Corporate
Quarterly Report

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

ASX Announcement (ASX: **AXE**) 30 July 2020

Fourth Quarter Activities Report

For the three months ending 30 June 2020

Significant Activities

- The Company is well capitalised with approximately $8.1 million cash and no debt.
- Archer signs an agreement with IBM to advance quantum computing and work towards solutions for the widescale adoption of the technology.
- European and Japanese patent applications for the ^{12}CQ quantum computing chip ("chip") proceed to substantive examination stage.
- Significant technological milestone achieved towards building the ^{12}CQ chip, confirming room-temperature conductivity of single qubit components.
- Drilling and assay results significantly increase the commercial development potential of the Company's Franklyn Halloysite-Kaolin Project ("Franklyn Project") and the Eyre Peninsula Kaolin-Halloysite Project ("EP Project").

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

Commenting on the fourth quarter activities Greg English, Executive Chairman of Archer, said, "During the Quarter we proudly announced our collaboration agreement ("Collaboration Agreement") with IBM and doing so became the first Australian company building a quantum chip to join into the global IBM Q Network as an ecosystem partner."

The agreement with IBM supports our plans to use IBM's open source framework, Qiskit, as the software stack for our future ^{12}CQ qubit processor chip technology. Mohammad Choucair and his team look forward to working with IBM and members of the network to address the most fundamental challenges to the wide-scale adoption of quantum computing."

"The development of a prototype portable powered graphene biosensor sensing device was also a great achievement by the Company. We own 100% of the patent application and will continue with our strategy of lodging strong patent applications in Australia, the US and EU and to protect the intellectual property rights to the biosensor technology."

"Test results from drilling and sampling at both the Franklyn Project and EP Project shows that we have high value halloysite and kaolin present at both projects. The mineralisation on the EP Project is outcropping and close to existing infrastructure which adds to the commercial potential of the EP Project.

Our recent Share Purchase Plan was oversubscribed, and we are now well funded to pursue our objectives for 2020/21 and beyond."

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Quarterly Activities to 30 June 2020

Archer is 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 diverse advanced materials inventory, and access to over $300 million of technology development infrastructure.

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 entered into an agreement with International Business Machines Corporation ("IBM", "NYSE: **IBM**") to work together on the advancement of quantum computing ("Agreement") (ASX ann. 5 May 2020). Archer is the first Australian company building a quantum computing qubit processor to join the global IBM Q Network as an ecosystem partner.

