Archer Materials Limited (ACN: 123 993 233)
Ground Floor, 28 Greenhill Road, SA 5034
www.archerx.com.au

ASX Announcement (ASX: **AXE**) 29 October 2020

First Quarter Activities Report

For the three months ending 30 September 2020

Significant Activities

- The Company is well capitalised with approximately $7.35 million cash and no debt.
- Archer commenced development towards its first major technological milestone in the operation of its ^{12}CQ quantum computing chip ("chip").
- South Korean patent application for the ^{12}CQ chip proceeds to substantive examination stage.
- Archer's biosensor technology development accelerated with the use of 3D printers.
- Completion of the sale of the Leigh Creek Magnesite Project.
- Expressions of interest received for the purchase of some of the Company's tenements.

Archer Materials Limited ("Archer", the "Company", "ASX: **AXE**") is pleased to report on its activities for the three-month period ending 30 September 2020 ("Quarter").

Commenting on the first quarter activities Greg English, Executive Chairman of Archer, said, "During the Quarter we successfully commenced development towards the control of single and a few qubits in our ^{12}CQ chip design components. Achieving control in few qubits would be a significant achievement and a major technology development milestone in chip operation."

"We successfully built qubit control componentry prototypes and began quantum measurements in August when we reported that we had built the first devices to perform the qubit control measurements. The control measurements on the qubit material would be a world-first, in particular for solid-state, non-optical quantum computing systems."

"The use of 3D printing to build proof-of-concept cartridge components for the biosensor device was also an outstanding achievement by the Company. It allows Archer to make prototypes of key biosensor elements in less than a few hours. Furthermore, the appointment of Dr Rebecca Soffe as Manager, Biotechnology will enable us to expedite the development of the Company's biosensor towards 'Lab-on-a-chip' based application."

"Our Advanced Materials Business is the Company's prime focus with our exploration tenements no longer core to our business strategy. We are continually engaging with prospective purchasers and the divestment of our remaining exploration projects in a disciplined way to maximise the value of these assets as we continue to shift our portfolio toward our Advanced Materials Business."

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Quarterly Activities to 30 September 2020

Archer is developing innovative deep tech for commercialisation in the multibillion dollar global industries of quantum technology, human health, and reliable energy. The Company is rapidly progressing the development of its ^{12}CQ qubit processor chip and biosensor technology, while continuing to divest its mineral exploration projects.

Advanced Materials

Quantum Technology

The ^{12}CQ qubit processor chip ("chip") is a world-first technology that Archer aims to build for quantum computing operation at room-temperature and integration onboard modern electronic devices.

During the Quarter, Archer commenced development towards its first major technological milestone in the operation of its ^{12}CQ chip (ASX Ann. 9 Jul 2020) related to 'qubit control'. The successful completion of the control measurements would be major validation of the commercial viability of the ^{12}CQ chip.

An initial prototyped qubit control device was built (Image 1) with the primary benefit of providing the magnetic ultra-sensitivity to establish quantitative measurements (i.e. characterisation) of the quantum information residing on very few qubit material components ("qubits") (ASX Ann. 10 Aug 2020).

