 27 months for completion of the Joint Studies with a final investment decision occurring within 6 months after completion of the Class 3 feasibility study. The cost of the Joint Studies is estimated to be approximately A\$5 million, however Neometals retains the right to withdraw at any time from the Joint Studies. If a positive investment decision to construct a Slag Recycling Facility is not made by 31 December 2022, or commercial production has not commenced at the Slag Recycling Facility by 31 December 2024, SSAB may terminate the Slag Supply Agreement.

A presentation on the Slag recycling opportunity is appended to this announcement.

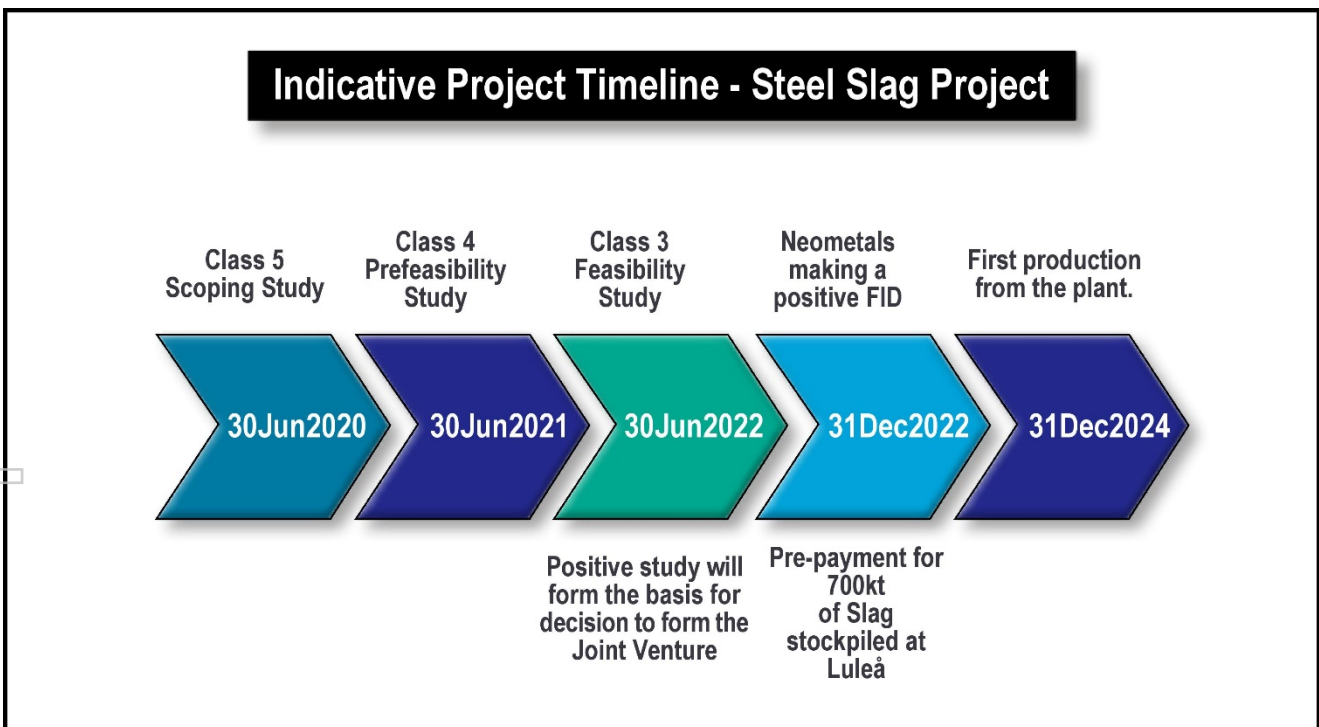


Figure 1 – Indicative Timeline for the Slag Recycling Project

## About Critical Metals Ltd

Critical Metals aims to supply the European energy storage industry with metals from Scandinavia. It aims to do this via urban mining (recovering metals from industrial waste stockpiles) and traditional mining (discovering and extracting metals from the earth) [www.criticalmetals.eu](http://www.criticalmetals.eu).

## About SSAB

SSAB is a Nordic and US-based steel company. SSAB offers value added products and services developed in close cooperation with its customers to create a stronger, lighter and more sustainable world. SSAB has approximately 14,300 employees in over 50 countries. SSAB has production facilities in Sweden, Finland and the US. In Scandinavia specifically, SSAB has slag stockpiles from steel production in Luleå or Oxelösund in Sweden and Raahe in Finland. In 2019, SSAB's net sales totalled SEK 76 billion (US\$7.6 billion). SSAB is listed on the Nasdaq Stockholm (Large cap list) and has a secondary listing on the Nasdaq Helsinki.