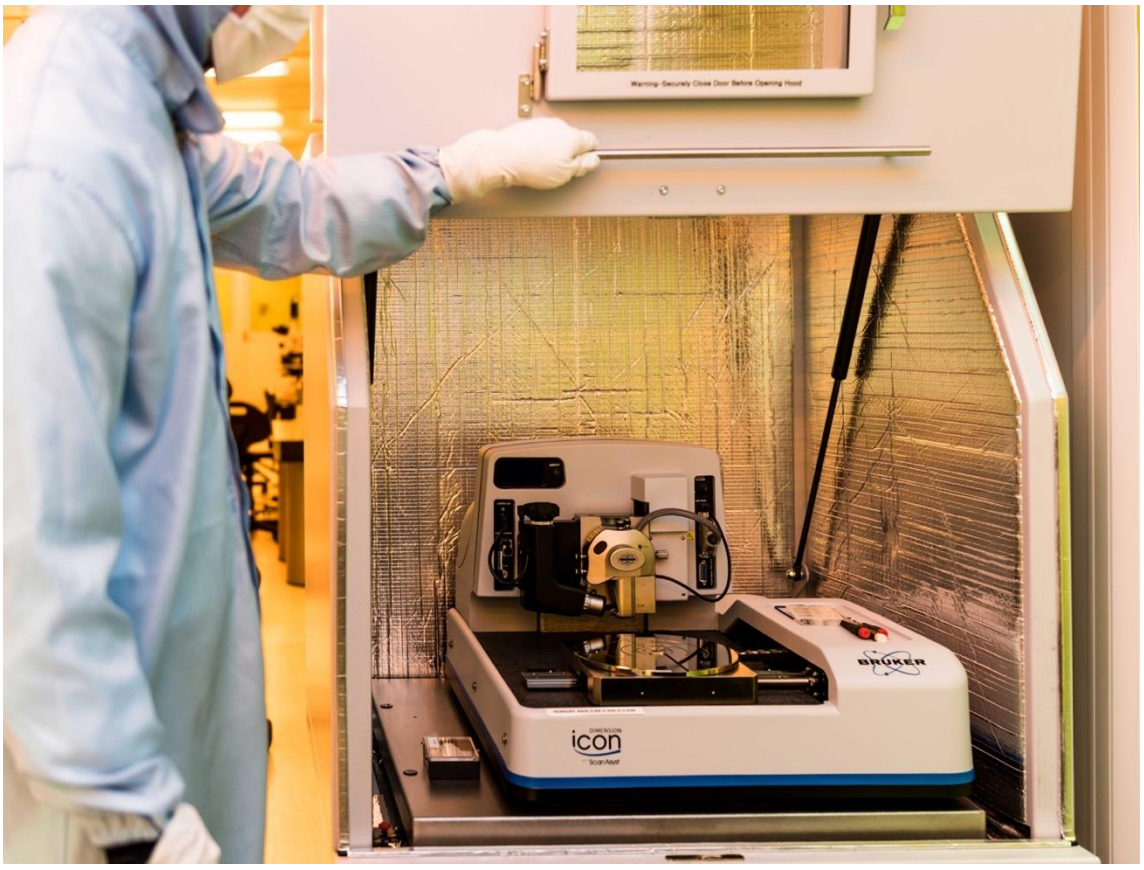

Image 1. Archer staff operating the specialised, state-of-art conduction atomic force microscopy instrumentation required to perform the measurements. The instrumentation is housed in a chip prototype foundry with a cleanroom environment and sterile protocols.

The Company has begun accessing IBM's quantum computing expertise and resources, and open-source Qiskit software and developer tools. IBM has also provided Archer access to the IBM Quantum Computation Center, which includes the most advanced quantum computers commercially available to explore practical applications.

Archer and IBM will seek mutually beneficial collaborative opportunities on the advancement of quantum computing. Such opportunities may include demonstration and development of actual and conceptual quantum processors and hardware, algorithms, applications, and business use cases.

All of Archer's intellectual property rights and title to pre-existing materials are unaffected by the Agreement. Archer maintains an exclusive licence to all the intellectual property rights ("IP") related to the ^{12}CQ chip technology, including patent applications filed under the Patent Cooperation Treaty ("PCT") to protect and commercialise intellectual property internationally.

The international PCT application continues to progress in a number of jurisdictions at various stages of the patent granting procedure (ASX ann. 11 May 2020 and ASX ann. 18 Jun 2020). During the Quarter, the European and Japanese patent applications proceeded to substantive examination stages.

The Company also reached a significant technological milestone in the development of its ^{12}CQ chip (ASX ann. 15 Jun 2020). Conductivity measurements ("measurements") on single qubit components ("qubits") were carried out by Archer staff using conductive atomic force microscopy that was configured using state-of-the-art instrumentation systems and housed in a semiconductor prototype foundry cleanroom (Image 1).

The outcomes of the measurements represent a global commercial advantage in the multibillion-dollar quantum computing industry[†]. The measurements directly and unambiguously proved, with nanometre-scale precision, the conductivity of single qubits at room-temperature.

The qubit conductivity and the associated underlying theories were proposed in 2016 by Archer CEO Dr Mohammad Choucair, in the seminal work underpinning the ^{12}CQ technology published in the highly reputable peer-reviewed scientific journal *Nature Communications*[‡].

The measurements progress Archer's technological development towards controlling quantum information residing on individual qubits ("control") – which is a key componentry requirement for a working quantum computing qubit processor; another being *readout*. Control must be performed prior to readout, as these subsequent steps represent a logical series in the ^{12}CQ quantum computing chip function.

The technical details of the ^{12}CQ chip development were covered in a webinar (ASX ann. 21 Apr 2020) ("Webinar") by Archer's Quantum Technology Manager, Dr Martin Fuechsle. The Webinar coincided with the CSIRO's publication of a comprehensive roadmap titled *Growing Australia's Quantum Technology Industry*[§] ("Roadmap") that Archer contributed to (ASX ann. 26 May 2020). According to the Roadmap, quantum technologies could create an $86 billion global industry by 2040.

[†] https://www.bcg.com/en-au/publications/2019/quantum-computers-create-value-when.aspx
[‡] https://www.nature.com/articles/ncomms12232
[§] CSIRO Futures (2020) Growing Australia's Quantum Technology Industry. CSIRO, Australia.