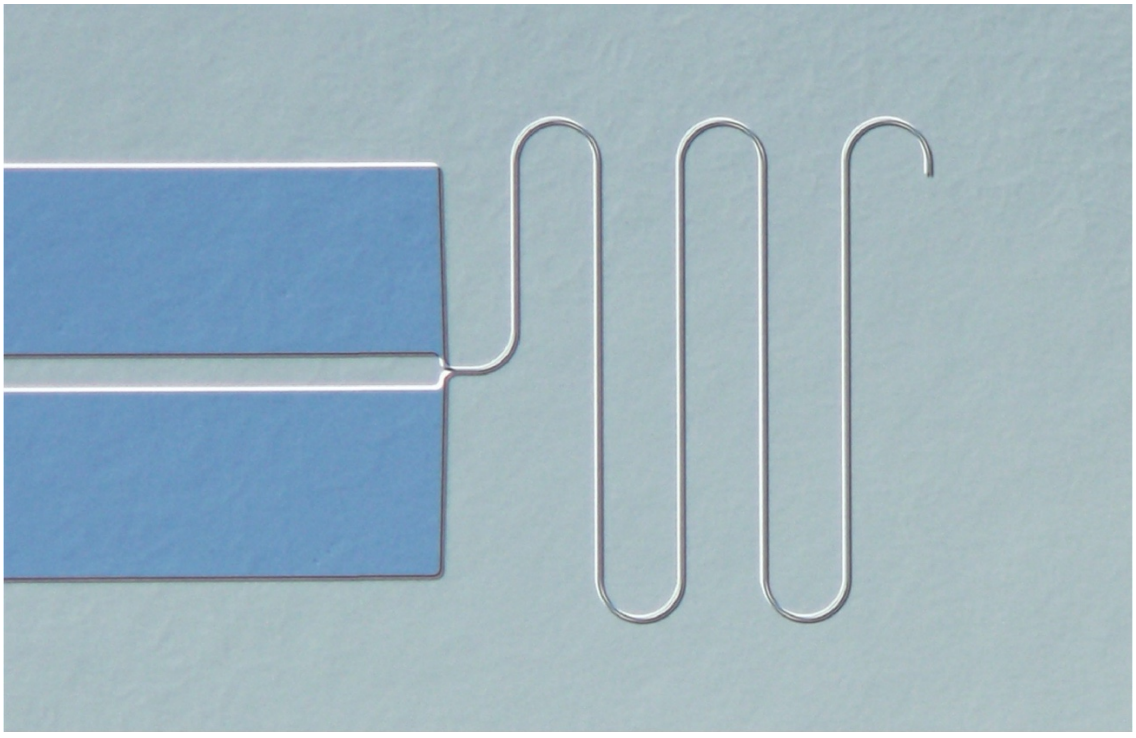

Image 1. High-magnification image of part of the prototype nanoscale qubit control device. The device has been fundamentally developed end-to-end and custom-built together by Archer and collaborators in Sydney, Australia, including all quantum mechanical theoretical considerations, the materials formulations used, the device operation, function and purpose, and its fabrication and testing.

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The ^{12}CQ chip design requires the isolation of a few to single qubits, therefore qubit control must be performed on isolated few to single qubits for successful operation of the ^{12}CQ chip (Image 2). Prototyping control componentry is an important part of the overall chip fabrication process.