*Authorised on behalf of Neometals by Christopher Reed, Managing Director.*

## ENDS

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## About Neometals Ltd

Neometals innovatively develops opportunities in minerals and advanced materials essential for a sustainable future. The strategy focuses on de-risking and developing long life projects with strong partners and integrating down the value chain to increase margins and return value to shareholders.

Neometals has three core projects:

- Lithium-ion Battery Recycling – a proprietary process for recovering cobalt and other valuable materials from spent and scrap lithium batteries. Pilot plant testing currently underway with plans established to conduct demonstration scale trials with potential JV partner SMS Group;
- Lithium Refinery Project – Progressing plans for a lithium refinery development to supply lithium hydroxide to the battery cathode industry with potential JV partner Manikaran Power, underpinned by a binding life-of-mine annual offtake option for 57,000 tonnes per annum of Mt Marion 6% spodumene concentrate; and
- Barrambie Titanium and Vanadium Project - one of the world's highest-grade hard-rock titanium-vanadium deposits, working towards a development decision in mid-2021 with potential JV partner IMUMR.





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All the right elements<sup>®</sup>

High Grade Vanadium Recycling

April 2020

ASX Code: NMT OTC/Nasdaq Intl: RDRUY

# Disclaimer

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**Summary information:** This document has been prepared by Neometals Ltd (“Neometals” or “the Company”) to provide summary information about the Company and its associated entities and their activities current as at the date of this document. The information contained in this document is of general background and does not purport to be complete. It should be read in conjunction with Neometals’ other periodic and continuous disclosure announcements lodged with the Australian Securities Exchange, which are available at [www.asx.com.au](http://www.asx.com.au).

**Forward-looking information:** This document contains opinions, projections, forecasts and other statements which are inherently subject to significant uncertainties and contingencies. Many known and unknown factors could cause actual events or results to differ materially from the estimated or anticipated events or results included in this document. Recipients of this document are cautioned that forward-looking statements are not guarantees of future performance.

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**Financial data:** All figures in this document are in Australian dollars (AUD) unless stated otherwise.

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**Investment risk:** An investment in securities in Neometals is subject to investment and other known and unknown risks, some of which are beyond the control of Neometals. The Company does not guarantee any particular rate of return or the performance of Neometals. Investors should have regard to the risk factors outlined in this document.

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# The Opportunity



- Scandinavian steel giant SSAB has approximately 2Mt of high-grade vanadium-bearing by-product (“Slag”) stored at 3 steel mills in Sweden and Finland.
- Highest-grade known vanadium feedstock in the world.
- Opportunity for Neometals and its partner to recover and produce high-grade vanadium products from the Slag (e.g. vanadium pentoxide or ferrovandium).
- Potential for Neometals to establish production within lowest quartile position on the cost-curve with no mining risk or beneficiation costs and feed material sitting at surface next to a port in a low sovereign risk jurisdiction.

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# The Opportunity (continued)

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- Introduced to Neometals by Scandinavian focused Critical Metals Ltd (“Critical”) which has secured a conditional Slag supply agreement with SSAB. Neometals owns ~15.4% of Critical.
- Joint evaluation underway by Neometals and Critical with a positive FID triggering development of processing facility adjacent to existing SSAB operations with excellent infrastructure – SSAB steel operations forecast to continue to generate slag at a rate of +180 ktpa to 2035.
- Neometals bench-scale metallurgical testwork results undertaken in the due diligence process on samples from three separate SSAB locations confirm acceptable recoveries with scope for further optimisation.

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# SSAB Steel Production and Slag at Luleå, Sweden

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# Location and Stockpiles

## Agreement Volumes and Price

- Initial purchase of 700kt of Slag from Luleå post FID
- Purchase 200ktpa Slag post commercial production for 10 years
- Price linked to prevailing FeV80 vanadium price and vanadium content (reference grade 2.2% V ~ 3.9%  $V_2O_5$ )

Luleå	
Slag stored	+630kt
Vanadium Grade $V_2O_5$	+4%
Contained $V_2O_5$	+25,000t
Net Slag Added	100ktpa



Raahé	
Slag stored	+360kt
Vanadium Grade $V_2O_5$	+3%
Contained $V_2O_5$	+13,000t
Net Slag Added	80ktpa

Oxelösund	
Slag stored	+890kt
Vanadium Grade $V_2O_5$	+3%
Contained $V_2O_5$	+25,000t
Net Slag Added	90ktpa

