

Alpha **HPA**

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ASX: **A4N**
ASX Announcement
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(5 pages by email)

HPA FIRST PROJECT UPDATE

HPA FIRST PILOT PLANT

- **Pilot plant assembly well advanced at Alpha HPA's facility in Brisbane.**
- **All major pilot plant equipment on site.**
- **Wet commissioning commenced for pre-cursor tank and filter, centrifuge and Al-salt crystalliser.**
- **Feedstock preparation for the pilot plant already commenced.**
- **First pilot plant operating run on track for commencement in June.**

HPA MARKETING

- **HPA marketing trip to Germany completed in May.**
- **Visits included HPA end-users (battery separator manufacturers), vehicle manufacturers, the Stuttgart Battery Conference and the MEET battery research centre.**
- **Technical exchange commenced with a number of parties requesting to receive multi-kg HPA samples from the pilot plant program.**
- **Direct alumina coating of cathode material confirmed as a key lithium-ion battery cell trend.**
- **All market participants confirm focus on lithium-ion cell safety and battery life strongly linked to increasing purity of all lithium-ion cell components, including HPA.**

HPA REFINING OF PRE-PILOT SOLVENT EXTRACTION RUN

- **The HPA refining of high purity aluminium solutions is now well advanced.**
- **HPA samples will be sent for assay, to HPA end-users and for micronising (milling) testwork.**

COO APPOINTMENT

- **Appointment of Mr Martin Kaderavek (Chem. Eng) as Chief Operating Officer.**

Managing Director, Rimas Kairaitis, commented; *"The Company's technical program continues to progress well, with the pilot plant on track for commencement in June. The HPA marketing effort has proved rewarding, establishing important dialogue with potential customers, as well as continuing to affirm the demand for suppliers of large volume, high-quality HPA"*

HPA FIRST PILOT PLANT

The Company is close to finalising construction of the HPA First pilot plant at its dedicated laboratory facility in Brisbane.

All major pilot plant equipment is now onsite.

Key process equipment including the feedstock preparation tanks, solvent extraction (SX) rigs, aluminium salt crystalliser, centrifuge, filters, ovens, and the high-purity HPA-pre-cursor room are operationally ready. Operational readiness has included the Teflon coating of contact components in key high-purity areas of the pilot plant.

Wet commissioning has commenced on the feedstock tank, aluminium-salt crystalliser, pre-cursor crystalliser and pre-cursor filters.

Pilot plant progress is displayed in the images below:



Teflon lined aluminium salt crystalliser



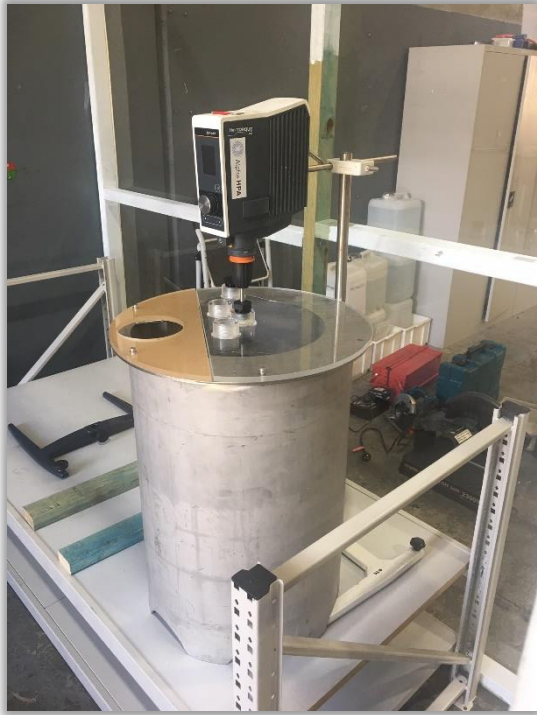
Teflon lined centrifuge



HPA pre-cursor generated from filter commissioning



High Purity HPA-pre-cursor room



Stirred tank crystalliser – HPA pre-cursor



HPA calcining furnace



Pilot scale Solvent Extraction (SX) cells



Process liquor drums

A number of key pilot plant activities have already commenced, most importantly being the feedstock preparation to generate the feed solution (PLS) for treatment via the solvent extraction cells. The commencement of the first pilot plant Solvent Extraction (SX) run remains on track for late June.

HPA REFINING OF PRE-PILOT SOLVENT EXTRACTION RUN

The Company has been sequentially refining all the very high purity advanced electrolyte (AE) generated from the recent pre-pilot mini-rig run into HPA. This process is continuing with a number of samples submitted for assay. Over the next week, further HPA samples will be despatched for micronising (jet milling) test work, as well as follow up samples to selected end users.

HPA MARKETING

Following a marketing visit to China in March 2019, Alpha HPA has now also completed a marketing visit to Germany. The trip included visits to HPA end-users (battery separator manufacturers), vehicle manufacturers and the MEET battery research centre in Münster, as well as attendance at the Stuttgart Battery conference. The trip provided valuable insights into the role of HPA within both the lithium-ion cell as well as within the EV battery pack.

