



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

# Quarterly Report

Period ending 31 December 2018

## Corporate Details

ASX Code:  
 ADN (ordinary shares)  
 ADNOB (listed options)

Cash at 31 December 2018:  
 \$1.006 million

Issued Capital:  
 1,084,422,288 ordinary shares  
 486,280,451 ADNOB options  
 22,476,507 unlisted options

## Directors

**Rhod Grivas**  
 Non-executive Chairman

**James Marsh**  
 Managing Director

**Nick Harding**  
 Executive Director and  
 Company Secretary

**Andrew Shearer**  
 Non-executive Director

## Contact Details

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## Summary of the Company's activities for the past quarter:

### Poochera Halloysite-Kaolin JV (right to earn up to 75% interest)

- Successful completion of a bulk sampling exercise at Carey's Well which yielded 215 tonnes of halloysite-kaolin to be used in commercial scale processing trials.
- 40 tonnes of the halloysite-kaolin extracted has been dry-processed in Australia with results due in Q1 2019.
- 140 tonnes of halloysite-kaolin shipped to China for wet-processing and additional dry-processing trials with a large Chinese kaolin producer with resultant products to be sent to end customers for commercial approvals.
- Extensive geological and geotechnical data collected during the bulk sampling exercise to be used for Scoping Study mine design work.
- A second round of HPA testing on Poochera halloysite kaolin gave a purity of 4N 99.9946% Al<sub>2</sub>O<sub>3</sub> after only a single purifications stage, thus confirming that the Carey's Well resource contains a world class feed material for HPA manufacture.
- Mt Hope tenement acquired which contains a historical kaolin resource, including significant halloysite (ASX release 24 October 2018).

### Moonta Copper-Gold Project

- Commercial terms agreed for a binding Earn-in and Joint Venture Agreement with copper in-situ recovery (ISR) focused Environmental Metals Recovery Pty Ltd (EMR) for total expenditure of \$5.5 million by EMR to acquire up to a 75% interest over the northern part of the Company's Moonta tenement.

### Drummond Epithermal Gold Joint Venture

- Joint Venture partner Evolution Mining Limited (ASX:EVN) undertook soil sampling, conducted magnetic surveys and completed mapping at both Bunyip and South West Limey Dam along with other targets during the quarter.
- Additional soil sampling, IP and geophysics to be conducted over the coming quarter at Bunyip and other regional targets in preparation for a significant diamond and RC drilling program principally at Bunyip that is scheduled to occur in the second quarter of 2019.




James Marsh  
 Managing Director  
 31 January 2019

The Board and management of Andromeda Metals Limited (ASX: ADN, Andromeda, the Company) is pleased to provide a summary of its activities for the quarter ended 31 December 2018 and an update on the Company's progress.

## Poochera Halloysite-Kaolin Project

- Bulk sampling exercise completed
- HPA testing confirmed 99.9946% (4N) purity with single stage purification
- Large scale dry processing trials done in Western Australia
- Several potential customers in China sampled for Direct Shipping Ore ("DSO") business
- Mount Hope halloysite kaolin tenement acquired

The Halloysite-Kaolin 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 Halloysite-Kaolin 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).



Figure 1 Project location plan

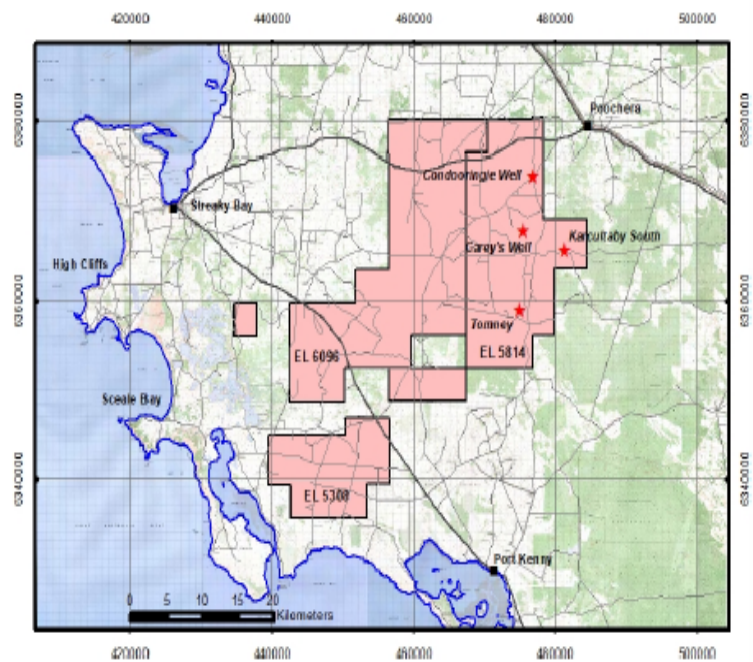


Figure 2 Poochera tenements and key kaolin-halloysite deposits

The ports of Thevenard at Ceduna and at Lucky Bay Port potentially offer bulk export facilities suitable for early DSO business. High quality halloysite-kaolin occurrences exist extensively across the Poochera Project area (Figure 2) making this a project of global significance for the mineral with the potential to support a considerable long-life mining operation, should final feasibility studies determine the project to be economically viable.