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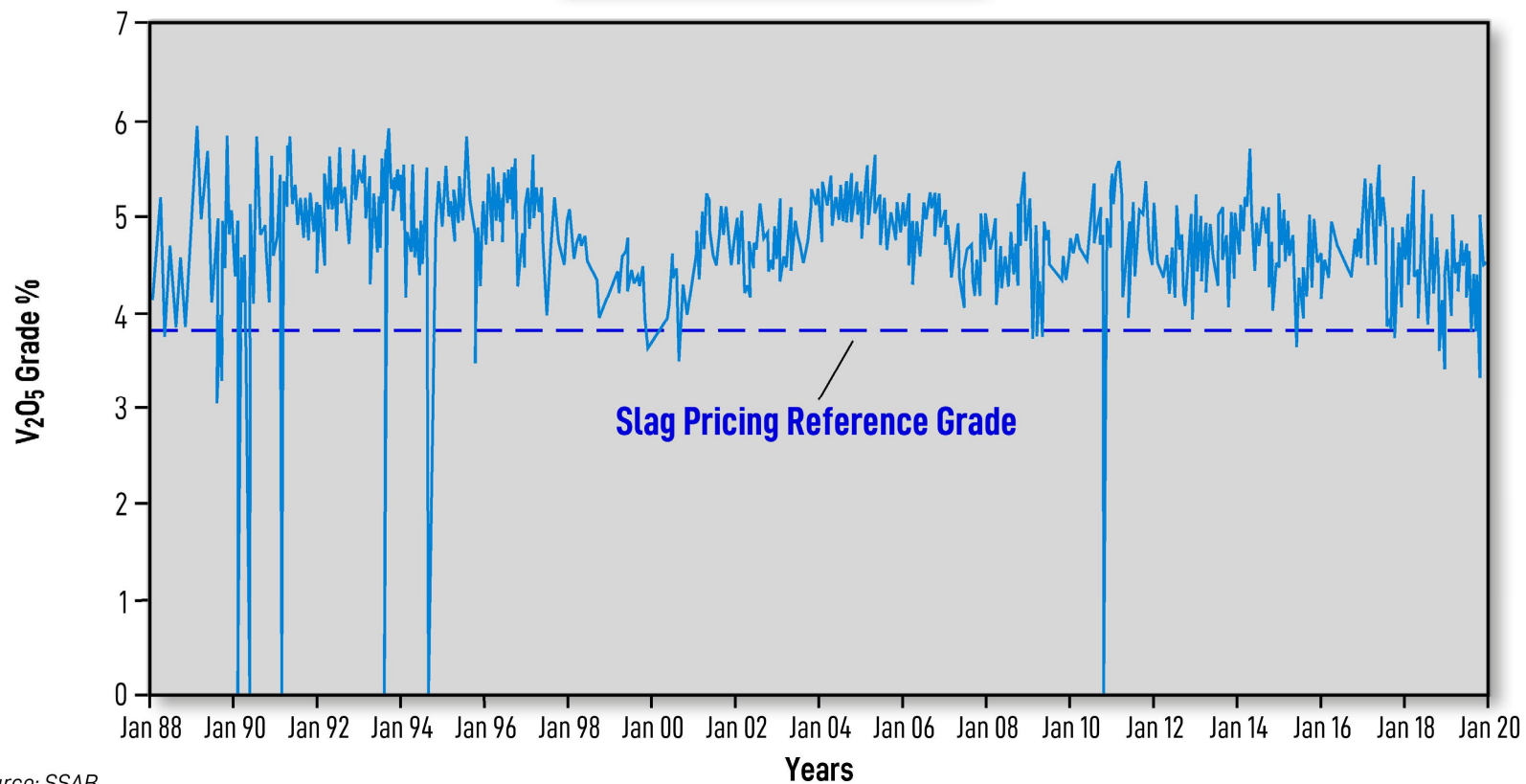


