

ASX Announcement ([ASX: AXE](#))

26 July 2022

Fourth Quarter Activities Report and Appendix 4C

For the three months ending 30 June 2022

Significant Activities

- The Company is well capitalised with approximately \$26.4 million cash and no debt.
 - Archer expands on its ¹²CQ quantum chip technology patent protection in the US, China, South Korea, and Japan, and Europe, with a patent grant in Australia.
 - Complex nanodevices fabricated in first step towards qubit readout. The nanodevices will be used to perform quantum measurements that fundamentally link to qubit operation.
 - The Company continued its focus on developing advanced semiconductor design, fabrication, and prototyping, by achieving 15 nanometre feature size fabrication.
 - Archer actively and regularly pursuing exposure to global industry participants in the US relevant to quantum computing and lab-on-a-chip biochip technology.
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Archer Materials Limited (“Archer”, the “Company”, “[ASX: AXE](#)”) is pleased to provide its Quarterly Activities Report and Appendix 4C for the three months ending 30 June 2022 (“Quarter”).

Commenting on fourth quarter activities, Greg English, Executive Chairman of Archer, said, “The granting of the Australian Patent provides Archer with exclusive and legally enforceable commercial rights to the ¹²CQ chip invention in Australia. Patent approval is essential as it effectively protects the ¹²CQ chip technology and prevents others from copying, making, or selling our devices in Australia”.

“Control and readout devices are required to set Archer’s ¹²CQ qubit and read the qubit stored on the carbon nanosphere. During the Quarter, we successfully fabricated nanodevices that will allow probing of quantum behaviour in the ¹²CQ qubit material. The nanodevice fabrication is the first step towards the readout of quantum states.”

“In April, we announced progress with the Company’s biochip through the fabrication of 15 nanometre (nm) size biochip features. The achievement of 15 nm feature size represents a minimum threshold of what is required for the development of Archer’s biosensor technology and paves the way toward Archer’s goal of miniaturisation below 10 nm.”

“Prior to COVID restrictions, Archer board and management regularly held meetings with shareholders. The easing of COVID restrictions during the Quarter allowed the Company to recommence shareholder meetings. The shareholder events were held in Adelaide, Melbourne and Sydney and were well attended.”

Quarterly Activities to 30 June 2022

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. The Company is progressing the development of its ^{12}CQ quantum computing qubit processor chip (“ ^{12}CQ chip”) and ‘lab-on-a-chip’ biochip technology (“biochip”).