### Bulk Sampling Exercise Completed

The bulk sampling operation was successfully completed at the Carey's Well deposit, on the Poochera Kaolin-Halloysite Project with 215 tonnes of sample ultimately extracted and bagged. 40 tonnes of this was sent to WA for dry processing trials, 140 tonnes shipped to China for wet processing trials, and the balance to be used to sample other potential customers in China and Japan.

Valuable geotechnical data was also collected during the exercise that is being used for ongoing mine design work.



**Figure 3 – Drill Rig used for Bulk Sampling Program**



**Figure 4 – Bulk Bags of Kaolin-Halloysite sample**

Results from the Chinese and West Australian processing trials will be used to identify the processing options available, determine final product specifications allowing indicative commodity pricing, and assist in estimating operational costings. The resultant fully processed products will be run through commercial ceramics factories for technical approvals, and samples used for global marketing initiatives. The results from the processing trials will provide a vital component of the planned Feasibility Study.

Following successful commercial processing and application testing, ADN will seek binding agreements with customers for DSO (kaolin processors) and end customers (ceramic factories).

#### **HPA Testwork Results**

High Purity Alumina is aluminium oxide ( $\text{Al}_2\text{O}_3$ ) a high purity non-metallurgical alumina product with an alumina grade exceeding 99.9% (3N). 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.

HPA metallurgical testing of Carey's Well halloysite-kaolin from the Poochera Project previously gave an  $\text{Al}_2\text{O}_3$  purity of 99.9946% with only a single stage of purification, indicating only 53.64 ppm of impurities remain. This high purity testing is at the detection limits of Australian commercial laboratory equipment. Further testing was conducted to confirm that the single stage purification result was repeatable, and to also determine if even higher levels of purity were possible. This was completed and indicated that producing 4N HPA from a single stage purification process is achievable when using Carey's Well halloysite-kaolin as a feed.

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
- Sapphire glass manufacture used in the production of smart phones and TV screens
- electric vehicle components
- high-strength ceramic tools
- space and aeronautic industry components

#### **Halloysite**

In addition, the halloysite component of the Carey's Well resource is a rare kaolin derivative with a nanotube structure that is of great interest in the nanotechnology sector, where it is being extensively researched globally in high-tech applications such as batteries, superconductors, water purification along with medicinal, construction and agricultural



products. Halloysite is in short supply due to the exhaustion of existing global reserves, and the closing of mining operations in China by government environmental teams. It is a relatively high value industrial mineral that commands a significant premium above the average kaolin price.

### Mount Hope Tenement Acquisition

An application was approved for an Exploration Licence covering a 227<sup>2</sup> km region in the Mount Hope area of South Australia. Mount Hope is approximately 80kms northwest of Port Lincoln and has had several stages of exploration conducted over an almost thirty-year period by companies looking for a kaolin that was suitable for use in paper applications.

The previous work resulted in a historical kaolin resource of 12.26Mt, along with the granting of two Mining Leases. The mineral resource estimate is not reported in accordance with the JORC 2012 Code and investors are cautioned that the Company has not yet completed the work to verify the historical resource estimate (see ADN ASX release 24 October 2018 for more information). Subsequent mineralogical analysis by the South Australian Department of Mines and Energy in 1989 showed the presence of a significant amount of halloysite-kaolin showing similarities to the Carey’s Well deposit.

### Moonta Copper Gold Project

In December, the Company announced that it has agreed commercial terms for a binding Earn-in and Joint Venture Agreement with Environmental Metals Recovery Pty Ltd (EMR) to form the Moonta ISR Joint Venture covering the northern part of the 100% owned Moonta tenement EL 5984 in South Australia. EMR is an Australian private company comprising a team of senior mining professionals with extensive experience in mine development and operations, including ISR production in South Australia. EMR is an entity associated to Environmental Copper Recovery SA Pty Ltd that is currently advancing the Kapunda Copper ISR Project and comprises the same project team.



