Archer Materials Limited (ACN: 123 993 233)
Lot Fourteen, Frome Road, Adelaide SA 5000
www.archerx.com.au

ASX Announcement (ASX: **AXE**) 27 October 2023

Q1 FY24 Activities Report and Appendix 4C

For the quarter ended 30 Septemeber 2023.

Overview

- Archer Materials' ^{12}CQ chip has made progress on its qubit readout technology design and validation, and associated engineering processes and measurements required for the quantum chip operation and function.
- Archer's new advanced graphene sensor device design (gFET) was validated with a whole wafer run in a commercial foundry in the Netherlands, representing a critical milestone in the commercialisation pathway for Archer's biochip.
- The advanced gFET now creates the potential for an early biochip platform that has single-device multiplexing, meaning the biochip technology would be able to sense different liquid samples to test for multiple diseases at once.
- Multi-Project Wafer run for first-generation of Biochip gFET design submitted to commercial foundry in Germany and to be completed by end of 2023.
- Archer continues to strengthen its relationships with global foundry partners to deliver its chips using a streamlined 'fabless' commercialisation model.
- Strong cash position to fund activities and R&D with $21.3 million and no debt.
- Investor webinar to take place at 12pm AEDT on Tuesday 31 October 2023.

Archer Materials Limited ("Archer", the "Company", "ASX: AXE"), a semiconductor company advancing the quantum computing and medical diagnostics industries, provides its Quarterly Activities Report and Appendix 4C for the quarter ended 30 September 2023 ("Quarter").

Commenting on Q1 FY24 activities, Greg English, Executive Chairman of Archer, said

"Archer progressed the development of its Biochip and the quantum ^{12}CQ processor chip during the Quarter.

"We designed the complex circuitry required for readout of the ^{12}CQ qubit. Readout, which is the output of information, is a key requirement in developing semiconductors, as chips require both input and output of information for them to function.

"The advanced Biochip gFET design is a step closer to being able to detect multiple diseases at once, with the validation of the whole four-inch wafer run with a commercial foundry partner in the Netherlands. While the first-generation Biochip gFET design is expected to complete its wafer run by the end of this year.

"Our leading R&D team, combined with our cash position, creates the building blocks to optimise the design of the Biochip and quantum ^{12}CQ chip technologies."

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Technology development and commercialisation activities

^{12}CQ chip

Like all advanced quantum computing architectures, the Archer ^{12}CQ qubit processor chip requires high fidelity control (data input) and readout (data output) to function. Readout allows for interpretation of quantum calculations while minimising the loss of quantum information to the surrounding environment.

During the Quarter, Archer's focus involved designing and developing several quantum state readout technologies from first principles for the unique carbon-based qubit material in Archer's ^{12}CQ chip (Image 1).

The Archer team designed and manufactured microwave circuitry for which readout devices will be embedded. These circuit designs were validated using electromagnetic simulation software and then built. The initial design of the electronic equipment required to interface between the readout technology and facility-based measurement systems has also been completed.

The Archer team then used the simulation software to validate readout device component designs, which are undergoing foundry fabrication. Testing and manufacturing some of these readout device components for measurements is done in partnership with an industry-based measurement facility in Germany.

Early-stage measurements and testing have provided a proof-of-principal for initial approaches to Archer's readout technology, including the first indications of quantum state detection. The design and manufacture of readout hardware, technology, and associated techniques for the ^{12}CQ chip is ongoing. Archer is working with commercial tier-one CMOS foundry partners for the scaled production of prototyped readout device designs.