Technology development and commercialisation activities

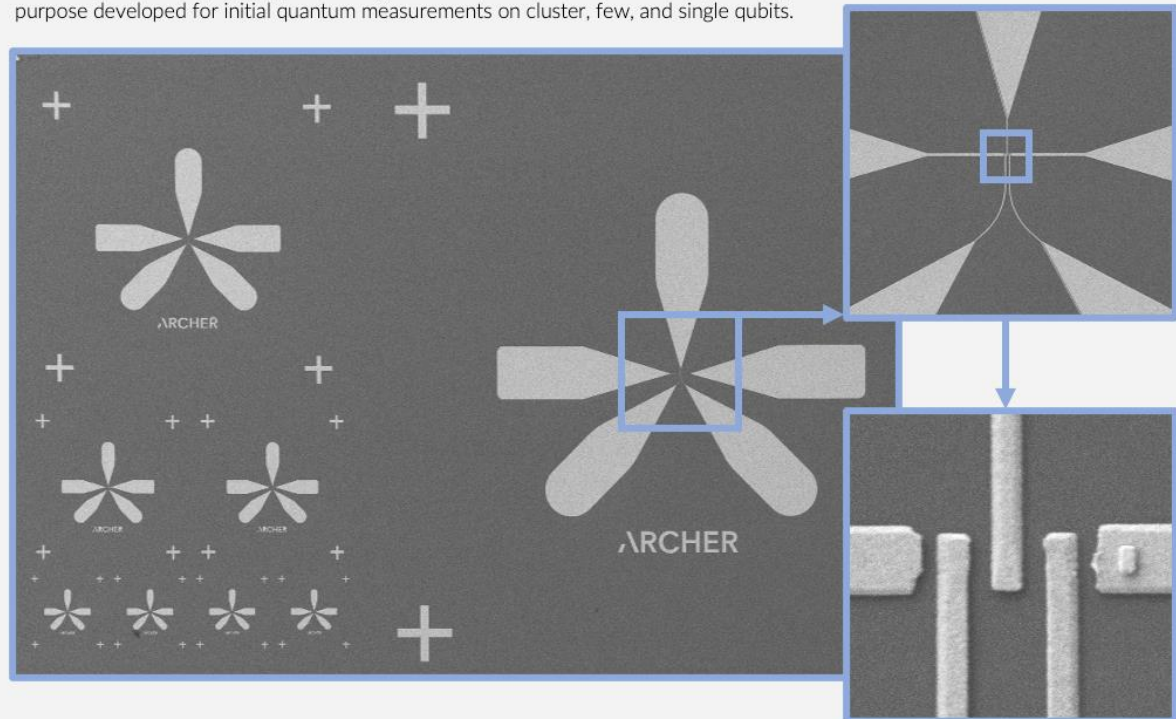
^{12}CQ Chip

Archer’s ^{12}CQ chip is a world-first qubit processor technology the Company is developing that would allow for mobile quantum computing powered devices. Archer has now successfully fabricated nanodevices that will allow probing of *quantum* behaviour in its qubit material that is of fundamental importance to the ^{12}CQ chip technology operation (Image 1).

Significant innovation is required to produce the nanodevices. The nanodevice fabrication reported (ASX ann. [20 June 2022](#)) is the first step towards the readout of quantum states from few and single qubits used in Archer’s ^{12}CQ technology.

Nanofabrication was performed using state-of-the-art lithography and specialised software, to obtain feature sizes compatible with a few to single qubits. The fabrication process is repeatable and reproducible at scale, solving challenges related to complex nanodevice proximity effects and the on-chip integration of micron and nanometre size features.

Image 1. An example of typical electronic nanodevices fabricated towards qubit readout. The complex features, that appear as a lighter shade, are of various sizes and proximity, purpose developed for initial quantum measurements on cluster, few, and single qubits.



During the Quarter, the Company expanded on its ¹²CQ chip technology patent protection in the US, China, South Korea, Japan, and Europe with an Australian patent grant (Patent No. 2016363118) (Exhibit 1) (ASX ann. [23 May 2022](#)).

The granting of the Australian Patent represents a significant early-stage milestone in Archer's development of the ¹²CQ chip and provides Archer with exclusive and legally enforceable commercial rights to the ¹²CQ chip invention in Australia. The protection provided by the Australian patent system gives Archer the right to stop others from manufacturing, using and/or selling the ¹²CQ chip technology invention in Australia, and is required for any possible future Australian commercialisation operations.

Exhibit 1. Description of Archer's technology patents and patent applications

Filing Date	Technology Summary
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3 Dec 2015	<p>■ A quantum electronic device. Quantum electronic devices for processing qubits represented by an electron spin on a new type of carbon nanomaterial and methods for using this material in quantum computing.</p>
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Stage & Coverage	Patent/Application Number
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Granted

Japan	6809670
South Korea	10-2288974
China	4606612
United States of America	11126925
Europe	3383792
Australia	2016363118

Pending

Hong Kong	18115770.4
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15 Feb 2019	<p>■ Graphene complexes and compositions thereof. Complexes comprising graphene compositions, methods of synthesising these complexes and compositions, and the use of these complexes and compositions in biomolecular sensing.</p>
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Stage & Coverage	Patent/Application Number
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Pending

Australia	2020220236
United States of America	17429442

1 Dec 2021	<p>■ Detection and quantification of nucleic acids.</p>
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Stage & Coverage	Patent/Application Number
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Provisional Patent

Australia	2021903898
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31 Mar 2022	<p>■ Fabrication and processing of graphene electronic devices on silicon with a SiO₂ passivation layer.</p>
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Stage & Coverage	Patent/Application Number
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Provisional Patent

