



**Andromeda Metals Limited**  
ABN: 75 061 503 375

**Corporate details:**

ASX Code: ADN

Cash: \$1.687 million  
(at 31 December 2017)

Issued Capital:  
896,028,227 ordinary shares  
486,280,451 ADNOB options  
2,476,507 unlisted options

**Directors:**

**Rhod Grivas**  
Non-Executive Chairman

**Chris Drown**  
Managing Director

**Nick Harding**  
Executive Director and  
Company Secretary

**Andrew Shearer**  
Non-Executive Director

**Contact details:**

69 King William Road,  
Unley, South Australia 5061

PO Box 1210  
Unley BC SA 5061

Tel: +61 8 8271 0600

Fax: +61 8 8271 0033

admin@andromet.com.au

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



METALS

## ASX announcement

26 April 2018

### Andromeda Metals to enter HPA sector and management changes

- **Joint Venture Heads of Agreement signed with Minotaur Exploration Limited (ASX: MEP) for the Poochera high purity alumina (HPA) project.**
- **Indicative offtake agreements in place for underlying kaolin/halloysite product.**
- **Appointment of experienced industrial minerals expert as the Company's new Managing Director to lead the development of the HPA Project.**
- **Preliminary test results for HPA support a considerable project upside.**
- **Andromeda to immediately commence additional drilling and feasibility studies.**

### SUMMARY

Andromeda Metals Limited (ASX: ADN) (Andromeda) is pleased to announce the signing of a binding Joint Venture Heads of Agreement (HOA) with Minotaur Exploration Limited (ASX: MEP) (Minotaur) to acquire up to a 75% interest in its world class halloysite-high purity alumina (HPA) project in South Australia for expenditure of \$6 million over a period of up to 5 years. The project contains a high-quality kaolin (+halloysite) JORC 2004 Mineral Resource<sup>1</sup> which has the potential to manufacture HPA.

HPA is a new age material critical in the manufacture of many high-tech products of today including the rapidly expanding battery technologies and energy storage sector, LED lighting industry and sapphire glass manufacture used in the production of smart phones and TV screens.

In addition, the project contains halloysite, a rare nanoclay derivative of kaolin with a nanotube structure. Halloysite has strengthening

applications in the ceramics and cement industries and presents niche market opportunities in the nanotechnology sector.

Indicative non-binding offtake agreements are already in place with Asian ceramic manufacturers providing confidence and opportunity for rapid development of the project.

Completion of the transaction provides Andromeda with access to an advanced project potentially capable of being advanced rapidly through feasibility to a development decision within 2-3 years.

Mr James Marsh is to be appointed as the Company's new Managing Director, commencing 1 June 2018. James is industrial chemist with world class production and marketing experience in kaolin and associated industrial minerals products and the skill set to advance the project into production.

The Chairman of Andromeda, Rhod Grivas, said; "the directors of Andromeda Metals are excited to see the Company enter this newly emerging high growth sector of HPA and the associated application halloysite offers to new age technology advancements. We are delighted to have secured the services of James Marsh to lead the development of the project going forward."

## **KAOLIN-HALLOYSITE JOINT VENTURE**

The binding HOA with Minotaur covers its world class kaolin-halloysite HPA project in South Australia. The project contains a high quality kaolin (+halloysite) JORC 2004 Mineral Resource which has the potential mineral properties to enable the manufacture of high purity alumina (HPA), an important feedstock commodity used in rapidly expanding new age markets including LED lighting, electric vehicle components, sapphire glass used in the manufacture of smart phones and TV screens, high-strength ceramic tools, space and aeronautic industry components, and battery technologies and energy storage.

### **What is HPA?**

High Purity Alumina is aluminium oxide ( $Al_2O_3$ ) a high purity non-metallurgical alumina product with an alumina grade exceeding 99.9% (3N). HPA products are categorised on the basis of purity level (ie 99,99% (4N), 99.999% (5N)) and of its application. HPA's properties include low-friction and high wear-resistance, hardness, thermal and electrical insulating ability, non-corrosive and broad chemical compatibility.