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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 the technology development of the graphene biosensors (ASX Ann. 11 Jun 2020), (Image 2).

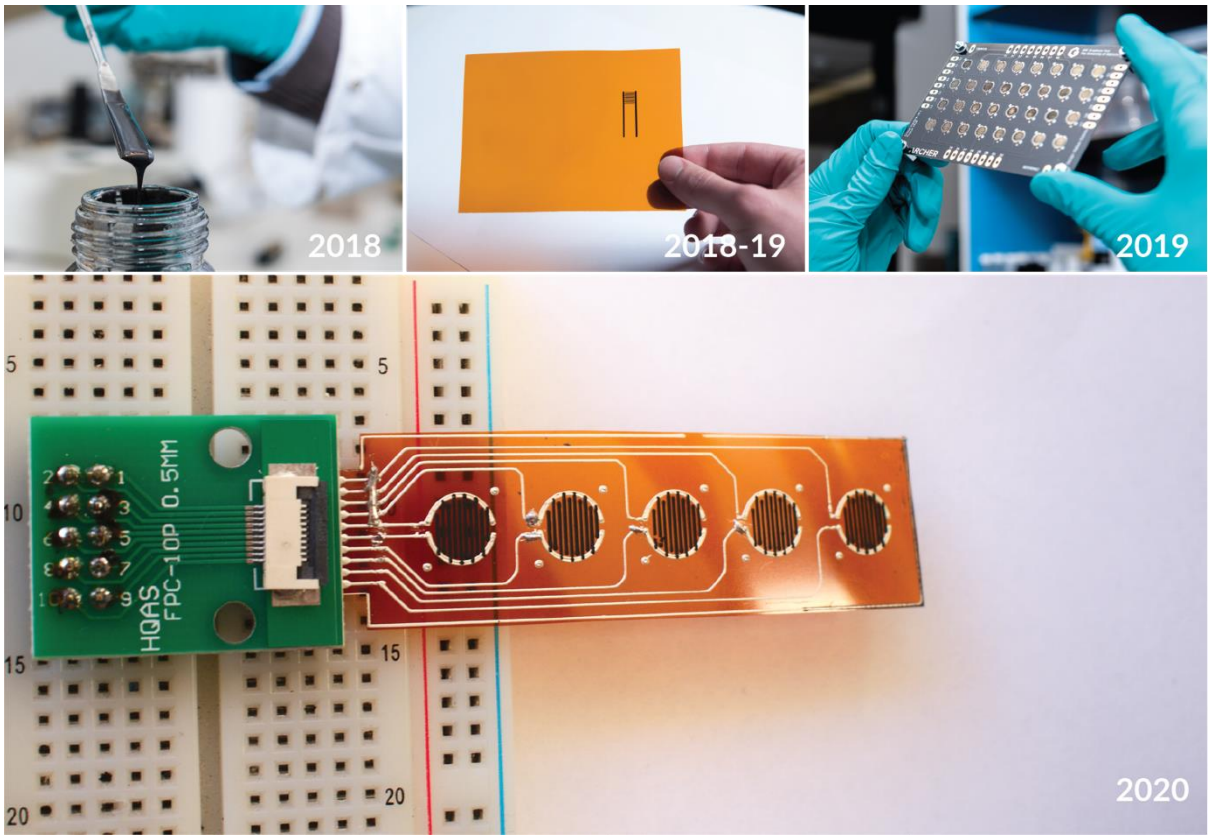

Image 2. Progress in the Company's graphene-based biosensor technology development. In 2018-2019 the Company focused on raw materials feedstock conversion to graphene and related inks that produce competitive advantages in biosensing. In 2019-2020, the technology componentry has evolved into prototypes of portable, battery powered, biosensing devices a few centimetres in size. The devices can incorporate flexible transparent substrates (orange), and inks made from graphene and biomaterials that can be patterned on the substrates for sensing (black interdigitated electrodes, that are the thickness of a few human hairs).

A number of achievements have been made recently that relate to the biosensing interface, data processing, and design and fabrication of materials electrodes critical to the biosensor technology function (Image 2). This has led to the design, testing and fabrication of early-stage portable battery powered prototypes employing an electronic interface for biosensing, which circumvents the need for cumbersome instrumentation and allows for point of use application.