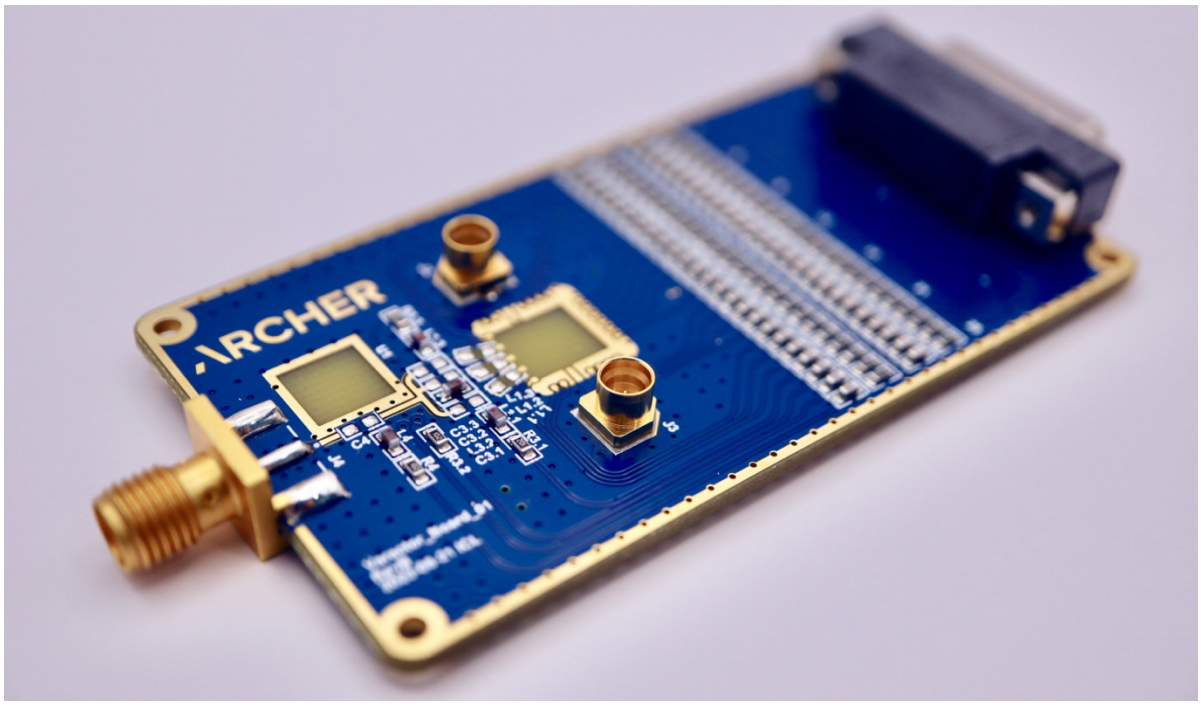

Image 1. A device developed by Archer to readout quantum states for the ^{12}CQ technology.

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Further developments were made during the Quarter that link to the future operation of Archer's ^{12}CQ chip and build on Archer's advances reported in FY23 on its wafer-scale manufacturing of hundreds of chip-based quantum electronic devices incorporating and integrating the company's ^{12}CQ qubit material for testing and measurements.

During the Quarter, magnetoresistance was for the first time observed in Archer's unique carbon-based qubit material – paving the way towards potential spintronic applications of the unique ^{12}CQ carbon material. The measurements were performed using QEDs fabricated at the nanometre-scale and state-of-the-art cryogenic measurement facilities in Australia.

The Archer team also estimated for the first time the 'exchange interaction' parameter in the qubit material. Archer used powdered quantities of qubit material samples in various pulsed electron spin setups and configurations at a range of temperatures. The exchange interaction parameter will guide the development and building of the qubit logic gates.

Archer's Biochip

Archer's biochip innovation aims to integrate gFETs into advanced fluidic systems to create miniaturised lab-on-a-chip device platforms for medical diagnostics. This could enable the ability to parallelise the detection of multiple biologically relevant targets on a chip.

During the Quarter, Archer announced that its advanced gFET design had been sent to a commercial foundry partner in the Netherlands for a whole four-inch wafer run for validation. Archer Materials' commercial foundry partner in the Netherlands validated its advanced biochip gFET design by successfully manufacturing the chips (Image 2). The whole wafer fabrication of the gFET device design is a significant step towards industrial production.