HPA is experiencing dramatic growth due to its application in the manufacture of today's high-performance electronic devices and electric powered vehicles. The HPA market is forecast to grow at a greater than 20% compound annual growth rate over the next five or more years through increasing penetration into traditional markets and increased per capita energy demand driving high specification energy efficient products.

### **The Kaolin-Halloysite Project**

The Kaolin-Halloysite Project covers two main geographic areas of interest, both situated in the western province of South Australia (Figure 1). The main area of focus, the Poochera Kaolin-Halloysite Project on the Eyre Peninsula comprises three tenements and is located approximately 635kms west by road from Adelaide and 130kms east from Ceduna (Figure 2). The port of Thevenard at Ceduna offers export facilities appropriate for likely future production.

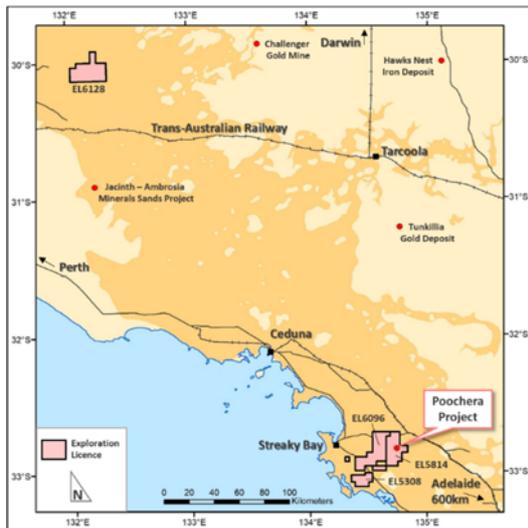


Figure 1 Project location plan

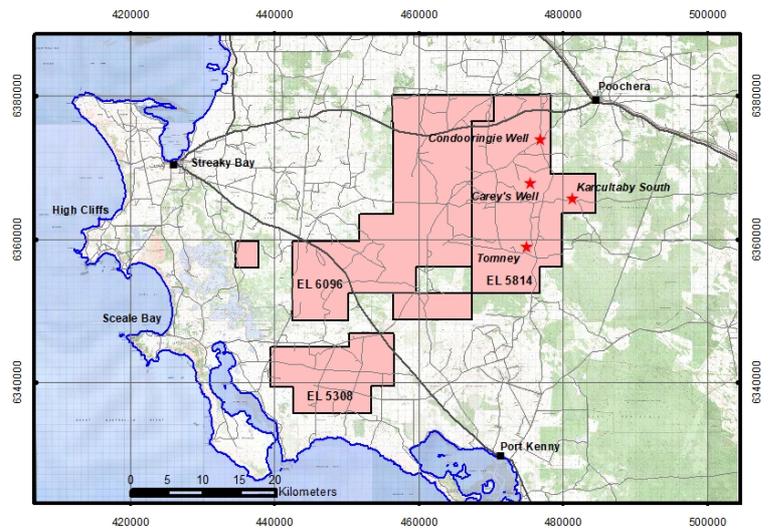


Figure 2 Poochera tenements and key kaolin-halloysite deposits

High quality kaolin-halloysite deposits occur extensively across the Poochera Project area (Figure 2) making this a region of global significance for the mineral and capable of supporting a considerable long-life mining operation should final feasibility studies determine the project to be economically viable.

Halloysite is a rare derivative of kaolin where the mineral occurs as nanotubes. Halloysite has a wide variety of industrial uses beyond simple kaolin and commands a significant premium above the average kaolin price. The Poochera kaolin deposits contain variable admixtures of kaolin and halloysite that appear amenable to selective mining to produce specific low, medium and high halloysite blends for the ceramic markets, new nanotechnology applications and as a strengthening additive in the cement and petroleum fracking industries.

The northern project area includes the near pure halloysite Camel Lake deposit on EL6128 (Figure 1) which could potentially be processed to provide a marketable pure product to be used to further upgrade halloysite blend products from Carey's Well and for the development of halloysite nanotubes and their potential use as replacements for carbon nanotubes in the areas of energy storage and carbon-hydrogen capture and storage.