Australia	2022900845
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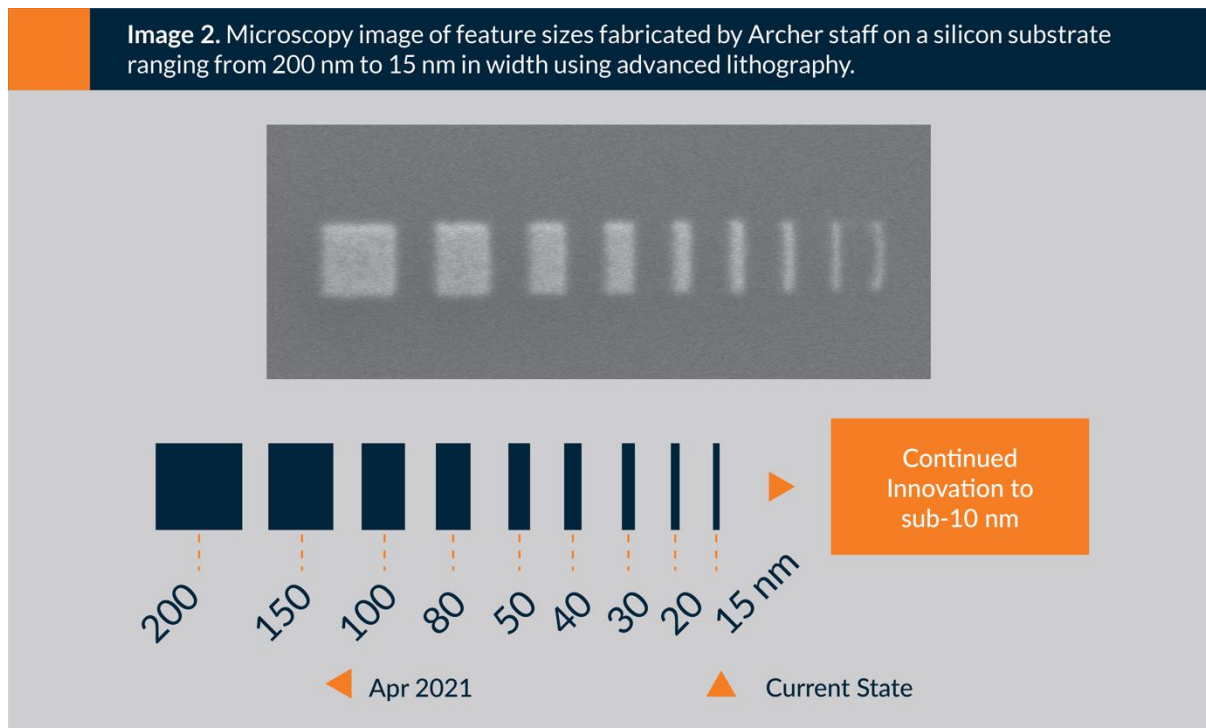
Patent Family

■ ¹²CQ chip ■ Biochip

Archer’s Biochip

Archer’s biochip is a unique graphene-based technology that the Company is developing to enable the complex detection of some of the world’s most deadly communicable diseases. Archer is currently focused on micro- and nano-fabrication of the biochip device components and combining these components with biologically relevant reactions to detect diseases. Archer owns 100% of the biochip technology intellectual property (Exhibit 1).

Archer has now successfully fabricated 15 nm features reproducibly and reliably by developing and implementing several advanced lithographic processes (Image 2). Archer has achieved miniaturisation from 200 nm down to 15 nm by developing several advanced lithography processes. The achievement of 15 nm paves the way to miniaturisation below 10 nm. The aim of developing sub-10 nm size biochip features representing the current ‘best-in-class’ in the semiconductor industry



The work is a significant technical achievement as the advanced lithography semiconductor fabrication processes are complex, requiring precision engineering to reach lateral control over a feature size of 15 nm (corresponding in this work to approximately 100 atoms). The significant reduction of feature size would potentially allow for billions of sensors on Archer’s biochip.

Miniaturisation of device components is an incremental process with each reduction in feature size requiring new and optimised lithography processes of increasing complexity. The extreme miniaturisation would give Archer greater flexibility and higher integration density in its lithographic processes for the design and fabrication of its technology.

Archer’s biochip design principles include the micro- and nano-fabrication of integrated sensing devices in regions of a chip that work alongside other fabricated functional regions *on the same chip* to process, detect and analyse biological specimens.

Advanced lithography processes performed in a semiconductor foundry are required to fabricate and integrate various features as part of a nanoelectronic device and the work done by Archer to fabricate 15 nm biochip features is an important step in the potential future operation of Archer's biochip.

Commercial agreements

During the Quarter, the Company concluded participation in the IBM Startup Program ("Program") which is designed to foster the quantum computing startup community through access to the IBM Quantum Network. During the past 12 months, Archer has made considerable progress in developing our ¹²CQ chip and as a result the Company is viewed as a genuine quantum hardware company rather than a "startup" company.