Image 2. Archer's advanced gFET chips for advanced biosensing diced from the whole four-inch wafer fabricated in a commercial foundry.

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The electronic and spectroscopic characteristics of the gFET chips, and the foundry fabrication process yield, are consistent with what Archer expected. The gFET chips are also compatible with Archer's biochip system platform.

The advanced gFET design now creates the potential for an early biochip platform that has single-device multiplexing, meaning the biochip technology would be able to sense different liquid samples to test for multiple diseases at once. Archer now intends to integrate more functionality on the biochip and optimise the device size and geometry to build advanced sensing regions.

In parallel, Archer's first-generation gFET design was submitted to a commercial foundry partner in Germany for a Multi-Project Wafer ("MPW") run which is expected to be completed in Q2 FY24. An MPW is where Archer's device design is imprinted on a small area of a wafer with the designs of other companies on the same wafer. The MPW fabrication is independent to Archer's dedicated whole wafer run.

Foundry and semiconductor industry partnerships

Archer is continuing to strengthen its relationships with global foundry partners to deliver its chips using a streamlined 'fabless' commercialisation model. During the Quarter, Archer engaged with a number of tier-one foundry manufacturers in Taiwan and across Europe to secure future semiconductor product manufacturing capability and to support technology development. This has included Archer obtaining leading edge process device design kits, and considerations and planning for preliminary device design validations for quantum and biochip technologies, including MPW and whole wafer runs.

Investor briefing

Archer is hosting a retail investor briefing via webcast at 12:00pm AEDT on Tuesday 31 October 2023. CEO, Dr Mohammad Choucair, will provide an overview of the Company's activities and there will be a Q&A session for attendees.

Investors are encouraged to register through the following link:

https://us02web.zoom.us/webinar/register/WN_l7gXl-wtTheF255IBMEDHw

Financial and corporate update

The Company's cash balance at the end of the Quarter was $21,345,000, with no debt.

The Company holds 1,633,944 shares in Canadian Stock Exchange listed Volatus Capital Corp (CSE:VC) and 11,571,119 shares and 2,892,780 quoted options in ASX listed ChemX Materials Ltd (ASX:CMX).

Archer's accompanying Appendix 4C cashflow report for the Quarter includes an amount of $165,000 at item 6.1, relating to executive and non-executive director fees paid as salaries and wages.

Annual Report and Corporate Governance

The Company's 2023 Annual Report and Appendix 4E, and Corporate Governance Statement and Appendix 4G, were lodged to ASX during the Quarter.

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Annual General Meeting

The Company's 2023 Annual General Meeting will be held in Sydney on Wednesday, 29 November 2023 at 10:30am (Sydney time) at the offices of KPMG, Level 38, Tower Three, International Towers Sydney, 300 Barangaroo Avenue, Sydney, NSW, 2000.

Events and outreach

Archer distributed several newsletters, and an investor presentation during the quarter, including:

- Presentation: Archer Investor Presentation September 2023
- August Newsletter: Archer primed for growth as a fabless chipmaker
- July Newsletter: Foundry fabrication of biochip gFET technology

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

Investor enquiries

Eric Kuret
+61 417 311 335
eric.kuret@automicgroup.com.au

Media enquiries

Tristan Everett
+61 403 789 096
tristan.everett@automicgroup.com.au

About Archer

Archer is a technology company that operates within the semiconductor industry. The Company is developing advanced semiconductor devices, including chips relevant to quantum computing and medical diagnostics. www.archerx.com.au

Appendix 4C

Quarterly cash flow report for entities subject to Listing Rule 4.7B

Name of entity	
Archer Materials Limited	
ABN	**Quarter ended ("current quarter")**
64 123 993 233	30 September 2023