Extensive test work has been completed by Minotaur on the Carey's Well deposit, including resource drilling, bulk sampling, pilot test plant trials and marketing for ceramics and other conventional applications, and the deposit is now considered ready for Mining Lease application as part of feasibility evaluations. Minotaur has also undertaken preliminary research into innovative uses of halloysite nanotubes as strengthening additive for proppants, concrete and other nanotubular uses (refer Minotaur's Quarterly Reports June 2015, December 2016 and June 2017).

The potential for Carey's Well to produce high purity HPA represents a significant opportunity for further development. Pilot plant trials conducted by Minotaur on kaolin from Carey's Well has produced one of the purest kaolin feedstocks available (refer Minotaur's Quarterly Report September 2012), while testwork with the goal of confirming that 3N and 4N HPA grades can be achieved is underway in trials being conducted by a commercial laboratory and with UniSA and the University of Newcastle researchers.

## **Resource Estimate by Minotaur for Carey's Well**

A resource estimate for the Carey's Well kaolin deposit was publicly reported by Minotaur Exploration on 8 February 2012 titled "Maiden measured resource for SA kaolin project" (refer ASX website <https://www.asx.com.au/asxpdf/20120208/pdf/4247hg1j61295n.pdf>). The report is also available on the Minotaur Exploration website ([www.minotaurexploration.com.au](http://www.minotaurexploration.com.au)). The Mineral Resource estimate of 16.3 million tonnes of kaolinized granite with 45% yield of -45 micron kaolin, using an ISO Brightness R457 cutoff of 75, was classified as Measured in accordance with the requirements of the 2004 edition of the JORC Code. The JORC 2004 Mineral Resource report dated 8 February 2012 included a detailed report on the estimation process as an Appendix.

The Carey's Well kaolin Mineral Resource Estimate published by Minotaur, and the supporting Exploration Data, were evaluated by Mr Lewis Barnes who is a member of the Australian Institute of Geoscientists and who has sufficient experience in the undertaken activities relevant to the style of mineralisation and type of deposit under consideration to qualify as a Competent Person as defined in the 2012 edition of the JORC Code. Minotaur confirms that all material assumptions and technical parameters underpinning the estimates published on 8 February 2012 have not materially changed. However, it must be noted that the kaolin resource estimate was not reported in accordance with the JORC Code 2012 and may not conform to the requirements in JORC Code 2012.

A Competent Person has not done sufficient work to classify the kaolin minerals resource estimate for Carey's Well in accordance with the JORC Code 2012. It is possible that following further evaluation and/or further exploration work, the estimates previously reported by Minotaur may materially change necessitating fresh reporting by Andromeda in accordance with the JORC Code 2012. Nothing has come to the attention of Andromeda that casts doubt on the accuracy or reliability of Minotaur's estimates, but Andromeda has not independently validated Minotaur's estimates and is not adopting or endorsing those estimates.

Andromeda has, however, established sufficient confidence in the integrity of the data underpinning the Mineral Resource published by Minotaur through a review process that has included site and pilot plant visits, confirmation of original drillhole, geological and assay data for their quality and integrity, and appropriateness of data sampling, aggregation and estimation methodologies. This review was undertaken by Dr Antonio Belperio who is a fellow of the Australasian Institute of Mining and Metallurgy, an executive director of Minotaur and part-time consultant to Andromeda. Dr Belperio has sufficient experience relevant to the style of mineralisation and type of deposit under consideration and to the activity that he has undertaken to qualify as a Competent Person as defined in the 2012 Edition of the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves (JORC Code). Dr Belperio consent to inclusion in this document of the information in the form and context in which it appears.

The resource estimate by Minotaur was generated with data from 6 bulk sampling Caldwell holes drilled in 2008 and an infill drilling program of 153 aircore holes completed in 2011. The brightness (whiteness) of the kaolin, measured by raw ISO brightness R457, and iron and titanium content were the key variables estimated with the target customers at that time being manufacturers of paints, paper coatings, polymers and special ceramics with a requirement for bright white kaolin. Kaolin sample preparation and testwork were conducted at Minotaur's pilot kaolin processing facility at Streaky Bay, South Australia. The Carey's Well kaolin resource

block model and Inverse Distance Squared grade estimation were completed by Minotaur using Vulcan software. Modelling boundaries were created using 100m-spaced sectional interpretations combining geological data and R457 kaolin brightness data.

