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Quantum technology presentation update

Archer Exploration Limited (Archer, the Company) is pleased to provide an update on its shareholder presentations (Events) which took place in Sydney on 29 May 2019, Adelaide 5 June 2019 and Melbourne 6 June 2019.

The Events focussed on Archer's ^{12}CQ project and progress in developing solutions for the quantum computing economy, a key area of the Company's strategic activities.

The following answers some common questions raised by shareholders who were in attendance at the Events.

What does Archer do?	Archer provides shareholders with exposure to financial returns from innovative technologies and the materials that underpin them. The company aims to achieve this by: – Developing our advanced materials business in the key areas of human health, reliable energy, and quantum technology. – Effectively exploring our mineral exploration projects. – Identifying opportunities to acquire new value add projects and to realise value through the sale of existing assets.
What is Archer's current strategy to provide shareholder returns?	Archer's strategy is to maximise the value of our patents and tenements (assets) through materials development and commercialisation and effective mineral exploration. Our focus is on: – Progressing the quantum computing technology toward commercialisation. – Prosecuting patents and continuing development of the graphene-based biosensor technology. – Continued testing of Campoona graphite for use in lithium-ion batteries. – Identification of partners to co-develop the Campoona Graphite Project. – Effective exploration of the Company's mineral exploration tenements. – The sale and acquisition of projects and businesses which add value to the Company.

What do you mean by "materials"?	Materials are the tangible, physical basis of all technology. The advanced materials business is focussed on the development of carbon-based technologies such as graphene whereas the focus of the exploration business is the discovery of in-demand minerals such as copper and tungsten.
What are your funding requirements for the next year and beyond, and how do you intend to fund the growth strategy given your cash resources?	Archer is currently well funded and at this stage has sufficient funds to meet its 2019/20 obligations. Over the last 12 months, we have sold $3.35m in non-core assets that includes land and tenements (ASX Announcements 8 February 2019 and 2 July 2018). Of that amount, $1.35m is due for settlement in July 2019, and a remaining $1.75m is due in January 2020 [having received a deposit of $250,000 last year]. Archer recently completed a share placement (ASX Announcement 21 May 2019) to raise an additional $300,000.
How committed is the company to minerals exploration?	The Company's tenements are highly prospective for copper, manganese, cobalt, tungsten, and graphite. We will continue to explore our tenements and where prudent, will consider further investment and monetisation of our mineral assets.
Why is Archer involved in Quantum Computing?	Archer's quantum technology is unique and has the potential to revolutionise worldwide computing. Most of today's quantum computers operate at temperatures close to absolute zero (i.e. colder than outer space). These computers must be housed permanently in purpose-built facilities. At Archer, we are developing a quantum computer chip that, if successful, will allow quantum computers to be mobile and operate at room temperature.
What is Quantum Computing?	Quantum computers are used to implement algorithms (and software) that provide substantial speed-ups in processing over current computers and the possibility to solve problems that modern computers find extremely difficult or impossible. They [quantum computers] use qubits and qubit processors to do this, and because of this, they represent the next generation of powerful computing.

What is the size of the Quantum Computing Industry?	Quantum computing is emerging as a rapidly growing sector in the US$500 billion+ market of the global semiconductor industry, and about 40% of costs in the US$500 billion+ semiconductor industry relates to materials. According to McKinsey, in 2015 about 7,000 people worldwide, with a combined budget of A$2.1bn, were working on quantum computing, with Australia (5%), the EU (35%), and North America (30%), making up 70% of world spend. Goldman Sachs predicts quantum computing could become a US$29 billion industry by 2021, while the BCG highlighted the dependence of market size on achieving technical milestones in materials development. Australia has a critical mass of expertise in quantum computing and is at the forefront of the industry.
What is a qubit?	The term 'qubit' is short for 'quantum bit.' Today's classical computers (e.g. your laptop computer) work by using standard bits to do calculations and processes. These standard bits exist in one of two states, either a 0 or a 1. Quantum computers encode information as qubits, which can exist in superposition state of 0 and 1. In the case of Archer's technology, qubits are represented by the quantum feature of electron spin and their respective control devices that are working together to act as a computer a processor. One of the biggest challenges to the widespread use of quantum computing technology involves keeping the qubit stable at room-temperature while integrating into electronic componentry.
What is a qubit processor, and how does it work?	The central processing unit of a quantum computer is comprised of a number of qubits. Qubit processors work by processing and executing quantum algorithms: processes or rules that are followed by the computer, often as a set of operations or calculations. A programmer [a trained, knowledgeable human] would then need to use a programming language to implement software for quantum algorithms. A control and readout device would be used to facilitate interaction between the qubits to perform quantum operations run using specially engineered software.