Consolidated statement of cash flows		**Current quarter $A'000**	**Year to date (3 months) $A'000**
1.	**Cash flows from operating activities**		
1.1	Receipts from customers	-	-
1.2	Payments for		
	(a) research and development (exclusive of wages allocated to R&D)	(657)	(657)
	(b) product manufacturing and operating costs	-	-
	(c) advertising and marketing	-	-
	(d) leased assets	(3)	(3)
	(e) staff costs	(915)	(915)
	(f) administration and corporate costs	(474)	(474)
1.3	Dividends received (see note 3)	-	-
1.4	Interest received	90	90
1.5	Interest and other costs of finance paid	-	-
1.6	Income taxes paid	-	-
1.7	Government grants and tax incentives	-	-
1.8	Other (provide details if material)		
1.9	**Net cash from / (used in) operating activities**	**(1,959)**	**(1,959)**

2.	**Cash flows from investing activities**		
2.1	Payments to acquire or for:		
	(a) entities	-	-
	(b) businesses	-	-
	(c) property, plant and equipment	(8)	(8)
	(d) investments		
	(e) intellectual property	(5)	(5)

Consolidated statement of cash flows		Current quarter $A'000	Year to date (3 months) $A'000
	(f) other non-current assets	-	-
2.2	Proceeds from disposal of:		
	(a) entities	-	-
	(b) businesses	-	-
	(c) property, plant and equipment	-	-
	(d) investments	-	-
	(e) intellectual property	-	-
	(f) other non-current assets	-	-
2.3	Cash flows from loans to other entities	-	-
2.4	Dividends received (see note 3)	-	-
2.5	Other (provide details if material)	-	-
2.6	**Net cash from / (used in) investing activities**	**(13)**	**(13)**

3.	**Cash flows from financing activities**		
3.1	Proceeds from issues of equity securities (excluding convertible debt securities)	-	-
3.2	Proceeds from issue of convertible debt securities	-	-
3.3	Proceeds from exercise of options	-	-
3.4	Transaction costs related to issues of equity securities or convertible debt securities	-	-
3.5	Proceeds from borrowings	-	-
3.6	Repayment of borrowings	-	-
3.7	Transaction costs related to loans and borrowings	-	-
3.8	Dividends paid	-	-
3.9	Other (provide details if material)	-	-
3.10	**Net cash from / (used in) financing activities**	**-**	**-**

4.	**Net increase / (decrease) in cash and cash equivalents for the period**		
4.1	Cash and cash equivalents at beginning of period	23,317	23,317
4.2	Net cash from / (used in) operating activities (item 1.9 above)	(1,959)	(1,959)
4.3	Net cash from / (used in) investing activities (item 2.6 above)	(13)	(13)

Consolidated statement of cash flows		Current quarter $A'000	Year to date (3 months) $A'000
4.4	Net cash from / (used in) financing activities (item 3.10 above)	-	-
4.5	Effect of movement in exchange rates on cash held	-	-
4.6	**Cash and cash equivalents at end of period**	**21,345**	**21,345**

5.	Reconciliation of cash and cash equivalents at the end of the quarter (as shown in the consolidated statement of cash flows) to the related items in the accounts	Current quarter $A'000	Previous quarter $A'000
5.1	Bank balances	1,800	772
5.2	Call deposits	19,545	22,545
5.3	Bank overdrafts	-	-
5.4	Other (provide details)	-	-
5.5	**Cash and cash equivalents at end of quarter (should equal item 4.6 above)**	**21,345**	**23,317**

6.	Payments to related parties of the entity and their associates	Current quarter $A'000
6.1	Aggregate amount of payments to related parties and their associates included in item 1 * The above payments relate to fees and salaries paid to Directors during the quarter.	165
6.2	Aggregate amount of payments to related parties and their associates included in item 2	-

Note: if any amounts are shown in items 6.1 or 6.2, your quarterly activity report must include a description of, and an explanation for, such payments.