Following publication of the JORC 2004 Measured Mineral Resource in February 2012, chemical testwork has continued to investigate adding value to the Carey's Well kaolin. Minotaur's ASX release "Poochera kaolin project moves into marketing phase" published on 28 August 2012, detailed chemical analyses by CSIRO and ALS Minerals which show Carey's Well kaolin to compare favourably with premium commercial kaolin grades. Four kaolin products labelled PW55, PW90UB, PW90B and PB80, with varying properties detailed in Minotaur's ASX release on 28 August 2012, were produced at the Streaky Bay processing facility for marketing purposes.

Several reputable minerals industry consultancies have provided quotes to revise the estimation of the Carey's Well kaolin resource in accordance with JORC Code 2012 guidelines. It is Andromeda's intention to conduct additional halloysite analysis from existing samples and to engage a preferred consultant to complete a resource estimation for halloysite and kaolin in compliance with the JORC Code 2012 within the next two months.

**Competent Person's Statement:**

*Information in this report that relates to Geology, Drilling, Sampling and Mineral Resource estimates is based on information compiled by Dr Antonio Belperio, an executive director of Minotaur and who is a part time consultant to Andromeda Metals Limited. Dr Belperio is a Fellow of the Australasian Institute of Mining and Metallurgy and has sufficient experience relevant to the style of mineralisation and type of deposit under consideration and to the activity that he has undertaken to qualify as a Competent Person as defined in the 2012 Edition of the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves (JORC Code). Dr Belperio consents to the inclusion in this document of the information in the form and context in which it appears.*

**Cautionary Statement:**

*The estimate of Mineral Resources are not reported in accordance with the JORC Code 2012. A Competent Person has not done sufficient work to classify the estimate of Mineral Resources in accordance with the JORC Code 2012. It is possible that following evaluation and/or further exploration work the currently reported estimates may materially change and hence will need to be reported afresh under and in accordance with the JORC Code 2012. Nothing has come to the attention of Andromeda that causes it to question the accuracy or reliability of Minotaur's estimates. However, Andromeda has not independently validated Minotaur's estimates and therefore is not to be regarded as reporting, adopting or endorsing those estimates.*

**The Kaolin-Halloysite Project Joint Venture Terms**

The principal terms of the Kaolin-Halloysite Project Joint Venture Heads of Agreement include:

- Andromeda and Minotaur have executed a HOA granting Andromeda an exclusive 60 day Option Period to complete appropriate due diligence investigations. Andromeda will pay Minotaur a non-refundable Option Fee of \$70,000 in payment for a high purity alumina study currently underway by an independent commercial laboratory;

- Andromeda can elect to exercise the Option within 60 days of signing the HOA, during which time it will have received and evaluated the HPA Study results, to make effective the Joint Venture with Minotaur. The Company shall then sole contribute a minimum expenditure of \$400,000 within 9 months of signing of the HOA, inclusive of the \$70,000 Option Fee previously paid, in accordance with a work program to be determined by Andromeda on the project, before it has a right to withdraw;
- Andromeda can subsequently earn a 51% interest in the Joint Venture on expenditure of \$2.6 million (ie \$3.0 million in total) within two years of execution of the Heads of Agreement (Stage 1 Commitment);
- Andromeda can then elect to sole contribute a further \$3.0 million (\$6.0 million in total) over a further three years (five years in total), to acquire a further 24% equity (Stage 2 Commitment);
- Andromeda's interest will convert to 75% on the earlier of either completion of the Stage 2 Commitment or of a Decision to Mine made by the Joint Venture Management Committee;
- On completion of Andromeda's sole funding commitments, either party may elect not to contribute to a proposed Joint Venture program and budget, in which case its interest in the Joint Venture will be reduced in accordance with a standard industry dilution formula;
- If any party dilutes to less than 5% equity interest in the Joint Venture, then it's interest will be acquired by the other party for a moderate sum and a 2% Net Smelter Royalty over the project.
- Andromeda will manage and operate the Joint Venture whilst it is sole contributing and thereafter while ever it holds a majority equity.

