



SUCCESSFUL COMPLETION OF LITHIUM BATTERY RECYCLING PILOT

HIGHLIGHTS

- Neometals lithium battery recycling pilot plant complete - all technical objectives met
- Final product recovery of lithium has been demonstrated at pilot scale
- Cobalt and nickel pilot solutions successfully purified and crystallised to meet battery grade specifications. Positive early product evaluation feedback received from industry
- Pilot outcomes delivered to potential JV partner (SMS Group) - JV formation on track for 30 April 2020

Project development company, Neometals Ltd (ASX: NMT) (“**Neometals**” or “**the Company**”), is pleased to announce the successful completion of its pilot plant test-work (“**Pilot**”) on the Company’s proprietary lithium-ion battery (“**LIB**”) recycling technology. The Pilot has validated earlier bench scale assumptions with high recoveries of the targeted suite of cathode active elements and refined them into high purity chemicals for re-use in the battery supply chain.

Neometals has developed a sustainable process for recovering nickel, cobalt and other valuable materials from spent and scrap LIBs that might otherwise be disposed of in land fill or processed in high emission pyrometallurgical recovery circuits. The flowsheet is designed to physically separate and recover battery steel casings, aluminium and copper foil, plastic separators, and graphite from high-value battery cathode materials including nickel, cobalt, manganese and lithium.

The Pilot, undertaken by SGS Canada Inc., represents part of the pre-development activities for a proposed commercial LIB recycling venture to recover LIB materials from electric vehicle and consumer electronics cells. Neometals successfully shredded and processed 2.3 tonnes of spent commercial LIBs during the ‘Feed Preparation’ stage of the Pilot. A total of 980 kg of shredded and upgraded cathode and anode material (“**Black Powder**”) were fed into the subsequent ‘Hydrometallurgical Processing’ stage from which cathode materials have been recovered and refined into high-purity chemical products.

During the concluding phase of the Pilot:

- the lithium extraction campaign successfully recovered lithium leaving only ammonium sulphate in the depleted solution for crystallisation as ammonium sulphate (“**Amsul**”). The remaining water will be recycled;
- the previously recovered Pilot cobalt and nickel sulphate solutions were successfully purified and crystallised to generate cobalt and nickel sulphate solids at specifications suitable for cathode production; and
- the Pilot data was modelled in a Metsim mass/energy balance and documented in a comprehensive test report that have been issued to potential joint venture (“**JV**”) partner (SMS Group) ahead of a JV formation decision targeted by the end of April 2020 (see *Neometals ASX announcements dated 17th October 2019 and 18th February 2020*).

Successful completion of the Pilot, which commenced in February 2019, represents a significant commercial milestone for the Neometals recycling technology. Objectives were met and surpassed, no fatal technical flaws arose, and the Company now has the data to commence feasibility-level studies and proposed demonstration trials (“**Demonstration Trial**”) in Europe. With the Pilot significantly reducing the technical risk of its proprietary process, Neometals can proceed confidently towards the proposed commercialisation JV and advance feed supply and product offtake activities.

Neometals and SMS Group are working collaboratively to finalise the formal JV legal agreements and Commercial Demonstration Plant design. Initial feedback from leading market participants on Pilot sample products has been encouraging and Neometals will look to secure evaluation partnerships with end-users to qualify products from the Demonstration Trial for future offtake agreements.

Neometals Managing Director Chris Reed commented:

“We are delighted to have completed the lithium battery recycling Pilot with such encouraging results. We remain convinced that electrification of transport is an unstoppable trend, which by default will generate ever increasing volumes of production scrap and end-of-life batteries to responsibly manage.

We have now proven that we have a solution to meet the lithium-ion battery supply chains need for a safe, environmentally friendly recycling process which can reduce reliance on imported mineral feedstocks and satisfy increasing regulatory and stakeholder demands for sustainable and ethical raw material supply chains.

We are looking forward with our partner to commercialise this asset. SMS’s skill set and global presence will further enhance value and lower risk as we prepare to showcase our offering to the market in a Commercial Demonstration Plant in Europe, the region with the fastest growing battery cell production capacity.

Lithium Recovery

After the cathode active elements (cobalt, manganese and nickel) have been extracted, the Pilot solution contains lithium and ammonium sulphate with minor impurities. Lithium recovery from that solution was tested in the final phase of Pilot operation. In excess of 90% lithium was successfully extracted as a lithium chloride solution and the remaining solution was an aqueous ammonium sulphate. Overall recoveries from feed were in line with assumptions in the scoping study.

The recovered lithium chloride solution is planned to be further purified to enable it to be electrolysed into lithium hydroxide using the patented ELi® process, which is owned by Reed Advanced Materials Pty Ltd (70:30 Neometals and Mineral Resources Ltd).

Ammonium sulphate crystallisation is widely practiced on a commercial scale, so no crystallisation Pilot test work was performed. The solution analysis indicates that the production of a marketable product should not be a technical challenge. Ammonium sulphate is a common fertiliser material as well as a feedstock for ammonia production.

Nickel and Cobalt final product purification and crystallisation

The cobalt and nickel solutions that were produced during the Pilot were of high purity (see Neometals ASX announcements dated 8th November 2019 and 28th November 2019 respectively). A flowsheet was developed to purify each solution and subsequent testing was successful. The product departs the purification stage as a solution from which a metal sulphate is crystallised. Cobalt sulphate and nickel sulphate were crystallised from Pilot generated solutions. The cobalt and nickel product analysis indicated the product meets battery grade specifications.

Product Evaluation

Potential end users in the battery supply chain (cathode makers and others) have reviewed cobalt and nickel sulphate assays from Pilot samples. Feedback received to date has been encouraging and Neometals intends to collaborate with potential customers in evaluation of demonstration plant product samples with a view to entering into product offtake commitments.

Next steps towards JV Formation

SMS Group will complete its review of the final metallurgical test work report and Metsim mass-energy balance. The review constitutes the final technical diligence requirements to enable an SMS decision to enter a project commercialisation JV by the end of April 2020. Both parties are negotiating the JV legal agreements in parallel with Commercial Demonstration Plant design and procurement work packages.

Importantly, the Pilot learnings have highlighted significant scope to further improve outcomes in optimisation test-work that has commenced and will precede the Demonstration Trial.

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.