

ASX Announcement (ASX:AXE)

30 January 2019

## Second Quarter Activities Report

For the three months ending 31 December 2018

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### Significant Activities

- Archer and the University of Sydney have executed an exclusive licence agreement that allows Archer to commercialise intellectual property (IP) related to room-temperature quantum computing technology. Patents protecting the IP have been filed internationally to cover Australia, United States of America, Europe, China, Hong Kong, Japan, and Republic of Korea.
  - Technical development involving materials transfer for a proof-of-concept biosensor has commenced with the University of Adelaide and a leading German biotechnology company and focuses on bridging technology gaps in the biosensor market that are able to be serviced by printable graphene components derived from Archer's Campoona graphite.
  - Collaboration with The University of New South Wales (UNSW) continues with a focus on graphite purification and morphology optimisation, and fabricating lithium ion batteries using Archer's Campoona graphite and three commonly used cathode variants: lithium-nickel-manganese-cobalt (NMC), lithium-iron phosphate (LFP), and lithium-cobalt oxide (LCO).
  - Execution of binding Sale Agreement of Sugarloaf farm land for \$1.35 million.
  - Drilling program for Hood, Hawkeye and Katniss prospects at Blue Hills Copper-gold Project commenced, with drilling at Hood completed early January 2019.
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Commenting on the second quarter activities Greg English, Executive Chairman of Archer Exploration, said, "Execution of the final licence agreement for the IP rights related to the carbon-based quantum computing technology with CDIP was a great achievement for Archer. Currently, the materials used in quantum computers either function at really low temperatures, or if they function at room temperatures, they are extremely difficult to integrate into modern electronics. Simply put, this limits their practicality and use. The IP we have licenced is a potential solution to these problems."

"During the Quarter we completed the preparatory work required for the reverse circulation drilling program at the Blue Hills Copper-Gold project. The RC drill program involves the drilling of twelve holes for a total of 1,800 metres at the Hood, Hawkeye, Katniss, and Legolas Prospects located within the larger Blue Hills Copper Gold Project area. Drilling commenced in early January with positive results so far".

"We continued the sale of non-core assets during the Quarter, with the sale of the Sugarloaf farm land for \$1.35 million. We have now sold \$3.35 million of non-core assets in the past 6 months (including Sugarloaf) and these funds will be used toward the development of our other projects".

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## Quarterly Activities to 31 December 2018

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Archer Exploration Limited (ASX: AXE) ("Archer" or the "Company") is pleased to report on its activities for the three-month period ending 31 December 2018 ("Quarter").

### Advanced Materials

Archer's vision is to build a long term and viable mineral and materials development business focussing on the key areas related to quantum technology, human health, and reliable energy. These three themes were targeted as they have associated industries with exponential growth opportunities. Archer's in-house expertise, materials inventory, and access to extensive infrastructure provides an opportunity for it to quickly develop and integrate materials-centric end-to-end solutions with the potential for positive global impact.

#### Quantum Technology

Archer executed a binding licence agreement (Agreement) with the University of Sydney Commercial Development and Industry Partnerships (CDIP) for exclusive rights to develop and commercialise intellectual property (IP) related to carbon-based quantum computing technology (Licenced IP). The technology to be developed is a device (chip) capable of electronically integrated quantum information processing at room-temperature, and the materials that would form the critical componentry of the chip are available in the inventory of Archer's wholly owned subsidiary Carbon Allotropes.