# Luleå Slag grade assays over last 30 years

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## Luleå Slag Grades



Source: SSAB

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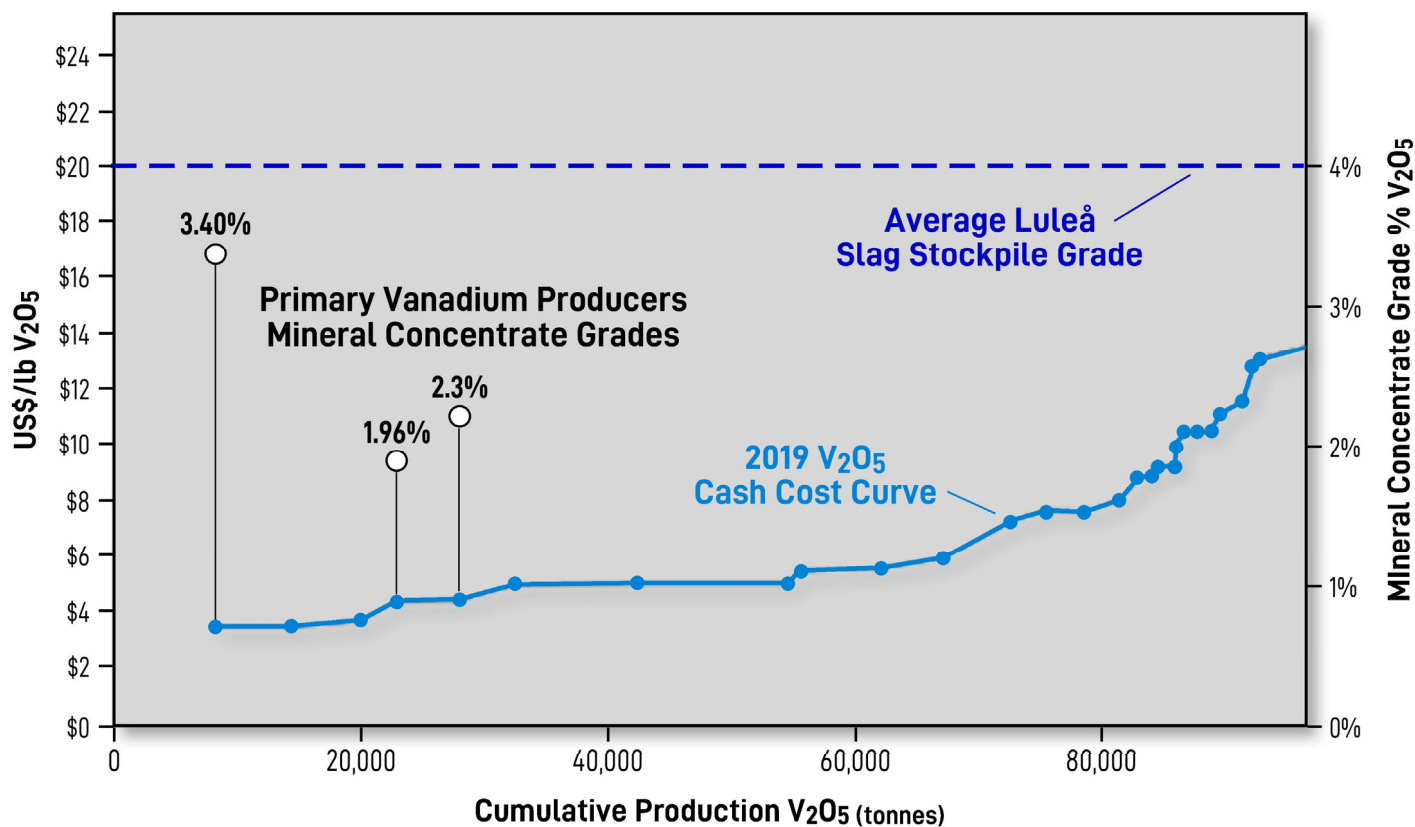


# Favourable Vanadium content to primary producers/developers



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**Vanadium Cost Curve 2019 & Mineral Concentrate Grade of Primary Producers**



Source: TTP Squared

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# Key Producers and Developers Concentrate Grade/Cost Comparison



Deposit	Reserve Grade (V <sub>2</sub> O <sub>5</sub> %)	Vanadium Concentrate Grade (V <sub>2</sub> O <sub>5</sub> %)	Concentrate Cost (US\$/t)	Operating Cost (US\$/V <sub>2</sub> O <sub>5</sub> )
Australian Vanadium Ltd Australian Project <sup>1</sup>	1.04	1.40	50.13	4.15
Bushveld Minerals Vametco <sup>2</sup>	0.62	2.02	45.66	4.81
Largo Resources Maracas Menchen Mine <sup>3</sup>	1.15	3.21	60.52	3.14
Steel Slag	Slag Grade (V <sub>2</sub> O <sub>5</sub> %)	Slag Grade (V <sub>2</sub> O <sub>5</sub> %)	Slag Cost (US\$/t)	Operating Cost (US\$/V <sub>2</sub> O <sub>5</sub> )
Luleå Slag	4.10	4.10	V content/price linked	Scoping study in progress

**Source 1** – AVL ASX announcement titled “Gabanintha Pre –Feasibility Study and Maiden Ore Reserve” dated 19/12/2018

**2** - BMN LN see report titled “Bushveld Minerals Limited (BMN) and Bushveld Vametco Alloys (Pty) Ltd Competent Persons Report on the Vametco Vanadium Mine, North West Province, South Africa” dated 10th January 2020 [http://www.bushveldminerals.com/wp-content/uploads/2020/01/Independent-CPR\\_Vametco-Mine-RSA\\_January\\_2020\\_Final.pdf](http://www.bushveldminerals.com/wp-content/uploads/2020/01/Independent-CPR_Vametco-Mine-RSA_January_2020_Final.pdf)