A set of new graphene materials has been developed by Archer that could be directly applied for enhanced biosensing and their processing into biocompatible inks in water-based solvents, eliminating the use of hazardous and non-biocompatible chemicals, increasing the scope of biomolecules that can be detected. Laboratory synthesis was complemented with computational chemistry to calculate and visualise these materials candidates at the atom-level for their suitability in biomolecular sensing.

Archer's graphene biosensor technology is at an early stage of commercialisation. During the Quarter, the Company engaged with independent technical and commercial advisors ("Advisors") within the Australian biotechnology industry to produce a comprehensive strategic commercialisation roadmap ("Roadmap") for Archer's graphene-based biosensor technology. The Roadmap remains commercial-in-confidence.

The independent research conducted by the Advisors indicates that within the multibillion-dollar biosensing industry, commercial transactions in the 5-year period between Jan 2014 to Dec 2019 related to diagnostics in development (i.e. not marketed):

+ the average acquisition value of disclosed terms exceeded US$100 million; and

+ of the 100+ partnerships and asset purchases, disclosures that were made indicated average transactions of US$20 million+.

Due to the long-term time frames associated with diagnostic deep tech development, later stage (and derisked) diagnostic technology (i.e. in-market) attracted larger size commercial transactions, with the average disclosed value from 50+ transactions, exceeding US$600 million. There were 450+ publicly announced partnerships and asset purchases, where average transactions exceeded US$230 million.

Value in the biosensor industry is primarily generated through the development of disruptive technology, strong portfolios of intellectual property, and access/ownership of technology infrastructure.

Archer's commercial strategy in its Human Health business line involves applying the triple-helix business model for biotechnology innovation to develop the graphene biosensor technology and sublicense the associated intellectual property rights.

Reliable Energy

During the Quarter the Company outlined its corporate strategy (ASX ann. 9 Jun 2020) which involves identifying and assessing new technologies for inclusion in the Reliable Energy vertical.

Archer's is applying traditional and next-generation materials discovery schemes to develop materials that meet the minimum performance requirements and market accepted benchmarks for lithium-ion batteries, by:

+ Optimising, creating and testing high value-added anode materials products and processes atom-by-atom using a combination of classical and quantum computing, in real-world full-scale lithium-ion batteries.

+ Establishing partnerships with highly resourced organisations in the energy industry to identify performance trade-offs using new materials and to licence the intellectual property rights associated with their efficient early-stage discovery.

The ongoing work with UNSW Sydney (ASX ann. 18 Apr 2018) is focused on addressing the trade-off between cost and battery performance by formulating, building, and testing full-cell batteries that include materials sourced from Archer's tenement areas, including Campoona Graphite. Technical development with UNSW Sydney to test electrode materials in lithium-ion batteries continued during the Quarter.

Mineral Exploration

Sale of Leigh Creek Magnesite Project

In 2018 the Company announced the sale of the Leigh Creek Magnesite Project ("Project") for $2.0 million plus a bonus payment ("Purchase Price") (ASX ann. 2 Jul 2018). The Company received $250,000 in 2018 with the remaining $1.75 million to be received at the completion of the sale and purchase of the Project ("Completion").

In late 2019 the Purchase Price was increased to $2.25 million ($2.0 million payable at Completion) plus the bonus payment (ASX ann. 30 Dec 2019). During the Quarter, Canadian Stock Exchange listed Volatus Capital Corp. ("Volatus", "CSE:VC") announced that it had acquired all of the shares (the "Transaction") in one of the purchasers of the Leigh Creek Magnesite Project ("Project") (ASX ann. 25 Jun 2020).

As a result of the Transaction, Archer will now receive approximately $2.64 million** worth of Volatus shares at Completion and may be entitled to receive a further bonus payment should there be a future transaction with the company that has purchased the remainder of the Project.

This means that the total purchase price of the Project (including $250,000 previously paid to the Company) is approximately $2.89 million plus any future bonus payments.**

On 29 March 2020, the Australian Government announced changes to its foreign investment review framework due to the impacts of the coronavirus outbreak and reduced the monetary threshold for all inbound investment to $0.

As a result of these changes, the Transaction requires approval by the Foreign Investment Review Board ("FIRB") given that Volatus is a Canadian registered company. Volatus has applied for FIRB approval. Completion will take place on the sooner of the tenth business day after the date that FIRB approves the Transaction and 9 December 2020.