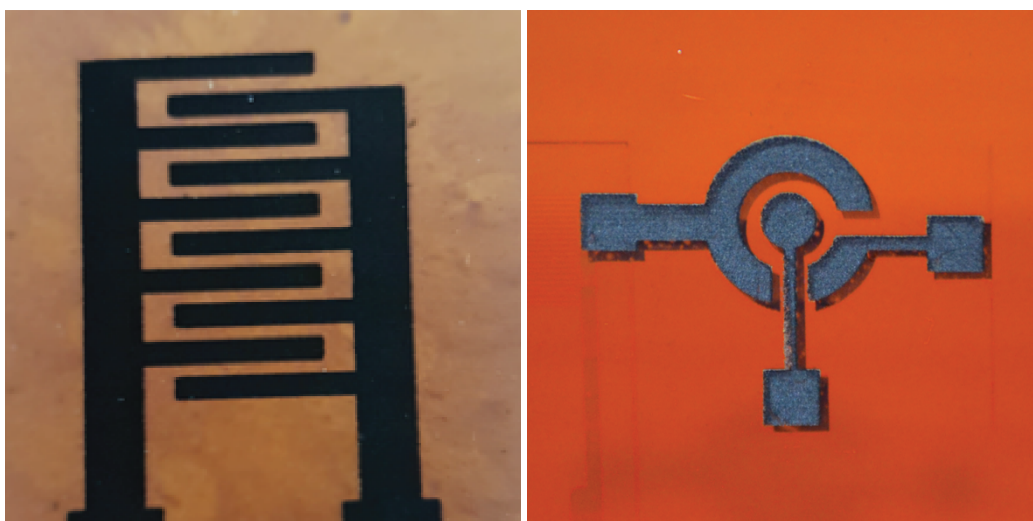
The Agreement gives Archer exclusive international rights to develop and commercialise the Licenced IP. The key terms of the Agreement remain confidential. The technology that is the basis of the Licenced IP will need to be realised through development. The Licenced IP has been filed through a patent cooperation treaty (PCT) application by the University of Sydney (University) in the geographic areas covered by a European Patent, Australia, United States of America, Japan, Republic of Korea, Hong Kong, and China. Archer has an option to acquire the Licensed IP, following the occurrence of commercial milestones linked to the technology development. Archer may sub-license its rights to the Licenced IP.

A key milestone realised in the development of the Licenced IP was the appointment Dr Martin Fuechsle in early Q3 (ASX Announcement 17 January 2019). Dr Fuechsle is internationally recognised for developing the smallest transistor, a "single-atom transistor", and the fabrication of breakthrough quantum computing devices; pioneering achievements that strongly align to Archer's quantum technology development. He held a research position at the Centre for Quantum Computation & Communication Technology (CQC2T) at the University of New South Wales which is headed by Prof Michelle Simmons, the 2018 Australian of the Year. He also held a research position as part of the Rio Tinto VK Technologies research group at the University of Western Australia. He joins Archer with over 10 years of experience in successfully designing, fabricating, and integrating quantum devices.

#### Human Health

Archer is engaged in a collaboration agreement with The University of Adelaide as part of the Australian Research Council Research Hub for Graphene Enabled Industry Transformation. The collaboration seeks to target high value, high growth markets servicing human health applications by developing and implementing graphene and carbon-based materials for use in complex biosensing devices.

During the Quarter, work continued on the development of graphene inks with The University of Adelaide and a leading German biotechnology company (the “Partner”) (ASX announcement 27 September 2018) with the aims of fabricating a proof-of-concept biosensor, comprising printable components capable of detecting disease state markers, such as antibodies or antigens (Fig. 1). The transfer of materials between Archer and the Partner commenced during Q2 and included materials held in the inventory of the Partner (e.g. infectious disease antigens and antibodies) and materials in the inventory of Archer’s wholly owned subsidiary Carbon Allotropes (e.g. graphene, ink formulations, and printed graphene electrodes). Biosensor development is expected to continue in Q3 focusing on the key milestones of optimisation of the graphene and graphene ink biosensor components for biomaterial integration and printing.



**Fig. 1.** Printed graphene electronics (electrodes) using graphene inks derived from Archer’s Campoona graphite.

## **Reliable Energy**

Archer is engaged in a Collaboration Agreement and Research Service Agreement with the University of New South Wales (“UNSW”) to focus on carbon-based energy storage technology. In August 2018, the Company announced that functional full-cell lithium ion batteries were successfully assembled and validated by UNSW for performance (ASX announcement 21 August 2018). The batteries were prepared with Archer’s Campoona graphite at the anode, and commercially equivalent cathode materials and chemistries used in consumer electronics and electric vehicles. Archer’s 99% acid-leached graphite from Campoona was used with no further optimisation.

During Q2 the ongoing work with UNSW focused on addressing the trade-off between cost and battery performance. The work with UNSW has focused on value-add technical development that assists in integrating Campoona graphite further downstream in the supply chain by formulating, building, and tested full-cell batteries. It is expected technical development with UNSW will continue in Q3. This will involve value-add to Archer’s proposed Campoona development overcoming general challenges associated with obtaining ultra-high graphite purities for lithium-ion battery applications in a viable and scalable manner, and the establishment of optimal morphologies (such as spherical graphite) for lithium-ion intercalation chemistry useful for commercially relevant cathode formulations.

## Mineral Exploration

### Eyre Peninsula Graphite Project

As reported in the September 2018 Quarterly Report, in early October 2018 Archer was granted a 12-month extension for the end date for the lodgement of the Campoona Mine Program for Environment Protection and Rehabilitation ("PEPR") with the SA Government. Although Archer has been granted a mining lease and two miscellaneous purpose licences for the Eyre Peninsula Graphite Project, activities on site cannot commence until the PEPR is approved and all other outstanding approvals (if any) are obtained. Under the terms of the extension granted by the SA Government, the PEPR is now due for lodgement before 4 December 2019. The Company has been continuing the preparation of the PEPR.