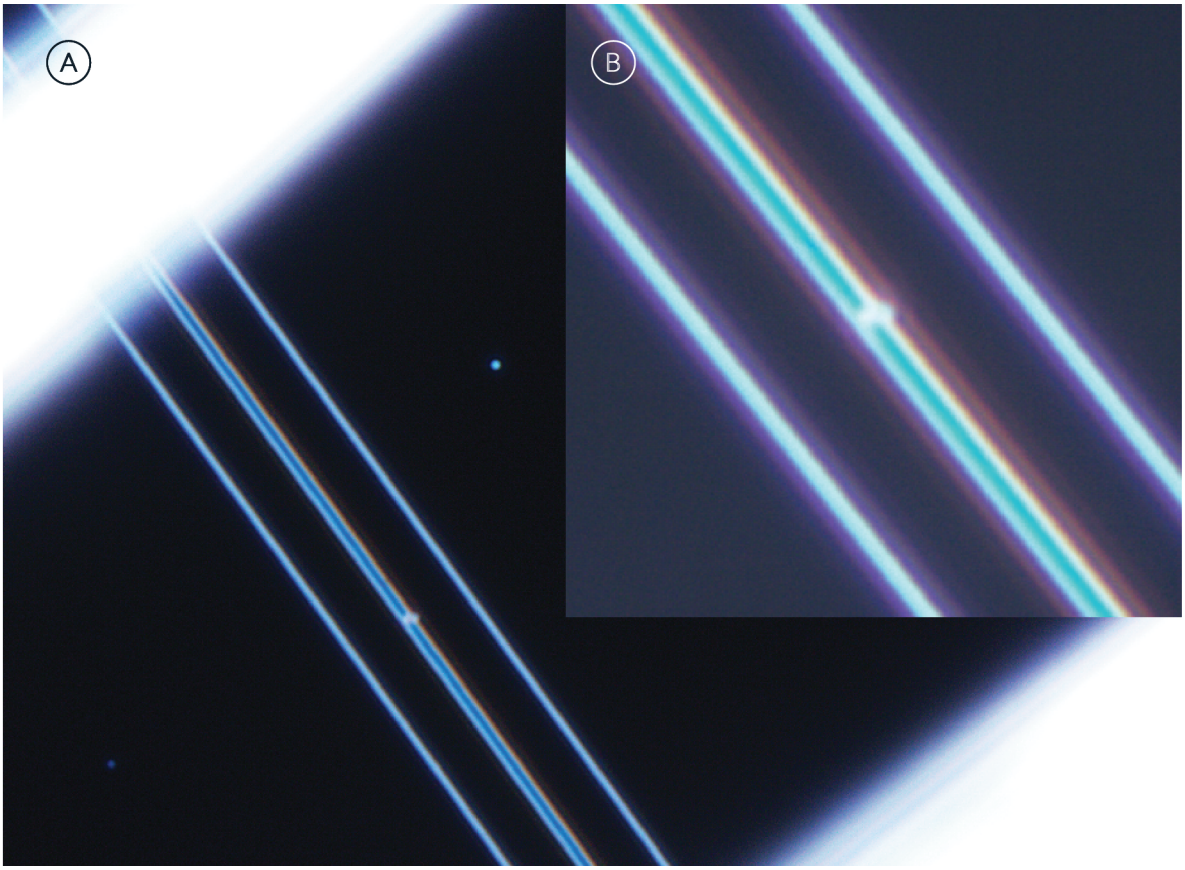

Image 2. ***A*** Ultra-precise nanoscale positioning and isolation of qubit clusters in [part of] the control measurement device, which was successfully carried out during the Quarter. Inset ***B*** shows a magnified region in ***A*** observing the round qubit clusters which are billionths of a meter in size in the centre of qubit control device components (appearing as parallel lines). The qubit control measurements are being led and performed by Archer staff together with world-renowned experts in the field of quantum computing in Australia.

The international PCT application to protect and commercialise intellectual property associated to the ^{12}CQ chip technology continues to progress in a number of jurisdictions at various stages of the patent granting procedure (ASX ann 3 Aug 2020). During the Quarter, the Republic of Korea patent application proceeded to substantive examination stages.

The technical details of the ^{12}CQ chip development and details of Archer's quantum computing collaboration with IBM (ASX Ann. 5 May 2020) was covered in a joint webinar (ASX ann. 17 Aug 2020) ("Webinar") between Archer and IBM. **The recorded Webinar can be found here**.

Over 320 people attended the webinar, which also focused on the opportunities and economic drivers behind quantum computing and included an in-depth Q&A session that was addressed by speakers from Archer and IBM (ASX Ann. 16 Sept 2020).

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Human Health

Archer is developing IP associated with a potential solution to graphene-based biosensors capable of complex detection of disease ("graphene biosensors"). During the Quarter, the Company made progress in its graphene biosensor development (ASX Ann. 31 Aug 2020), (Image 3), and appointed Dr Rebecca Soffe to lead Archer's biotechnology development (ASX Ann. 10 Sept 2020).