### **Next Steps**

Extensive pilot plant trials and product marketing have confirmed the purity, brightness and whiteness of Poochera kaolin making it highly suitable for the paint, paper, ceramic, plastic, rubber and pharmaceutical industries. In addition, indicative offtake discussions with a number of Chinese ceramic manufacturers provide a path to markets for a fully hydrous processed, and partly processed, mixed halloysite product, while production of a higher quality halloysite product would potentially be in demand by Chinese ceramic feedstock customers to supplement their poorer quality supplies.

At the same time, research and development is underway to explore the opportunities identified to use the kaolin-halloysite product to serve as a HPA feedstock, proppant feedstock and a strengthening filter especially in the cement industries.

A development path is proposed that will allow for early mining approvals and start-up mining operations within two to three years. These specific development stages include:

- Complete the JORC 2012 Mineral Resource for kaolin and halloysite. This will include halloysite analysis of existing outstanding aircore samples;
- Updating an in-house Minotaur Scoping Study prepared for the Carey's Well deposit with additional Caldwell bulk sample drilling and incorporating the latest offtake indications;

- Concurrently undertaking Feasibility Studies, mining approvals and preparation of a PEPR for the Carey's Well kaolin resource based upon a conventional production process;
- Accelerate the potential commercialisation of HPA product from Carey's Well kaolin-halloysite;
- Continue to investigate development and commercialisation of Carey's Well kaolin-halloysite for use in the proppant, petroleum fracking and nanotechnology industries;
- Develop product marketing including converting indicative offtake agreements into binding contracts with product customers;
- Put in place funding arrangements to complete the Feasibility Study and the approval processes required to allow a decision to mine;
- At Camel Lake, negotiate land access agreements to allow exploration activities to occur, perform resource definition drilling, and undertake laboratory testwork on pure halloysite contained within the deposit.

## **CHANGE OF MANAGING DIRECTOR**

With the Company entering a new phase as a potential developer and producer of kaolin-halloysite and HPA, the Board is pleased to announce the appointment of Mr James Marsh as the Company's new Managing Director. James is an industrial chemist and holds tertiary qualifications in chemistry and physics. He has extensive experience across a wide range of industrial minerals spanning a 25 year period, including senior technical and marketing roles with two global market leaders. Most recently James has spent the past 7 years as Business Development Manager for Active Minerals Australia, part of the Active Minerals International group, a worldwide leader in the production and marketing of kaolin and gel quality attapulgite clay minerals.

James has been instrumental in developing and launching industrial minerals products into established and new applications globally, and has a successful track record in general management and sales. Prior to joining Active Minerals Australia, James gained first-hand experience with the Poochera project in 2010-11 where he consulted to Minotaur Exploration as General Manager – Industrial Minerals in which he managed the project through pre-feasibility and market appraisal stages.

Chris Drown has decided to resign as Managing Director and as a director of the Company. Chris's experience and passion is in exploration and he believes that a new MD for the Company is now appropriate in taking the HPA project from feasibility into production. Chris has been associated with Andromeda Metals for over 21 years, the past 11 of which has been as Managing Director. The Board wishes to thank Chris for his devoted service to the Company over more than two decades. Chris has agreed to provide geological consulting services to the Company on an as required basis going forward.

## Terms of Managing Director's Employment

Mr James Marsh will be paid a salary of \$200,000 per annum inclusive of statutory superannuation. In addition, he will receive a one-off cash amount of \$40,000 payable six months following his commencement with the Company. The Company has also agreed to grant to Mr Marsh a total of 13 million options with an exercise price of 1.2 cents per option and a term of 3 years from his commencement date, the issue of which will be subject to obtaining shareholder approval.

Mr Marsh will commence with the Company on 1 June 2018 or such earlier date as agreed with the Board. A notice period of 4 months applies on termination of the employment agreement by either the Company or Mr Marsh.



Rhod Grivas  
Chairman

(1) See MEP's ASX release dated 8 February 2012 title "Maiden Measured Resource for SA Kaolin Project"