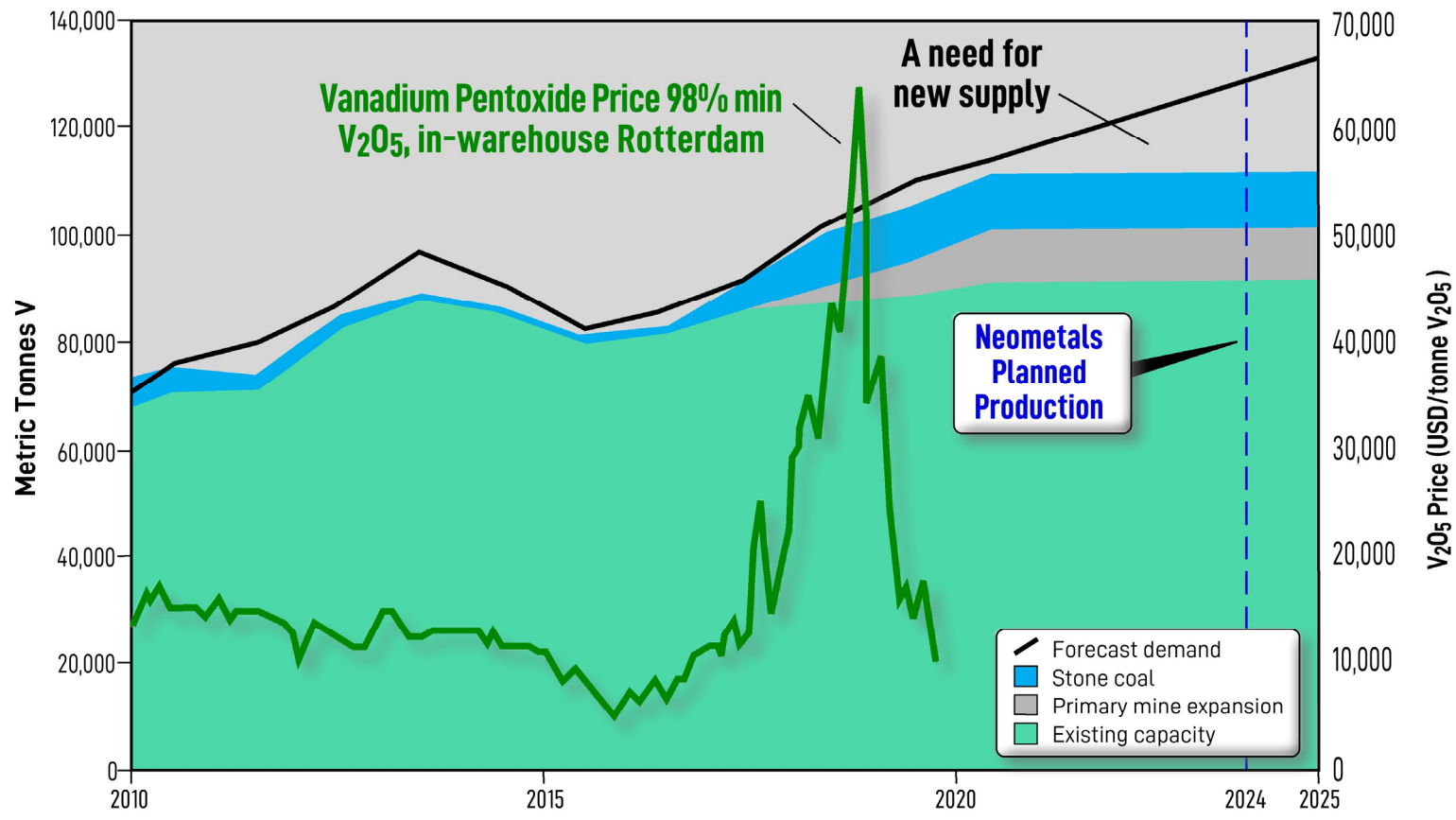
**3**– LGO.TSX see NI 43-101 titled :An updated Mine Plan, Mineral Reserve and Preliminary Economic Assessment of Inferred Resources dated 2/5/2017

# Development timetable well aligned with underlying commodity market



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## Vanadium Supply & Demand



Source: Fastmarkets, TTP Squared Inc.