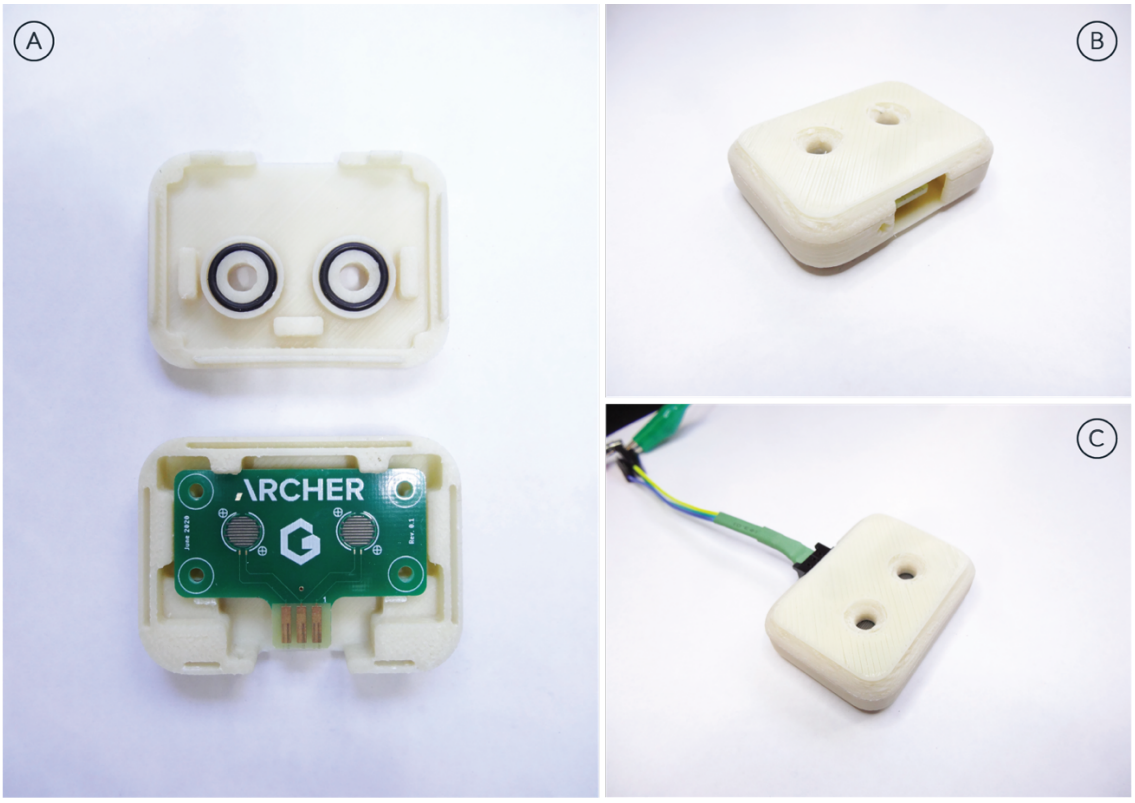

Image 3. ***A*** Graphene-based biosensor devices 2D printed on a circuit board (shown as interdigitated electrodes on green circuit board with logos) that has been incorporated into the custom designed and 3D printed cartridge made from ABS. The cartridge is opened and the interior shown. ***B*** The 3D printed cartridge enclosure with two liquid wells present unambiguously at the top of the prototype to easily guide placement of fluids during testing (*e.g.* via pipetting) and a side port opening to allow for connection to the analysis interface as shown in ***C***, providing a rapid 'plug and use' function without need to determine orientation or polarity of connections. The entire device has been developed end-to-end in-house, with cartridge prototyping ongoing and includes designs that may allow for reuse and biosensor multiplicity.

During the Quarter the Company renewed a Material Transfer Agreement with its collaborating German Biotech Company. The world-class infrastructure, facilities, R&D personnel, and best-in-class 3D and 2D printers are available to Archer through the Company's collaboration with the University of Adelaide, as a founding industry partner of the ARC Research Hub.

Proof-of-concept cartridges were 3D printed for Archer's graphene-based biosensor devices (Image 3). **A video of the biosensor device cartridge 3D printing can be found here.** The cartridge prototypes address challenges associated with portable biosensor device handling and biosensing processes and provides greater control over evaporation during analysis which could improve *accuracy* and *reproducibility* in device function, key requirements in an operational biosensor.

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Mineral Exploration

Sale of Leigh Creek Magnesite Project

During the Quarter the Company announced the completion ("Completion") of the sale of the Leigh Creek Magnesite Project ("Project") to a company that was subsequently acquired by Canadian Stock Exchange listed Volatus Capital Corp. ("Volatus", "CSE:VC"). The issue of Volatus shares paid the purchase price for the Project, and the Company cannot sell these shares before 14 Dec 2020 (ASX Ann. 14 Aug 2020).