Under the legislation, FIRB has up to six months to make a decision. At Completion, Archer will receive $2.0 million worth of Volatus shares plus an additional number of shares equal to 5% of the Volatus market capitalisation (together the "Shares"). The Shares will be subject to escrow for four months or such other period determined by the Canadian Stock Exchange, and Archer cannot sell the Shares during the escrow period.

Volatus is only acquiring one of the Purchasers, and the other Purchaser will continue to hold its interest in the Project. Archer will receive a bonus payment equal to 5% of the value of any future transaction should the second Purchaser at any time sell its share of the Project or list on any stock exchange.

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

** Assumes AUD:CDN exchange rate of $0.94 and Volatus Capital Corp. market capitalisation of CDN$12 million.

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 3).

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.

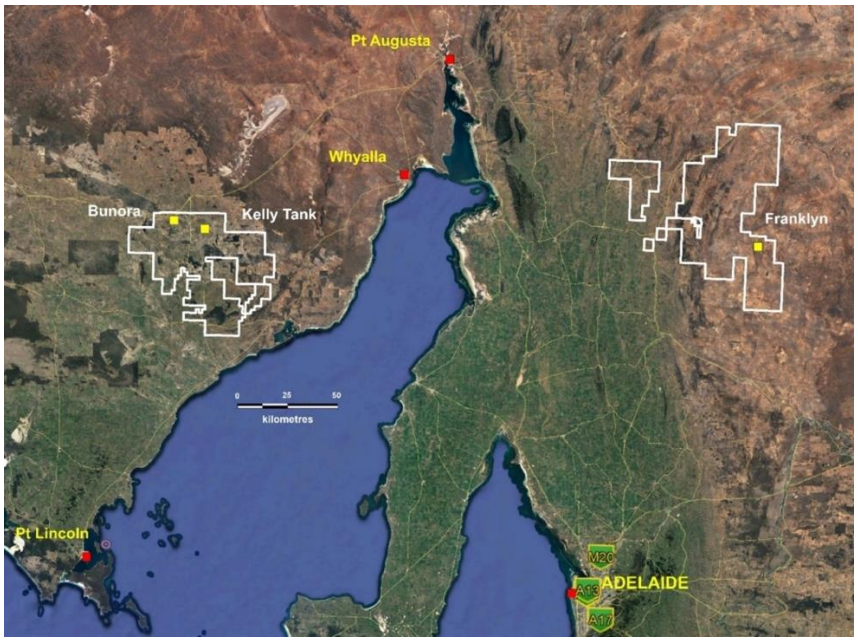

Image 3. Location of Archer's Halloysite-Kaolin EP Project and Franklyn Project.

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 (Image 4). 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). All holes intersected kaolin mineralisation with some kaolin outcropping at the surface and the remaining kaolin covered by less than 3 metres of soils. There has been no visual confirmation of halloysite at the Prospects by historic explorers.

During the Quarter, excellent results were reported from the EP Project drill samples submitted for analysis (ASX ann. 6 Apr 2020). Drill holes at Kelly Tank consistently reported grades over 30% alumina ("Al2O3") with most of the mineralisation starting from the surface (Image 5). Bunora target drill hole BNAC20-006 intercepted high-grade kaolin - 17m @ +36% Al_2O_3 in the -45 µm size fraction (Image 6), and high grades of up to 36.8% Al_2O_3 and recoveries over 90% were reported from Bunora East drilling (Image 6).