7.	**Financing facilities** *Note: the term "facility' includes all forms of financing arrangements available to the entity.* *Add notes as necessary for an understanding of the sources of finance available to the entity.*	**Total facility amount at quarter end $A'000**	**Amount drawn at quarter end $A'000**
7.1	Loan facilities	-	-
7.2	Credit standby arrangements	-	-
7.3	Other (please specify)	-	-
7.4	**Total financing facilities**	**-**	**-**

7.5	**Unused financing facilities available at quarter end**	n/a

7.6 Include in the box below a description of each facility above, including the lender, interest rate, maturity date and whether it is secured or unsecured. If any additional financing facilities have been entered into or are proposed to be entered into after quarter end, include a note providing details of those facilities as well.

n/a

8.	**Estimated cash available for future operating activities**	**$A'000**
8.1	Net cash from / (used in) operating activities (item 1.9)	(1,959)
8.2	Cash and cash equivalents at quarter end (item 4.6)	21,345
8.3	Unused finance facilities available at quarter end (item 7.5)	-
8.4	Total available funding (item 8.2 + item 8.3)	21,345

8.5	**Estimated quarters of funding available (item 8.4 divided by item 8.1)**	10.9 quarters

Note: if the entity has reported positive net operating cash flows in item 1.9, answer item 8.5 as "N/A". Otherwise, a figure for the estimated quarters of funding available must be included in item 8.5.

8.6 If item 8.5 is less than 2 quarters, please provide answers to the following questions:

8.6.1 Does the entity expect that it will continue to have the current level of net operating cash flows for the time being and, if not, why not?

Answer: n/a

8.6.2 Has the entity taken any steps, or does it propose to take any steps, to raise further cash to fund its operations and, if so, what are those steps and how likely does it believe that they will be successful?

Answer: n/a

8.6.3 Does the entity expect to be able to continue its operations and to meet its business objectives and, if so, on what basis?

Answer: n/a

Note: where item 8.5 is less than 2 quarters, all of questions 8.6.1, 8.6.2 and 8.6.3 above must be answered.

Compliance statement

1 This statement has been prepared in accordance with accounting standards and policies which comply with Listing Rule 19.11A.

2 This statement gives a true and fair view of the matters disclosed.

Date: ..... 27 October 2023.....

Authorised by: ..... By the Board.....
(Name of body or officer authorising release – see note 4)

Notes

1. This quarterly cash flow report and the accompanying activity report provide a basis for informing the market about the entity's activities for the past quarter, how they have been financed and the effect this has had on its cash position. An entity that wishes to disclose additional information over and above the minimum required under the Listing Rules is encouraged to do so.

2. If this quarterly cash flow report has been prepared in accordance with Australian Accounting Standards, the definitions in, and provisions of, *AASB 107: Statement of Cash Flows* apply to this report. If this quarterly cash flow report has been prepared in accordance with other accounting standards agreed by ASX pursuant to Listing Rule 19.11A, the corresponding equivalent standard applies to this report.

3. Dividends received may be classified either as cash flows from operating activities or cash flows from investing activities, depending on the accounting policy of the entity.

4. If this report has been authorised for release to the market by your board of directors, you can insert here: "By the board". If it has been authorised for release to the market by a committee of your board of directors, you can insert here: "By the [*name of board committee – eg Audit and Risk Committee*]". If it has been authorised for release to the market by a disclosure committee, you can insert here: "By the Disclosure Committee".

5. If this report has been authorised for release to the market by your board of directors and you wish to hold yourself out as complying with recommendation 4.2 of the ASX Corporate Governance Council's *Corporate Governance Principles and Recommendations*, the board should have received a declaration from its CEO and CFO that, in their opinion, the financial records of the entity have been properly maintained, that this report complies with the appropriate accounting standards and gives a true and fair view of the cash flows of the entity, and that their opinion has been formed on the basis of a sound system of risk management and internal control which is operating effectively.