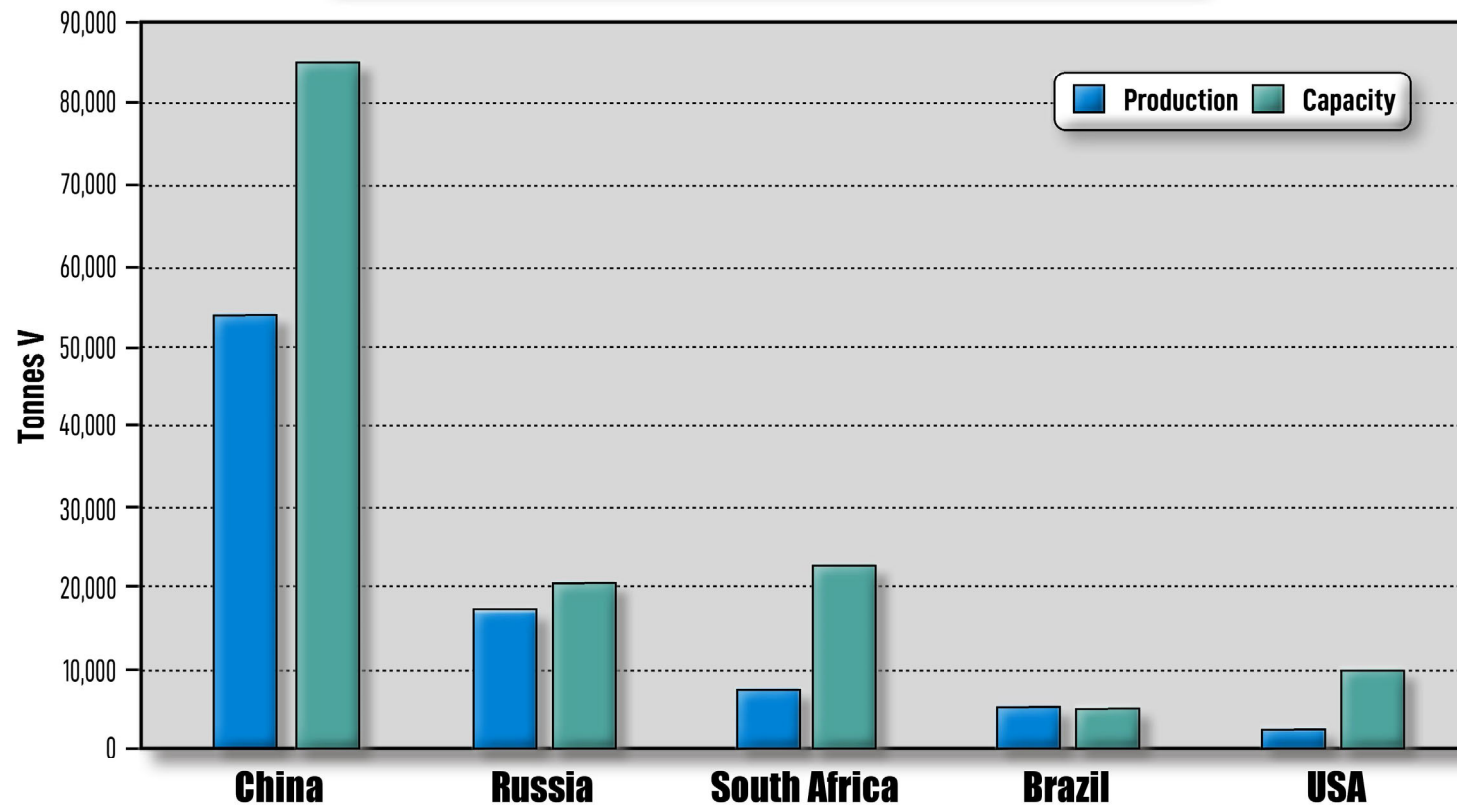
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# Need for secure supply chains

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Vanadium Feedstock Production & Capacity, by Country, 2018 (t V)