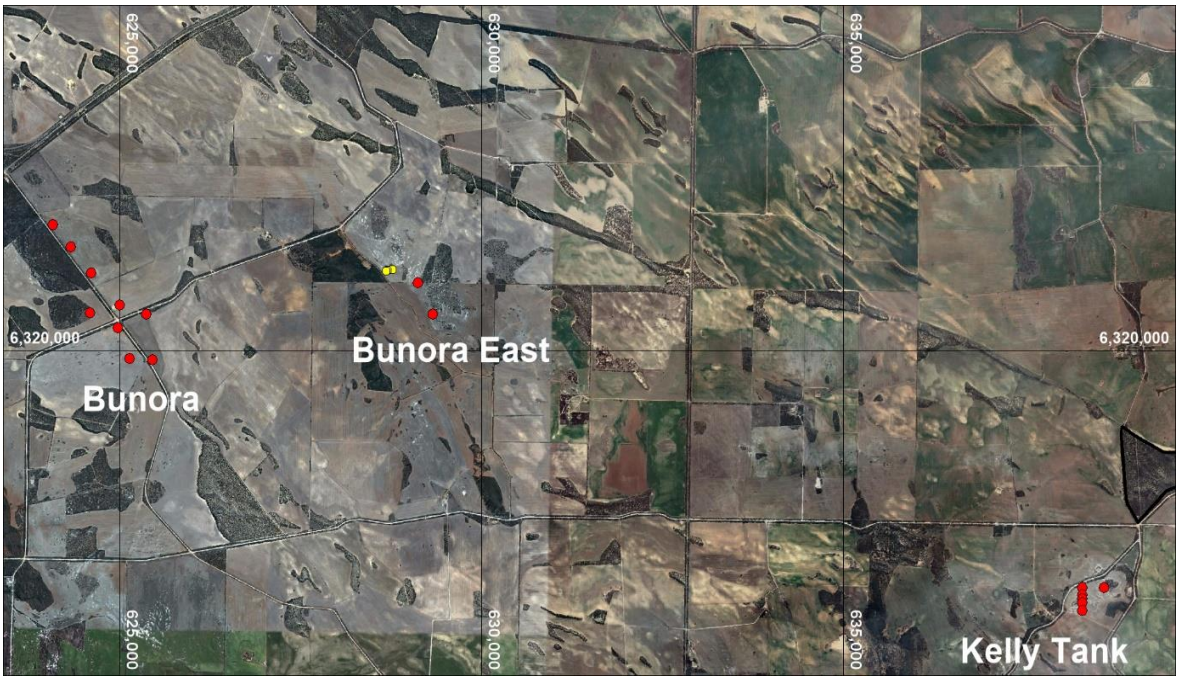

Image 4. Locations of EP Project Prospects, and locations of holes drilled by Archer (red) this year and holes drilled by a previous explorer in 2014 (yellow).

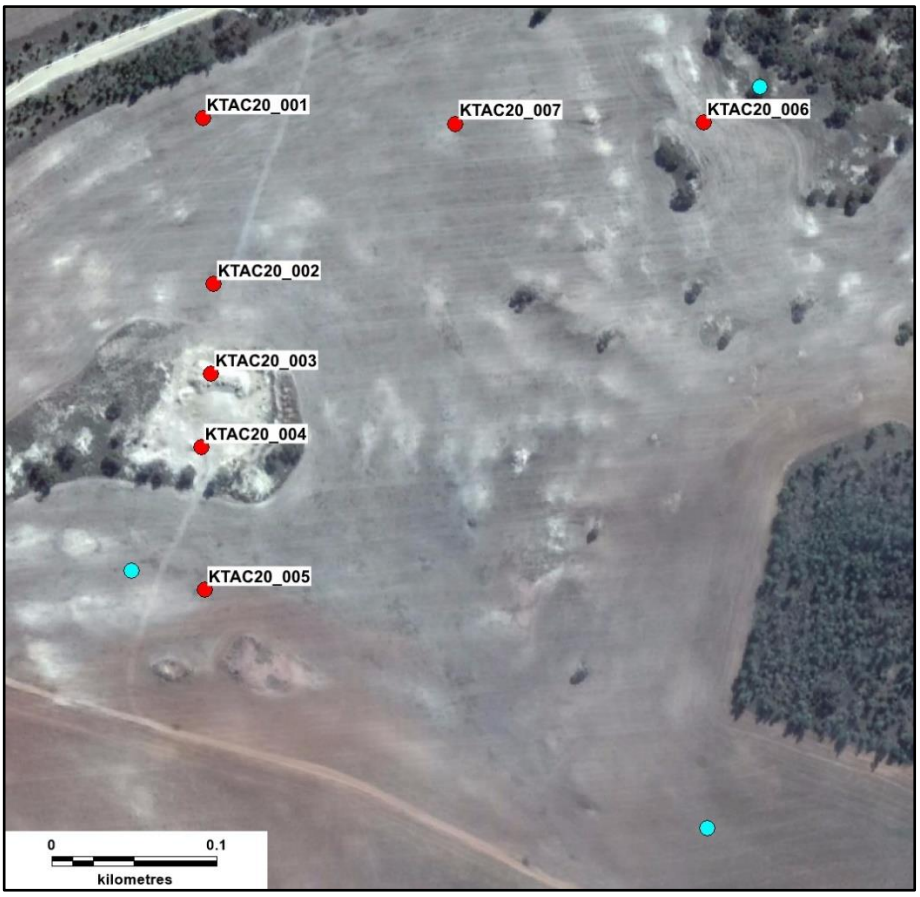

Image 5. Location of holes drilled by Archer (red) at Kelly Tank this year and holes drilled by historic explorers (in the 1970s) (blue). Note the visible white kaolin at the surface.