Key findings of the trip include:

- The absolute focus on battery safety and integrity driven by EV vehicle manufacturers. This is considered strongly favourable to HPA demand, given its role in thermal stability and control of battery thermal runaway.
- The focus on extending battery charge-recycle cycles (i.e.: battery life) to match EV battery pack life to internal combustion engine (ICE) vehicle equivalents. Battery ageing is substantially influenced by impurities within the cell, so the increased focus on battery life is considered strongly favourable for all high-purity cell components, and in particular HPA.
- To offset the high-cost and ethical sourcing issues of cobalt in the lithium-ion battery cathode, the trend toward cobalt reduction in the battery cathode (i.e.: the move toward 8:1:1 nickel-manganese cobalt (NMC) ratio) appears well entrenched. A consequence of this trend is the requirement to stabilise the 8:1:1 cathode via either chemical doping or direct alumina coating which is further constructive for HPA demand.

As a result of the trip, Alpha HPA has commenced a technical exchange with a number of parties requesting to receive multi-kg HPA samples from the Company's upcoming pilot plant program.

COO APPOINTMENT

Alpha HPA is pleased to note the appointment of Mr Martin Kaderavek as Chief Operating Officer. Mr Kaderavek is a chemical engineer with over 25 years industry experience including senior management roles within Schenck Process, a large integrated engineering and manufacturing firm, consulting roles with PWC, and direct experience with design, construction and commissioning of integrated chemical processing facilities with BOC gases. Martin will take Company oversight for the successful delivery of the HPA First pilot plant and DFS, as well as preparing to build a commercial project delivery team.

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About the HPA First Project

The Company's HPA First Project represents the evaluation and intended commercialisation of the production of ~10,000tpa of high purity alumina (HPA) using the Company's proprietary licenced solvent extraction and HPA refining technology. The technology provides for the extraction and purification of aluminium from an industrial feedstock to produce 4N (>99.99% purity) alumina for the intended use within the lithium ion battery and LED lighting industry. Following a successful testwork programme and Pre-Feasibility Study (PFS), updated in March 2019, Alpha HPA is now completing a pilot plant program at its dedicated laboratory facility in Brisbane, as part of a full definitive Feasibility Study (DFS) due for delivery in CY2019.

Key highlights of the PFS (ASX: 7 March 2019):

- Unit production costs of **US\$5,123** per tonne of HPA (after by-product credits)
- Annual Free Cash Flow (FCF) at full production rate, of **US\$199 million** (assuming US\$25,000/t HPA)
- Capital Expenditure of US\$149 million

Competent Persons Statement (Process Development Testwork)

Information in this announcement that relates to metallurgical results is based on information compiled by or under the supervision of Dr Stuart Leary, an Independent Consultant trading as Delta Consulting Group. Dr Leary is a Member of The Australasian Institute of Mining and Metallurgy (AusIMM). Dr Leary has sufficient experience to the activity which he is undertaking to qualify as a Competent Persons under the 2012 Edition of the 'Australasian Code for reporting of Exploration Results, Mineral Resources and Ore Reserves'. Dr Leary consents to the inclusion of the technical data in the form and context in which it appears.

For further information on testwork results and processes see ASX announcements dated 17 April 2019, 7 March 2019, 4 December 2018, 20 November 2018, 6 September 2018, 31 August 2018, 9 July 2018, 30 April 2018, 26 April 2018, 21 March 2018, 6 March 2018, 21 February 2018, 8 December 2017, 30 November 2017, 29 November 2017, 24 November 2017 and 13 November 2017.

Cautionary Statement

The Pre-Feasibility Study (PFS) referred to in this announcement has been undertaken to assess the technical and financial viability of the HPA First Project. Further evaluation work including a Definitive Feasibility Study (DFS) is required before the Company will be in a position to provide any assurance of an economic development case. The PFS is based on the material assumptions about the availability of funding and the pricing received for HPA. While the Company considers all of the material assumptions to be based on reasonable grounds, there is no certainty that they will prove to be correct or that the range of outcomes indicated by this PFS will be achieved. To achieve the range of outcomes indicated in the PFS, Pre-Production Capital in the order of A\$198 million plus working capital will likely be required. Investors should note that there is no certainty that the Company will be able to raise the amount of funding when needed. It is also possible that such funding may only be available on terms that may be dilutive to or otherwise affect the value of the Company's existing shares. It is also possible that the Company could pursue other "value realisation" strategies such as a sale, partial sale or joint venture of the Project. If it does, this could materially reduce the Company's proportionate ownership of the Project. Given the uncertainties involved, investors should not make any investment decisions based solely on the results of the PFS.

Forward Looking Statements

This PFS contains certain forward-looking statements with respect to the financial condition, results of operations, and business of the Company and certain plans and objectives of the management of the Company. These forward-looking statements involve known and unknown risks, uncertainties and other factors which are subject to change without notice, and may involve significant elements of subjective judgement and assumptions as to future events which may or may not occur. Forward-looking statements are provided as a general guide only and there can be no assurance that actual outcomes will not differ materially from these statements. Neither the Company, nor any other person, give any representation, warranty, assurance or guarantee that the occurrence of the events expressed or implied in any forward-looking statement will actually occur. In particular, those forward-looking statements are subject to significant uncertainties and contingencies, many of which are outside the control of the Company. A number of important factors could cause actual results or performance to differ materially from the forward looking statements. Investors should consider the forward looking statements contained in this PFS in light of those disclosures.

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