Archer will continue to provide technical assistance and support Volatus in the development of the Project.

Halloysite-Kaolin Projects

The Company currently has two mineral exploration projects focused on Halloysite-Kaolin. The Eyre Peninsula Halloysite-Kaolin Project ("EP Project") is located 115km west of the Whyalla Port, South Australia. The Company's Franklyn Halloysite-Kaolin Project ("Franklyn Project"), is located approximately 220km east of the EP Project (Image 4).

EP Project

The EP Project comprises the Kelly Tank, Bunora and Bunora East prospects ("Prospects") that are approximately 14km apart and connected by established roads. The Company recently completed a 21-hole aircore drill program with eleven holes drilled at Bunora, three holes at Bunora East and seven holes at Kelly Tank (ASX ann. 3 Feb 2020). There has been no visual confirmation of halloysite at the Prospects by historic explorers.

During the Quarter, halloysite was reported from across the EP Project drill samples submitted for Microscopy analysis ("SEM"). The results from the SEM analysis are exceptional, especially for the Kelly Tank and Bunora East prospects, where naturally occurring halloysite is clearly evident in the SEM imagery (Image 5).

The SEM results obtained of corresponding materials' morphologies at an early stage of exploration indicates that the halloysite-kaolin mineralisation could be suitable for a number of potential end-uses and markets. Low iron values (ASX announcement 6 Apr 2020) and minimal halloysite at Bunora, is in contrast to compositions at Kelly Tank that contain higher halloysite content.

Kaolin and halloysite are alumina-based clays that can naturally occur intermixed and may undergo beneficiation to high-value and hard-to-substitute high-purity alumina. Halloysite has a nanostructure that could allow its application as an efficient catalyst in the petrochemicals industry, amongst other high value end-uses.

Other Projects

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

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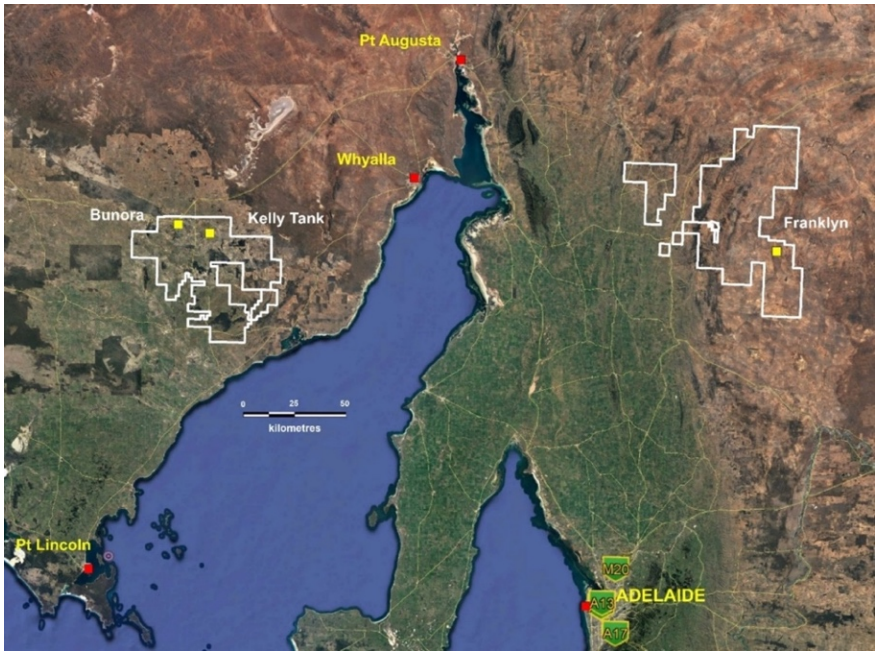

Image 4. Location of Archer's Halloysite-Kaolin EP Project and Franklyn Project.