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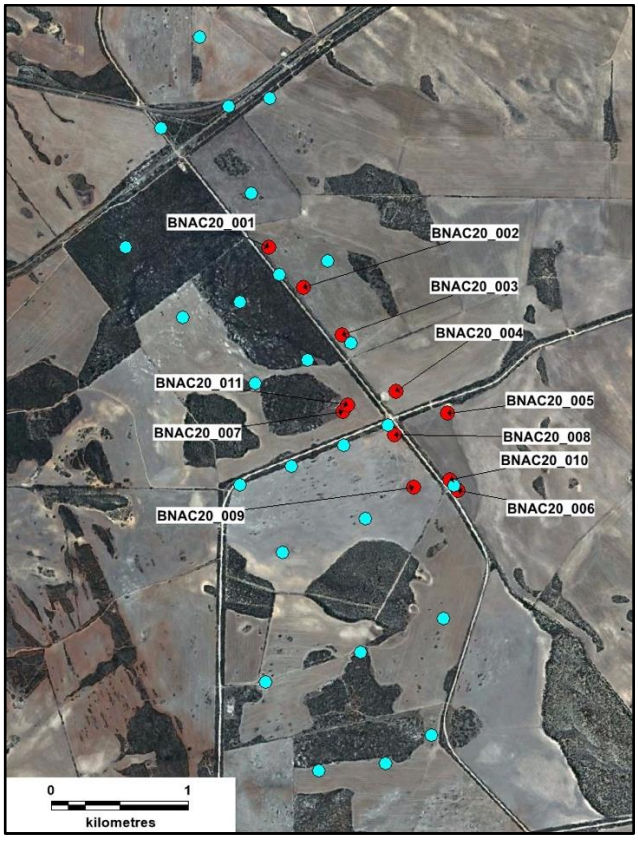

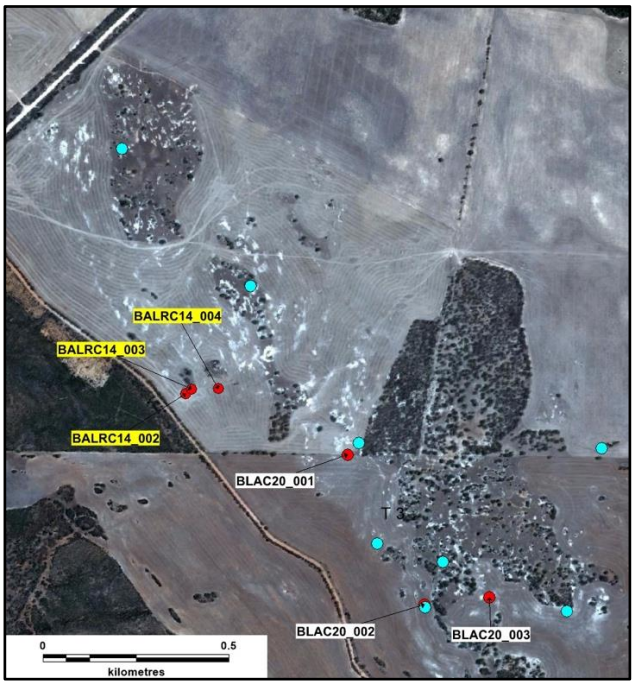

Image 6. *Top:* Location of holes drilled by Archer (red) at Bunora this year and holes drilled by historic explorers (in the 1970s) (blue). *Bottom:* Location of holes drilled by Archer (red) this year at Bunora East, and holes drilled by previous explorers in 2014 (labelled yellow); and in the 1970s (blue). Note the appearance of white kaolin at the surface.

Franklyn Project

The Company has previously announced the discovery of halloysite from drilling at the Franklyn Project (ASX ann. 23 Mar 2020). Test work undertaken by a well-respected UK based kaolin industry laboratory identified the presence of halloysite with long tubes, a high aspect ratio and other properties which should make it desirable to customers.