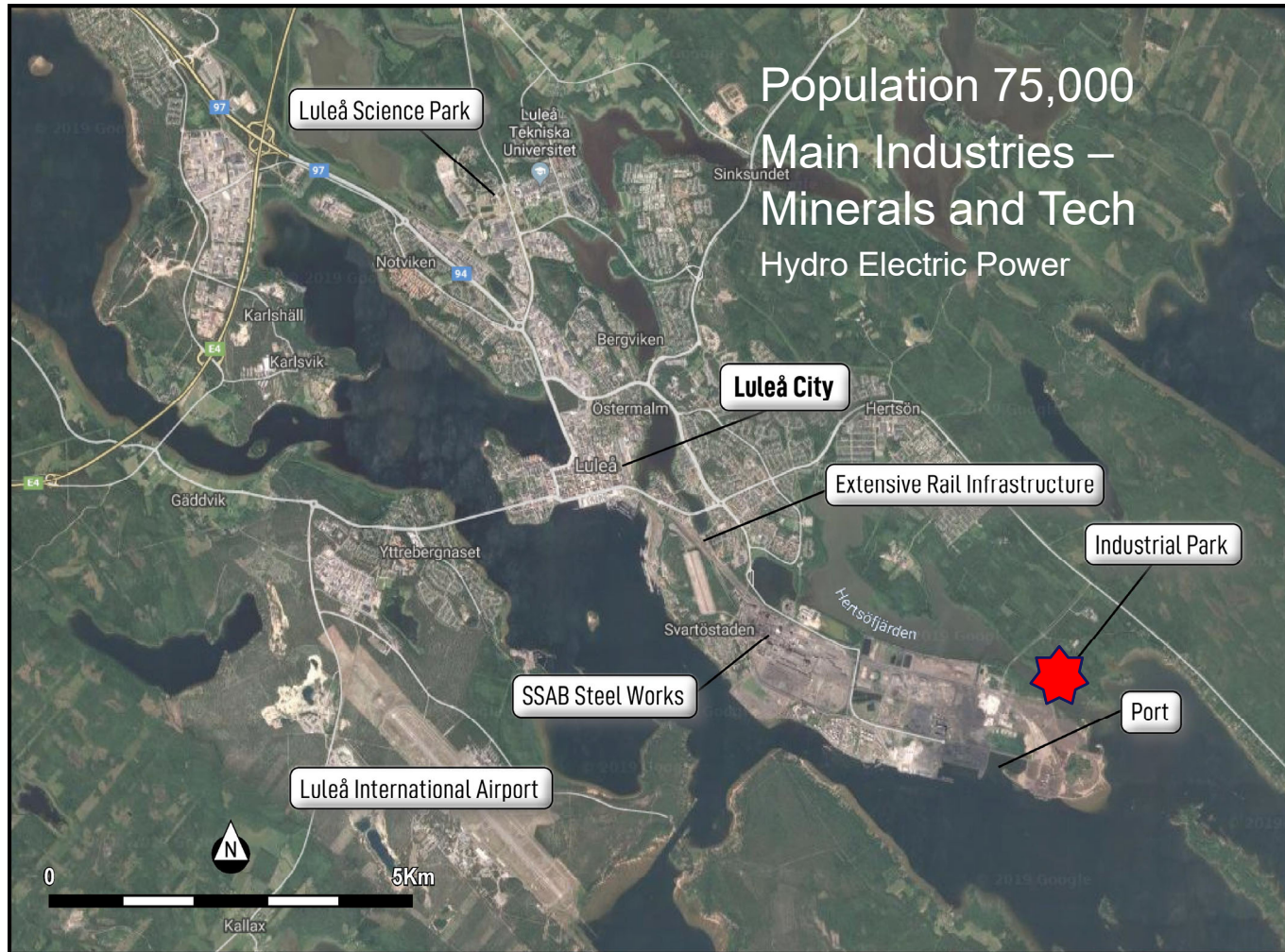
Source : Roskill (2019)

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# First-class infrastructure will reduce opex and capex



Population 75,000  
Main Industries –  
Minerals and Tech  
Hydro Electric Power

- Large skill base
- Technical University
- World class infrastructure
- Low cost, HV hydropower
- Unlimited water
- Reticulated gas/steam
- ★ Potential plant location in approved heavy industry park (alternative sites in Sweden and Finland will also be considered)



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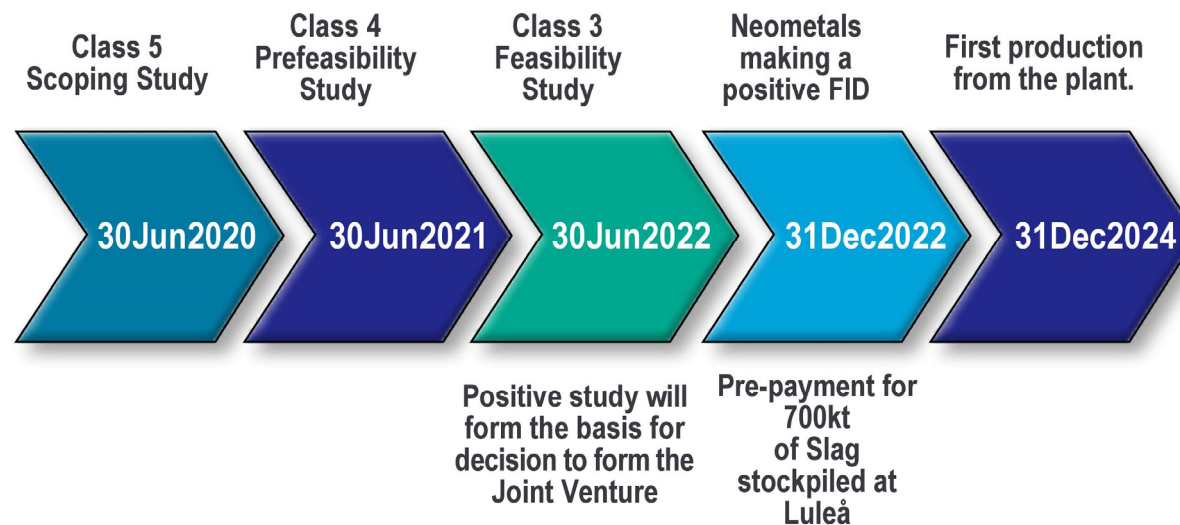
# Forward work program