Figure 5 – Location of Moonta tenement

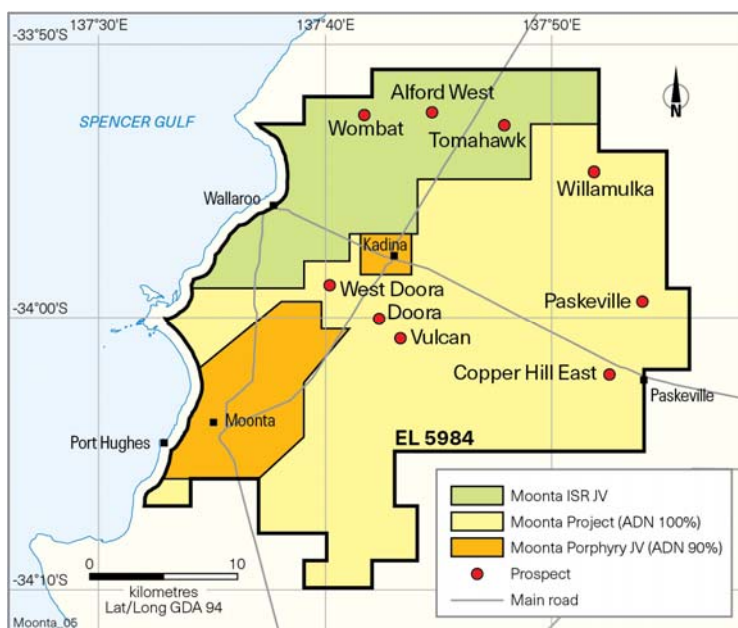


Figure 6 – EL 5984 project location map

The Project Area defined by the Joint Venture Agreement is considered to have attributes that are prospective for hydrometallurgical in-situ recovery application and significant technical due diligence has been completed by EMR personnel to date. The Bruce and Wombat prospects within the Project Area are seen to possess a number of critical attributes that may allow hydrometallurgical ISR copper production. Both prospects are characterised by deeply developed weathering troughs that extend hundreds of metres below the surface. The rock to both the north and south of the weathering troughs are fresh and impermeable while the trough material contains copper mineralisation that is oxidised, porous and likely permeable, and is situated below the water table and sea level. Both prospects remain open along strike, presenting opportunities to find further mineralisation in the trough extensions.

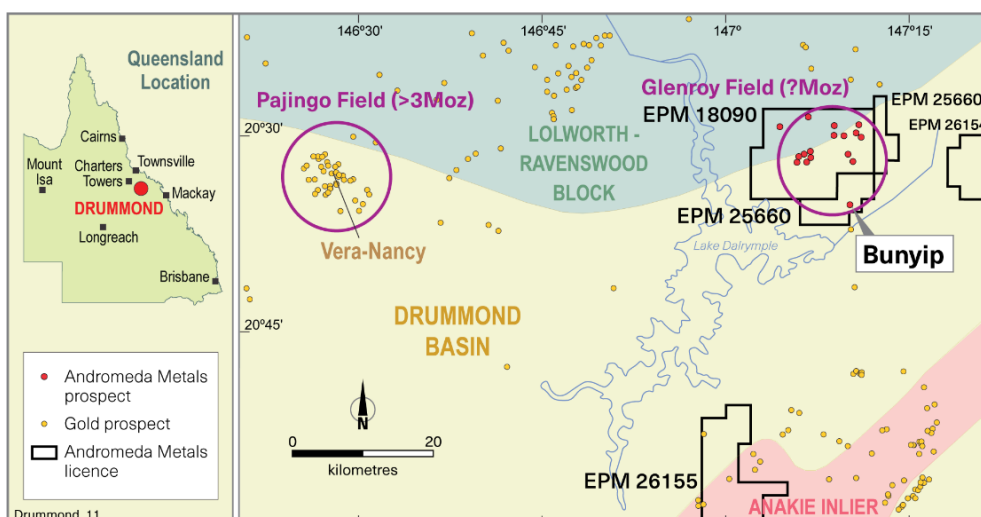
In-situ recovery is a production process used to recover minerals using a fluid circulated via drilled wells. During the process a leaching solution (or “lixiviant”) is injected into the mineralisation via a borehole, passes through the deposit leaching the target commodity, and is returned to the surface via a second bore where the dissolved metal is extracted from solution by SXEW or ion exchange in a processing plant. The costs of ISR are substantially below those of conventional mining, allowing production from much lower grade deposits. Importantly, as no significant surface disturbance is required, an ISR operation could conceivably be conducted in conjunction with current agricultural land use, and once completed have little on-going impact.