Why is a qubit processor so important?	A qubit processor would form the most crucial hardware component and core processing unit (CPU) of a quantum computer – the 'brain' of the quantum computer. There is no agreed universal architecture for qubit processors, so they come in a variety of forms depending on the qubit type and materials and technology used. Modern central processing units are performance benchmarked and typical chips currently sell for $400-600, and billions are sold every year to service a growing number of global mobile devices and computer sales in the consumer electronics industry. Not all computers in the future will require a qubit processor, and they may not necessarily displace standard CPUs; however, they may be used in tandem in certain applications.
What is the ^{12}CQ Project?	Archer commenced ^{12}CQ in April 2019. The ^{12}CQ Project focuses on the development and commercialisation of a qubit processor product. That is, a chip, that could operate at room temperature and integrated into modern electronics to service existing and emerging consumer markets reliant on computational power. Patents protecting the ^{12}CQ intellectual property (IP) (which would expire 2035) have been filed in Australasia, the US, and EU, are exclusively licensed to Archer by the University of Sydney.
What are the main objectives of the ^{12}CQ Project?	The main goals of the ^{12}CQ Project are to: 1. De-risk the technology by progressively building a room-temperature operational qubit processor chip that would form the core device of a universal quantum computer. 2. Establish commercial partnerships with highly resourced organisations that would allow the opportunity for product scale, knowledge exchange, integration, and distribution to capture maximum market share. 3. Successfully prosecute patent applications in Australia, the US, China, Japan, Korea, Hong Kong, and the EU, to provide the commercial freedom to operate in these markets.

What is so special about Archer's quantum technology?	At the most basic technical and innovative level, Archer has something that no one else has been able to achieve: a conducting material capable of practical room-temperature quantum information processing. This material is a breakthrough in the development of quantum computing. This material is the critical component in a prototype qubit processor chip being built by Archer. This type of knowledge is very difficult to acquire and is backed and protected by very strong IP in the form of patents. These patents are exclusively licensed to Archer by the University of Sydney, who owns the IP.
How do you intend to generate revenue from the ^{12}CQ Project?	We intend to develop a qubit processing chip that can be sold or sublicensed. Potential customers include original equipment manufacturers (OEMs). Well-known OEMs include IBM and Asus. Well-known examples from the computing industry employing this business model include Intel Corporation and Advanced Micro Devices, Inc., who design, fabricate, and manufacture central processing units (CPU's), generating revenue through direct sales channels or distributors, or as suppliers to OEMs and other businesses who employ the 'Hardware Unit Sales and Service' business model.
What is ^{12}CQ's qubit processor competitive advantage?	The successful development of the ^{12}CQ qubit processor chip would represent a breakthrough in overcoming both the limitations of sub-zero operating temperatures and electronic device integration for qubits. If successful, it would allow for the first quantum computing processor technology onboard mobile devices and would reduce the commercial barriers to quantum computing by making it globally accessible.
How is ^{12}CQ different from other quantum computing projects?	Consumers and businesses would be the beneficiaries of our qubit processor once integrated into mobile devices like smartphones, tablets, and PCs. Ultimately, the successful chip integration could allow for quantum computing onboard technologies, that may never be possible with current impractical quantum computing technology.

Is there any proof that the ^{12}CQ technology works?	The technical discovery at the heart of ^{12}CQ's core IP has been published in the prestigious peer-reviewed scientific journal *Nature Communications* and currently ranks in the top percentiles in all fields. The research was conducted over many years between two highly regarded institutes, the University of Sydney (Australia) and EPFL (Switzerland), and validated at a third, The Freie University of Berlin (Germany), unifying global efforts in quantum computing. The first written opinion of the international patent searching authority was received 20 January 2017 and found that all 16 claims in the patent cooperation treaty application in Australia, China, Japan, Hong Kong, South Korea, the EU, and the US, describing the ^{12}CQ IP were novel and inventive.
How is it that a company the size of Archer can compete against the global leaders/powerhouses in the computing industry?	Intel Corporation, the world's largest semiconductor company (e.g. microprocessors and chips), was founded in 1968 by two people, a chemist, and a physicist. The company on 6 June 2019 had a market capitalisation > US$190 billion. Just like Intel more than 50 years ago, exceptionally intelligent and talented people have joined Archer who are passionate about ^{12}CQ's success and who are global pioneers in quantum materials and technology development. – Archer's CEO, Dr. Mohammad Choucair, is the co-inventor of the ^{12}CQ technology and is a world-renowned Chemist and the winner the RACI Cornforth Medal (2011) for the most outstanding Chemistry Ph.D. in Australia. – Dr. Martin Fuechsle is Archer's Manager, Quantum Technology and has ten years' experience in building quantum computing devices and technology. Dr. Fuechsle is well credentialed and is the inventor of the single-atom transistor. He received the Australian Institute of Physics Bragg Gold Medal for the most outstanding Physics Ph.D. in Australia in 2013. Importantly, Archer recently signed a Facilities Access Agreement with the University of Sydney, that provides Archer access to the $150m Research & Prototype Foundry at the Sydney Nanoscience Hub: comprehensive world-class infrastructure comparable to production-level facilities found in major international semiconductor chip building foundries required to build prototypes of the ^{12}CQ qubit processor chip successfully.

Where can I learn more about Quantum Computing?	Philip Gerbert and Frank Ruess of the Boston Consulting Group (BCG) have recently written a report titled “The Next Decade in Quantum Computing-and How to Play”, and Massimo Russo also of the BCG (Henderson Institute) has compiled “The Coming Quantum Leap in Computing”. Both reports capture a broad view of the state of the field, which contains a flurry of activity in a complex system spanning decades of seminal work. The quantum computing industry forms a niche part of the global semiconductor industry, which is analysed in depth in the Global Semiconductor and Electronic Parts IBISWorld Industry Report. In May this year, a team at BCG also released “Where Will Quantum Computers Create Value—and When?” detailing likely areas of value generation in the step-change technology focusing on integration, talent, and IP.

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