Evaluation studies to be funded and managed by Neometals to timetable below:

- Metallurgical testwork
- Class 5, 4 and 3 AACE (Association for the Advancement of Cost Engineering) Engineering Cost studies

## Indicative Project Timeline - Steel Slag Project



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# The NMT/Critical Collaboration Agreement

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- Neometals will manage and fund various studies required to FID (Final Investment Decision) to earn its interest in the JV (Joint Venture) with Critical.
- Critical will manage all activities in Sweden and Finland, including permitting.
- Neometals and Critical will form a JV committee, comprising of two representatives from each party, to oversee the conduct all activities.
- Positive study outcomes will trigger decision over formation of 50:50 JV between Neometals and Critical:
  - JV will consider an FID for the construction of a commercial Slag recycling facility to produce high-purity vanadium chemicals and/or ferrovanadium; and
  - Both parties will be entitled to maintain their relative equity in the JV by contributing equally to costs.

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# SSAB Supply Agreement

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- Critical has entered into a conditional agreement with SSAB for the supply of Slag with Luleå as baseload with balance from SSAB Oxelösund and Raahe sites:
  - Conditional upon the successful completion of scoping, pre-feasibility and feasibility studies and positive investment decision by no later than 31st December 2022;
  - Pricing formulas, minimum volumes and specifications have been agreed and are commercial in-confidence; and
  - Purchase of Slag will be from the “mill gate” initially from the Luleå site.

# SSAB Supply Agreement (continued)

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## Key terms include:

- The product is defined as LD-Slag (<200mm)
- The Minimum Volume of Product to be provided is Two Million (2M) dry metric tonnes (dmt) with a minimum of 200,000 tpa with a focus on supply from Luleå
- The Grade for the Product is typically between 2.67 and 4.10%  $V_2O_5$
- The price is linked to the prevailing vanadium price and vanadium content, using a reference grade of 2.2% V or 3.92%  $V_2O_5$
- Subject to making a positive FID, the JV is obliged to pre-pay for 700,000 tonnes of Slag stockpiled at Luleå
- Neometals has met Critical' s obligation to pay SSAB a sign-on payment

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# Neometals Key Project Staff

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**Darren Townsend – Chief Development Officer (Project Sponsor)**

**Mining Engineer and EMBA with 25 years experience (10 years Corporate). Extensive experience in exploring for and developing speciality metal mines in jurisdictions around the world**

Responsible for leading all metallurgical test work and studies for the Barrambie Titanium Vanadium Project. Oversaw construction and operations of Wodgina - at the time the worlds largest Tantalum mine and processing facility.



**Irena Ivanova – General Manager Evaluation Studies (Project Engineer)**

Irena is a chemical engineer, project manager and senior executive with more than 20 years' experience in the mining and resources industry. Irena's commodity experience includes Gold, Copper, Nickel, Cobalt, Uranium, Vanadium, Tungsten, Iron Ore, Lead, Zinc and Silver via a range of mineral processing and hydrometallurgical technologies. Irena has previously held roles with Ausenco, Tetra Tech and Hatch.



**Dr David Robinson – General Manager Metallurgy + R+D (Process Development)**

Chemist with BSc (1<sup>st</sup> Class Honours), MSc, MBA, PhD

Dave has extensive operational and academic experience including 10 years in CSIRO managing and running an extensive number of hydrometallurgical and chemical projects and 15 years in the Anglo Platinum group running operations and technical programs at numerous refineries.

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# Thank you

[www.neometals.com.au](http://www.neometals.com.au)

# Appendix

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## Neometals



# SSAB Luleå, Sweden



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New Industrial Area

Stockpiles

Pouring and cooling

SSAB's steel mill



Crushing and screening

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# Luleå Site – a bird's eye view



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# SSAB Raahe, Finland



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# SSAB Oxelösund, Sweden

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