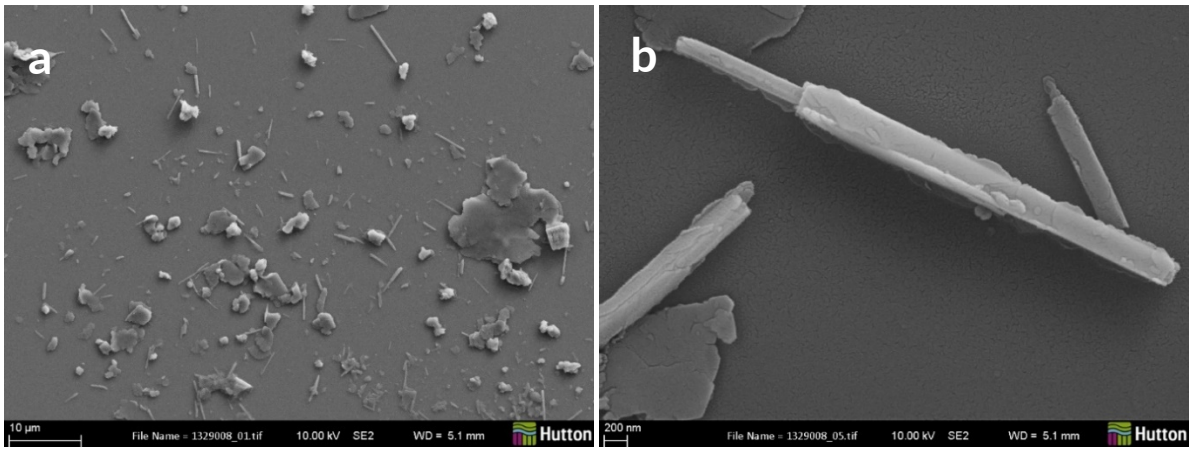

Image 5. (a-b) SEM images at various magnifications of kaolin-halloysite samples taken from drill holes at Kelly Tank. The platelet structures correspond to kaolin and the tubular structures are halloysite. The halloysite tubes are comparable to the width of a human hair and few billionths of a metre thick.

Sale of Tenements

The Company has previously stated its intention to divest or otherwise commercialise its mineral tenements as the Company sharpens its focus on growing the Advanced Materials Business. Funds raised from the divestment of the exploration projects will be used to progress the ^{12}CQ chip and biosensor development work.

During the Quarter the Company received unsolicited approaches from parties interested in acquiring an interest in some of the Company's tenements. Discussions with these parties are ongoing, and if these discussions do not ultimately lead to binding sale agreements, then the Company intends to commence a formal sales process in the expectation of finding other buyers for the mineral tenements.

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Corporate

Cash balance

The Company's cash balance at the end of the Quarter was $7,351,000.

Exercise of Unlisted Options

During the Quarter, the Company received $58,000 from the exercise of unlisted options.

Appointment of Non-Executive Director

Archer appointed Mr Ken Williams as an independent non-executive director of Archer on 28 September 2020. Ken will serve as a member of the Archer board's Audit and Risk Management Committee.

Ken is currently the Independent Chairman of Statewide Super, a South Australian based industry super fund with over $10 billion in funds under management. He is also a member of Statewide Super's Investment Committee and Remuneration & Nomination Committee.

Prior roles include Chair of AWE Limited, Chair of Havilah Resources Limited, Director of Queensland Cotton Limited, and Senior Finance Executive roles with Newmont Corporation, Normandy Mining, and Qantas.

Annual Report

The Company's Annual Report was lodged with ASX at the end of September 2020 and can be found on the Company website (ASX Ann. 25 Sept 2020).

Shareholder Events and Outreach

The Company attended the Virtual Trade Mission to London Tech Week 2020 (ASX Ann. 5 Aug 2020). Also, the Company held a successful quantum computing webinar with IBM:

+ Quantum Computing: The Era of Quantum Advantage

The Company electronically distributed a number of Newsletters and News Spotlights to shareholders during the Quarter, including:

+ Message from CEO: Annual Report Highlights
+ Interview with CEO: Annual Report 2020
+ Message From CEO: London Tech Week And The UK's Deep Tech Industry
+ Message From CEO: Global Scale Of The Quantum Computing Opportunity
+ Newsletter: Even Einstein Found Quantum Mechanics 'Spooky'
+ Message From CEO: The Dawn Of The Deep Tech Ecosystem
+ Interview with CEO: Fourth Quarter Activities Report
+ Newsletter: The Fourth Quarter Activities Report
+ Newsletter: Qubit Control Measurements Commence