### Strategic Review of Non-Graphite Assets

#### *IPO of non-graphite projects*

During the Quarter, Archer terminated the Share Sale Agreements with Ballista Resources Ltd for the sale of all of Archer's tenements (except for the Magnesite Project tenements) ("Ballista Agreements"). Ballista was to raise funds by an initial public offer of shares and list on ASX. The Ballista Agreements allowed either party to terminate if the ASX listing of Ballista was not achieved by 30 September 2018 or such other date agreed by Archer and Ballista. Ballista notified Archer that the Ballista IPO will not take place this year. As a result, Archer terminated the Ballista Agreements (ASX announcement 9 October 2018).

#### *Sale of Sugarloaf Land*

During the Quarter, Archer announced the sale of its Sugarloaf farmland for \$1.35 million (ASX announcement 28 November 2018). Under the terms of the Land Sale Agreement ("Sale Agreement"), Archer will sell the entirety of the Sugarloaf farm land but maintains an option to buy back approximately 30% of the Sugarloaf farm land, which will be required for the construction of the Sugarloaf Graphite Processing Facility. The option to buy back part of the land can be exercised by Archer any time during the next 20 years.

The Sugarloaf farm land is contained within Archer tenement EL 5920 and hosts the Sugarloaf carbon deposit and the proposed site of the Sugarloaf Graphite Processing Facility, which will be used to process the graphite from the nearby Campoona mining lease.

Archer purchased the farm land in April 2013 and at the time of the acquisition, the final size of the Sugarloaf Graphite Processing Facility and associated tailings dam was unknown. Since 2013, Archer has finalised the design and areal extent of the Sugarloaf Graphite Processing Facility, and as a result, the Company has made the decision to sell the Sugarloaf farm land to release funds for drilling and technology development.

Settlement of the sale and purchase is subject to (the "Condition") the buyer obtaining finance by 1 February 2019 ("End Date"). If the Condition is not satisfied or waived by the buyer by the End Date, then the buyer can terminate the agreement and Archer must refund the 10% deposit. If the Sale Agreement is not terminated by the End Date, then settlement is scheduled to take place on 1 July 2019.

**Blue Hills Copper-gold Project**

During the Quarter, Archer announced that the company would be undertaking a reverse circulation (RC) drilling program at the Blue Hills Copper Gold Project, with drilling to commence early in 2019 (Fig 2.). The RC drill program involves the drilling of up to twelve holes for a total of approximately 1,800 metres at Hood, Hawkeye, Katniss and Legolas Prospects located within the larger Blue Hills Copper Gold Project area (ASX announcement 19 November 2018).

The first drill results from Hood were reported after the end of the Quarter, with Archer reporting that drilling to date appears to confirm the conceptual model of Hood as an intrusive style copper gold mineralised system. The three holes drilled so far at Hood confirm that the rocks at Hood are different to the surrounding geology and that Hood has been subjected to a large-scale alteration event. The drill results confirm that the alteration at Hood is consistent with the type of alteration associated with intrusive style copper gold deposits.

In addition to the results from the three Hood RC drill holes, Archer has discovered albitite (a sodium rich rock) as float in the Hood area and also in situ between Hawkeye and Katniss. The vein nature of this material could be a “high level” type of rock/mineral, which exists above the actual granite intrusion. The presence of albitite supports the intrusive model being proposed for the large-scale mineralising system at Blue Hills.



**Fig. 2.** Drilling at the Hood prospect at the Blue Hills Copper-gold Project.

**Jamieson Tank Manganese**

The Jamieson Tank Manganese Project is located within 2km of the site of the proposed Sugarloaf Graphite Processing Facility, near the township of Cleve, South Australia. No exploration activity was undertaken at Jamieson Tank during the Quarter.

**North Broken Hill Cobalt Project**

The North Broken Hill Project is located approximately 20km north of Broken Hill, New South Wales. The North Broken Hill tenements collectively cover a large area of approximately 450km<sup>2</sup> and early exploration work has focussed on visiting previously identified cobalt outcrops and the discovery of new regional cobalt, copper and gold targets. No exploration activity was undertaken at North Broken Hill during the Quarter.



**Other Projects**

No work was undertaken during the Quarter at Archer's other project areas not mentioned in this report.