The principal terms of the Moonta ISR Joint Venture are:

- Subject to completion of satisfactory due diligence, EMR can earn an initial 51% interest in the Project Area by sole funding \$2.0 million on project related activities across the Project Area within four years of execution of the Joint Venture Agreement (Stage 1 Commitment);
- EMR is required to spend a minimum of \$200,000 on the project in the first year and a further \$300,000 in the second year under the Stage 1 Commitment;
- On completion of Stage 1 Commitment, EMR may elect to acquire an additional 24% equity interest (75% in total) through expenditure of an additional \$3.5 million (\$5.5 million in total) over a further 3.5 years (7.5 years in total) (Stage 2 Commitment);
- On completion of EMR’s sole funding commitments, ADN 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 ADN dilutes to less than 10% equity interest in the joint venture, then its interest will revert to a 1.5% net smelter return royalty payable with respect to any minerals produced from the Project Area;
- EMR will manage and operate the joint venture whilst it is sole contributing and thereafter while ever it holds a majority equity.

The Company believes this transaction is an excellent result for shareholders as it will result in considerable effort being directed towards evaluating the potential for extracting copper at Moonta by a group of professionals experienced in ISR application, whilst allowing Andromeda Metals to continue to focus efforts towards progressing the Poochera Halloysite-Kaolin Project. The Company still retains 100% ownership of a significant amount of the tenement, which is highly prospective for copper mineralisation and located at the southern end of the Olympic Copper-Gold Domain. The ground contains the Willamulka, Paskeville, Copper Hill East and West Doora prospects amongst others and Andromeda Metals would welcome third party involvement to further explore and evaluate this project area.

### Drummond Epithermal Gold Joint Venture



**Figure 7 – Plan of Drummond Epithermal Joint Venture tenements**

Following execution in late August 2018 of a binding Earn-In and Exploration Joint Venture Agreement with Evolution Mining Limited (EVN) to form the Drummond Gold Project Joint Venture covering the Company's Drummond Epithermal Gold Project in North Queensland, EVN has conducted considerable field work at the project during the December quarter. A program of 200m x 50m soil sampling was completed at Bunyip and at quarter end was 95% complete at South West Limey Dam. Detailed geological mapping was performed for both the Bunyip and South West Limey Dam prospects while a 75m drone magnetic survey and 3 IP lines were completed at Bunyip to target veins and to gain an understanding of structures at depth.

Subject to suitable weather conditions, the next quarter will see soil sampling completed for South West Limey Dam and at other regional targets across the project. In addition, IP survey work will be completed at Bunyip and a ground magnetic survey undertaken at South West Limey Dam. A significant diamond and RC drilling program, principally at Bunyip, is then planned to occur during the second quarter of 2019.

### **Wudinna Gold Farm-in and Joint Venture**

Following agreement of terms under a joint venture with Lady Alice Mines Pty Ltd (LAM) over the Company's Eyre Peninsula Gold Project in late 2017, LAM has undertaken a thorough review of the extensive project database and resource determinations for the project. Design of a new drilling program to follow-up and test results of this review in addition to the undertaking of a large calcrete sampling program and possible follow up drilling of these new targets funded by LAM is scheduled to commence in the first quarter of 2019.

### **Pilbara Gold Project**

The Company is currently working with respective Native Title groups holding claim to the three Pilbara tenement applications owned by Andromeda Metals in order to put in place heritage agreements as a requirement to having the tenement applications granted.

### **Rover Copper Gold Project**

The Company is seeking third party interest to advance the Rover Copper Gold Project.

### **Finance and Corporate**

Andromeda Metals' has on issue 1,084,422,288 ordinary shares, 486,280,451 listed options and 22,476,507 unlisted options.

The Company's available cash position stood at \$1.006 million at 31 December 2018.

### ***Competent Persons Statement***

Information in this announcement has been compiled from previous ADN ASX releases by Mr James Marsh and Mr Rhoderick Grivas, both members of the Australasian Institute of Mining and Metallurgy (AusIMM). Mr Marsh and Mr Grivas are employees of Andromeda Metals Limited and have sufficient experience, which is relevant to the style of mineralisation, type of deposits and their ore recovery under consideration and to the activity being undertaken to qualify as Competent Persons under the 2012 Edition of the 'Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves' (JORC Code). This includes Mr Marsh attaining over 29 years of experience in kaolin processing and applications. Mr Marsh and Mr Grivas consent to the inclusion in the report of the matters based on the information in the form and context in which it appears.