Archer CEO, Dr Mohammad Choucair, also gave interviews with Proactive Investor:

+ Archer Materials highlights strong progress made in FY20
+ Archer Material adds to graphene-based biosensor technology by producing it with 3D printing
+ Archer Materials hits another milestone with Quantum devices successfully built for qubit control
+ Archer Materials updates progression on patent application in South Korea
+ Archer Materials latest financial numbers show company is cashed up with 12 Q of runway in treasury
+ Archer Materials confirm the presence of Halloysite at the Company's Eyre Peninsula Project
+ Archer Materials begins next phase in the development of their 12CQ Chip

Appendix 5B disclosures

Archer's accompanying Appendix 5B (Quarterly Cashflow Report) includes amounts in item 6.1 which were executive and non-executive director fees paid as salaries and wages.

During the Quarter the Company spent $126,000 on exploration activities, primarily on its Halloysite-Kaolin Projects in South Australia. The expenditure represents direct costs associated with drilling and various sampling activities as part of the exploration of the Company's Halloysite-Kaolin Projects as well as capitalised exploration staff wages which can be directly attributed to exploration projects. This amount does not include any costs associated with the Quantum Computing, Human Health and Reliable Energy projects, nor does it include other corporate salaries and other associated overheads.

Issued Capital

Time	Shares	Options	Performance Rights
Start of Quarter	224,354,823	18,170,000	Nil
New issues during Quarter	Nil	Nil	Nil
Exercised/forfeited during Quarter	300,000(1)	2,300,000(1) (2)	Nil
End of Quarter	224,654,823	15,870,000	Nil
Date of this Report	224,836,546(3)	15,688,277(3)	Nil

(1) 300,000 unlisted options, exercisable at $0.1929 each on or before 31 March 2023, were exercised into shares. The unlisted options were previously issued under an employee incentive scheme.

(2) 2,000,000 unlisted options exercisable at $0.245 each on or before 31 March 2023, previously issued to a consultant of the Company (ASX ann. 5 Feb 2020) were forfeited.

(3) 181,723 unlisted options exercisable at $0.1929 each on or before 31 March 2023, exercised into shares on 16 October 2020. The unlisted options were previously issued under an employee incentive scheme.

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List of Archer Tenements

Tenement*	Location	Commodity
South Australia		
EL 6363	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 6351	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	Peterborough	Copper / Gold
EL 6354	Bendigo	Copper/Gold
EL 6478(1)	Caralue Bluff	Kaolin
ML 6470	Campoona Shaft	Graphite mining
MPL 150	Sugarloaf	Graphite and graphene processing
MPL 151	Pindari	Process water for Sugarloaf
New South Wales(2)		
EL 8894	Stanthorpe	Tungsten / Tin
EL 8871	Crowie Creek	Copper/Gold
Western Australia		
E53/1926	Albion Downs	Nickel

Notes

* All tenements are 100% owned by Archer.

(1) Tenement was granted during the Quarter

(2) Broken Hill tenements EL 8592, EL 8593, EL 8594, EL 8595 and EL 8779 were relinquished during the Quarter.

(3) Leigh Creek Magnesite Project tenements EL 5730 and EL 6019 were sold during the Quarter (refer to the commentary elsewhere in this report).

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. Mr. Bollenhagen is a Member of the Australasian Institute of Mining and Metallurgy who has more than 20 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.

About Archer

A materials technology company developing materials in quantum computing, biotechnology, and lithium-ion batteries, and exploring for minerals in Australia. The Company has strong intellectual property, broad-scope mineral tenements, world-class in-house expertise, a unique materials inventory, and access to over $300 million of technology development infrastructure.

The Board of Archer authorised this announcement to be given to ASX.

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

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

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

YouTube:
https://bit.ly/2UKBBmG

Medium:
https://medium.com/@ArcherX

Sign up to our Newsletter:
http://eepurl.com/dKosXI