During the Quarter, drill hole samples from the Franklyn Project were received and prepared by a kaolin industry processing plant in the USA for processing through a pilot plant (ASX ann. 19 May 2020). However, processing of the bulk samples has now been indefinitely delayed by the COVID-19 pandemic.

Background:

Late last year the Company announced a significant kaolin Exploration Target for both the EP Project (ASX Ann. 19 Aug 2019) and Franklyn Project (ASX Ann. 7 Nov 2019):

Project	Tonnes	Grade
Franklyn Project	45 - 91 million	30 – 36% Al_2O_3 (-45 µm size fraction)
EP Project	55 - 135 million	33 – 36% Al_2O_3 (-53 µm size fraction)

Table 1. EP Project and Franklyn Project Exploration Targets.

The potential quantity and grade of the Exploration Targets reported are conceptual in nature, there has been insufficient exploration to estimate a Mineral Resource and it is uncertain if further exploration will result in the estimation of a Mineral Resource for the EP Project or Franklyn Project.

Gold Projects

During the Quarter, the Company performed a technical review of its 100% owned mineral tenements hosting gold exploration projects in South Australia (Altimeter and Bartels), and in New South Wales (Stanthorpe) (together the "Gold Projects") (ASX ann. 4 Jun 2020). Each of the Gold Projects are at early stages of exploration.

The Gold Projects cover a large area (over 1,500 km^2) and are considered prospective for 'intrusion-related gold systems' and 'epithermal-style' gold mineralisation. The Company will continue to gradually explore the tenements or seek a partner to expedite the exploration of the tenements in-line with the Company's strategy to monetise its mineral exploration assets.

Other Projects

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

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Corporate

Cash balance

The Company's cash balance at the end of the Quarter was $8,115,000.

Share Purchase Plan

During the Quarter, the Company undertook a Share Purchase Plan ("SPP") which closed on Monday, 22 June 2020 and the Company received total SPP application funds of $6,363,000, exceeding the targeted amount of $3,000,000 (ASX ann. 25 Jun 2020).

The Company would like to thank all shareholders for their participation in the SPP and for their continued support during 2020.

Exercise of Unlisted Options

During the Quarter, the Company received $257,000 from the exercise of unlisted options.

Shareholder Events and Outreach

During the Quarter, Archer held shareholder events online due to the COVID-19 pandemic. In particular, the Company held a successful Q&A webinar and also outlined its corporate strategy:

+ Quantum computing Q&A webinar
+ Corporate presentation and strategy overview

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

+ Message from CEO: Archer's Quantum Computing Agreement with IBM
+ Newsletter: ASX-listed quantum computing hardware firm enters IBM club
+ Newsletter: Share Purchase Plan to accelerate work programs
+ Spotlight: Archer Materials makes major progress towards graphene biosensors for detection of disease
+ Interview Transcript: CEO Corporate Presentation Interview
+ Message from CEO: Quantum Digital Week
+ Newsletter: Qubit Control Measurements Commence

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

+ Archer Materials closes extremely successful Share Purchase Plan doubling their original ask
+ Archer Materials Japanese patent application for 12CQ technology undergoing substantive examination
+ Archer Materials hits milestone in evolution of room-temperature quantum computing qubit processor
+ Archer Materials makes major progress towards graphene biosensors for detection of disease
+ Archer Materials looking to raise 3 million offering a Share Purchase Plan
+ Archer Materials agrees quantum computing deal with IBM

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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 $331,000 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 development 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	212,419,573	19,500,000	Nil
New issues during Quarter	10,605,250(1)	Nil	Nil
Exercised/cancelled during Quarter	1,330,000(2)	1,133,000(2)	Nil
End of Quarter	224,354,823	18,170,000	Nil
Date of this Report	224,354,823	16,170,000(3)	Nil

(1) New shares issued pursuant to the Share Purchase Plan which closed on 22 June 2020.

(2) 1,330,000 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.

(3) 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 cancelled.

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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 6019(1)	Witchelina	Magnesite
EL 5730(1)	Termination Hill	Magnesite
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(2)	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(3)		
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) These tenements have been sold (refer to the commentary elsewhere in this report).

(2) Tenement was granted during the Quarter

(3) Broken Hill tenements EL 8592, EL 8593, EL 8594, EL 8595 and EL 8779 were relinquished 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. 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:

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https://archerx.com.au/

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

YouTube:
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