**Corporate****Cash balance**

The Company's cash balance at the end of the Quarter was \$1,604,000.

**Junior Minerals Exploration Incentive**

On 2 October 2018, the Company confirmed that following the lodgement of the Company's income tax return for the year ending 30 June 2018, that it will be issuing a total of \$133,601 JMEI credits to those shareholders who received new Archer shares on the exercise of their SPP Options during the period 23 April 2018 and 30 June 2018 (Eligible Shareholders). JMEI - 2017/18 Entitlement Statements ("Statement") were despatched by Computershare to Eligible Shareholders. The Statement is an advice only, and there was no payment by Archer.

**Annual General Meeting**

The eleventh annual general meeting of Archer shareholders was held in Sydney on 30 November 2018. All resolutions were passed by shareholders.

**Issued Capital**

Time	Shares	Options	Performance Rights
Start of Quarter	188,302,114	5,000,000 (Rix Options) <sup>(1)</sup> 8,281,693 (SPP Options) <sup>(2)</sup>	4,200,000
New issues during Quarter	3,013,964 <sup>(3)</sup>	Nil	Nil
Exercised/cancelled during the Quarter	Nil	(13,964) <sup>(2)</sup>	(3,000,000)
End of Quarter	191,316,078	5,000,000 (Rix Options) 8,267,729 (SPP Options)	1,200,000
On issue at 30/01/19	191,423,132	5,000,000 (Rix Options) 8,160,675 (SPP Options)	As above

**Notes**

- (1) Unlisted options issued to Paul Rix, a director, exercise price of \$0.15, expiry date of 31 January 2019 and subject to satisfaction of certain vesting conditions.
- (2) Unlisted options, exercise price \$0.075 and expiry date of 28 February 2019.
- (3) Shares issued on conversion of SPP Options (13,964) and upon vesting of Performance Rights (3,000,000).

## List of Archer Tenements

Tenement	Location	Commodity
<b>South Australia</b>		
EL 5434	North Cowell	Graphite
EL 5791	Cockabidnie	Graphite
EL 5804	Wildhorse Plains	Graphite
EL 5815	Waddikee	Graphite
EL 5870	Carpie Puntha	Graphite
EL 5920	Carappee Hill	Graphite
EL 6019 <sup>(1)</sup>	Witchelina	Magnesite
EL 5730 <sup>(1)</sup>	Termination Hill	Magnesite
EL 5433	Burra North	Base Metals
EL 5769	Napoleons Hat	Copper / Gold
EL 5794	Blue Hills	Copper / Gold
EL 5935	Whyte Yarcowie	Cobalt / Copper
EL 6000	Pine Creek	Copper / Gold
EL 6029	Altimeter	Copper / Gold
EL 6160	Franklyn	Copper / Gold
EL 6287 <sup>(2)</sup>	Peterborough	Copper / Gold
ML 6470	Campoona Shaft	Graphite mining
MPL 150	Sugarloaf	Graphite and graphene processing
MPL 151	Pindari	Process water for Sugarloaf
<b>New South Wales</b>		
EL 8592	Morris's Blow	Cobalt / Copper
EL 8593	Broken Hill	Cobalt / Copper
EL 8594	Broken Hill	Cobalt / Copper
EL 8595	Broken Hill	Cobalt / Copper
EL 8596	Kanbarra	Cobalt / Copper
EL 8597	Kanbarra	Cobalt / Copper
EL 8598	Kanbarra	Cobalt / Copper
EL 8779	Campbells Ck	Cobalt / Copper
<b>Western Australia</b>		
E23/1926	Mt Keith	Nickel

### Notes

- (1) Magnesite Project tenements. These tenements have been sold with Completion scheduled to occur at the end of calendar year 2019.
- (2) This tenement was granted during the Quarter.

### Competent Person Statement

The exploration results reported herein, insofar as they relate to mineralisation, are based on information compiled by Mr. Wade Bollenhagen, Exploration Manager who is an employee of Archer Exploration Limited.

Mr. Bollenhagen is a Member of the Australasian Institute of Mining and Metallurgy who has more than twenty years' experience in the field of activity being reported. Mr Bollenhagen has sufficient experience which is relevant to the style of mineralisation and type of deposit under consideration and to the activity that he is undertaking 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" relating to the reporting of Exploration Results. Mr. Bollenhagen consents to the inclusion in the report of matters based on his information in the form and context in which it appears.

For further information, please contact:

#### Contact Details

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#### Shareholders

For more information about Archer's activities, please visit our:

Website  
<https://archerx.com.au/>

Twitter  
<https://twitter.com/archerxau?lang=en>