

Alpha **HPA**

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## HPA FIRST PFS UPGRADE AND PROJECT UPDATE

### MODIFIED FEED SIGNIFICANTLY IMPROVES THE HPA FIRST PRE-FEASIBILITY STUDY (PFS)

- **Detailed testwork on a modification to the HPA First process feedstock has identified a number of significant project improvements, including:**
  - **Simplified flow sheet**
  - **Higher aluminium feed-grades**
  - **Improved process stability**
  - **Very high aluminium extraction (to >95%)**
- **The HPA First PFS design and costing has now been updated to accommodate for the feedstock modification, capturing the following highlight benefits:**
  - **Project CapEx reduced by A\$17M to A\$198M (US\$149M)**
  - **Unit OpEx reduced to A\$6,830 (US\$5,123) per tonne HPA\***
  - **Annual Free Cash Flow (FCF) increased to A\$265M (US\$199M)**

### HPA MARKETING

- **Alpha HPA has now conducted a number of visits to potential HPA customers. HPA samples have been provided and HPA specifications exchanged.**
- **End-user market interaction has strongly confirmed the nature of HPA demand within the lithium-ion battery sector.**
- **End-user visits continuing through March.**

### PILOT PLANT ASSEMBLY UNDERWAY

- **Key pilot plant equipment is now being assembled at Alpha HPA's facility in Brisbane.**
- **Interim testwork to refine the pilot plant and DFS inputs is also under way.**

Managing Director, Rimas Kairaitis, commented; *"The opportunity to modify the process feedstock was identified during the 2018 PFS. We are delighted that the validation testwork has been strongly conclusive, translating to significant technical and financial project improvements. We are excited to bring this upgrade forward into the pilot plant, DFS and then to the commercial facility."*

\* After accounting for by-product credits.

## PRE-FEASIBILITY STUDY UPDATE

### Background

On 20 November 2018, Alpha HPA Limited ('the Company'), announced the findings of the Pre-Feasibility Study (PFS) on the HPA First Project. The HPA First Project is the application of the Company's licensed proprietary solvent extraction (SX) and refining technology, to process aluminium derived from an industrial chemical feedstock into High Purity Alumina (HPA).

The PFS described a technically robust project and delivered a compelling business case.

In Part 18 of the PFS announcement, the Company noted a significant opportunity identified during the PFS regarding the modification of the chemical feedstock. The Company has now completed a technical and financial assessment of this opportunity as described below.

A full project description and summary of material assumptions and modifying factors is detailed in the Company's PFS announcement dated 20 November 2018.

### Feedstock Modification

The Company has now completed a number of detailed batch scale SX tests using the modified feedstock.

Key findings of this testwork are as follows:

- The modified feedstock allows for a higher grade aluminium feed, which translates to reduced tank and pipe sizing, with attendant CapEx reductions.
- The modified feedstock presents a far more stable process, with rapid extraction of aluminium and rapid SX phase separation of the loaded organic from the feed solution.
- The modified feedstock also provides for a simplified flow sheet, with an increase in the production of higher value by-product B, and the elimination of by-product A. A simplified flow sheet using the modified feed is shown as Figure 1, below.
- In-house analysis has confirmed a very-high aluminium extraction to >95%.

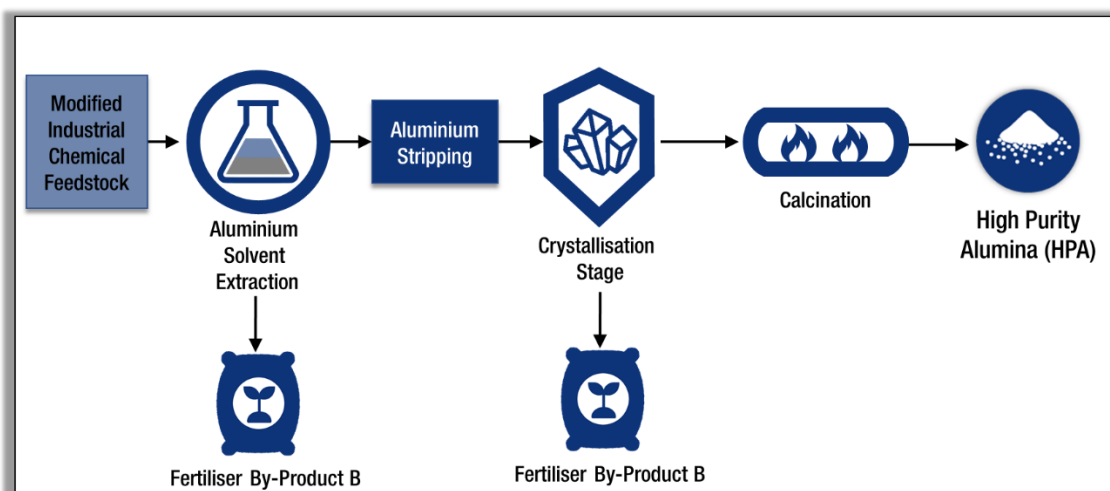


Figure 1: HPA First - Simplified Process Flow Sheet with modified feedstock

## PFS Update

Based on these very encouraging results, the Company has now adopted the modified feed and completed PFS level design and costings and updated the PFS accordingly, with the following highlights:

- Total Project CapEx is reduced by A\$17M to **A\$198M (US\$149M)**, due largely to the removal of significant plant rendered redundant by the adoption of the modified feed.
- Although the reagent cost increases with the modified feed, this is more than offset by increased by-product sales revenue, providing for an approximate 20% net reduction in unit operating cost, down to **A\$6,830 (US\$5,123)** per tonne of HPA after by-product credits.
- An increase of A\$17.6M in annual free cash flow (FCF) to **A\$265M (US\$199M)**.

The refreshed PFS findings of the HPA First Project are summarised in the table below alongside the November 2018 results:

HPA First Project Key Project Parameters	November 2018		PFS Update March 2019	
	A\$	US\$	A\$	US\$
A\$/US\$ Exchange Rate	0.75		0.75	
HPA Production (t/y)	10,200		10,200	
HPA Price Assumption (\$/t HPA)	\$33,333	\$25,000	\$33,333	\$25,000
Annual Revenue (including by-products)	\$384 million	\$288 million	\$413 million	\$310 million
Annual Average Cash Operating Cost	\$131 million	\$98 million	\$143 million	\$107.5 million
Unit Cash Cost accounting for by-products (\$/t HPA)	\$8,538	\$6,403	\$6,830	\$5,123
<b>Annual Free Cash Flow (FCF)</b>	<b>\$247 million</b>	<b>\$185 million</b>	<b>\$265 million</b>	<b>\$199 million</b>
Annual EBITDA	\$248 million	\$186 million	\$266 million	\$200 million
Aluminium Feedstock Processed (t/y)	65,753		20,400	
Pre-Production Capital Cost	\$215 million	\$161 million	\$198 million	\$149 million
Capital Intensity (CapEx \$ per tpa HPA)	\$21,043	\$15,783	\$19,417	\$14,563

The upcoming pilot plant program will operate on the modified feed, with a view to adopting the modified feed for the CY19 Definitive Feasibility Study (DFS) and the commercial facility.

The modified plant design will now be confirmed in an interim SX mini-rig (cut down pilot scale) program, to supply mass-balance information to the pilot plant installation.

## HPA END-USER MARKETING

In December 2018, the Company completed two marketing trips to South East Asia to meet with direct HPA offtake counterparties, as well as market intermediaries and battery industry advisors. The visits consolidated two positive findings relevant to the Company's HPA First Project, namely:

- Both existing and new-entrant electronic vehicle (EV) battery separator manufacturers are committing large scale capital expenditure on battery separator facilities this calendar year to be positioned to meet the Government mandated Chinese EV battery demand; and
- The purity and morphology of the HPA produced by the Company's process is well suited to battery separator applications and is considered to be a desirable product, particularly with the volumes and CapEx requirement as set-out on the HPA First PFS.

Follow up visits are planned in the week commencing 18 March 2019.

## PILOT PLANT AND INTERIM WORKS

The HPA First Pilot Plant is steadily being assembled at the Company's dedicated facility in Brisbane. With the adoption of the modified feedstock and the requirement for an interim mini-rig SX campaign, the Pilot Plant operation is now scheduled for June 2019. However, with the parallel program of interim works, the DFS scheduled for completion in CY19 is unaffected.



Figure 2: Solvent Extraction cells for the pilot plant installed

In parallel to the Pilot Plant assembly, the Company is completing a number of key interim tests required to maximise the technical confidence of the upcoming pilot and DFS. These works include, but are not limited to:

- Front end optimisation studies.
- In-house manufacture of low-impurity reagent for the crystallization stage.
- Materials of construction testing.
- HPA morphology study.
- Filtration testing.
- Crystalliser optimisation.

Key findings from the interim works will be incorporated into the pilot campaign and included in the final DFS report.

For further information, please contact:

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## **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 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.