Archer has moved beyond (i.e. graduated) the Program however, the Company will continue to access IBM's quantum computing expertise and resources and open-source Qiskit software and developer tools. The Company is in discussions with IBM about participation in other programs and will announce the outcomes of these discussions in due course.

During the quarter, the Company concluded its participation in the Graphene Enabled Industry Transformation Hub with the University of Adelaide ("Graphene Hub"). Archer joined the Graphene Hub over four years ago to investigate opportunities for the manufacture of graphene from the Campoona graphite project. The Graphene Hub project has completed meaning that Archer is no longer a part of the Graphene Hub.

Financial update

The Company's cash balance at the end of the Quarter was \$26,464,000.

The Company holds 1,633,944 shares (post share consolidation on a 1 for 4 basis in May 2022) in Canadian Stock Exchange listed Volatus Capital Corp (CSE:VC) and 11,571,119 shares in ASX listed ChemX Materials Ltd (ASX:CMX). Subsequent to the end of the quarter the Company acquired 2,892,780 quoted options in CMX, being the Company's full entitlement pursuant to the CMX Entitlement Issue Prospectus dated 30 May 2022 (Loyalty Options Offer).

Archer's accompanying Appendix 4C cashflow report for the quarter includes \$94,000 at item 6.1, relating to executive and non-executive director fees paid as salaries and wages.

Corporate

Issued Capital

Date	Shares	Options
Start of Quarter	247,567,207	35,750,000
New issues during Quarter	900,000 ⁽¹⁾	Nil
Options Exercised/forfeited during Quarter	Nil	900,000 ⁽¹⁾
End of Quarter	248,467,207	34,850,000
Date of this Report	248,467,207	34,850,000

(1) Exercise of unlisted options, exercisable at \$0.1511 by 31 March 2023.

Stakeholder events and outreach

Archer has recently been, and is actively and regularly pursuing exposure to global industry participants in the markets relevant to quantum computing and lab-on-a-chip biochip technology, to potentially foster connections with future partners, including at significant industry specific events that help inform Archer's tech development.

During the Quarter, Archer staff attended the [Quantum.Tech Conference](#) in Boston, US, and the [BIO International Convention](#) in San Diego, US. The Company also held shareholder events in Adelaide, Melbourne, and in Sydney (ASX ann. [26 April 2022](#)).

The Company electronically distributed a number of Newsletters and Commentary to shareholders during the Quarter, and featured in media, including:

- [CEO Commentary](#): Australian Missile Corporation selected for Guided Weapons Program
- [Newsletter](#): Solving 'on-chip' challenges for integrating quantum materials.
- [Newsletter](#): Archer well-funded, progressing on strategy
- [CEO Commentary](#): Preparing the trusted internet for the age of quantum computing
- [Newsletter](#): Australian patent protection granted for 12CQ quantum tech
- [Presentation](#): Archer shareholder and investor event presentation
- [Presentation](#): Goldman Sachs Emerging Tech Series
- [The Australian](#): Archer takes a quantum leap with processing technology

About Archer

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

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>

YouTube:

<https://bit.ly/2UKBBmG>

Sign up to our Newsletter:

<http://eepurl.com/dKosXI>

Appendix 4C

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

Name of entity

Archer Materials Limited

ABN

64 123 993 233

Quarter ended ("current quarter")

30 June 2022

Consolidated statement of cash flows	Current quarter \$A'000	Year to date (12 months) \$A'000
1. Cash flows from operating activities		
1.1 Receipts from customers	-	30
1.2 Payments for		
(a) research and development (exclusive of wages allocated to R&D)	(1,291)	(1,622)
(b) product manufacturing and operating costs	-	-
(c) advertising and marketing	-	-
(d) leased assets	(1)	(10)
(e) staff costs	(539)	(2,072)
(f) administration and corporate costs	(160)	(1,139)
1.3 Dividends received (see note 3)	-	-
1.4 Interest received	3	13
1.5 Interest and other costs of finance paid	-	-
1.6 Income taxes paid	-	-
1.7 Government grants and tax incentives	-	489
1.8 Other (provide details if material)		
1.9 Net cash from / (used in) operating activities	(1,988)	(4,311)

2. Cash flows from investing activities		
2.1 Payments to acquire or for:		
(a) entities	-	-
(b) businesses	-	-
(c) property, plant and equipment	(17)	(19)
(d) investments		
(e) intellectual property	(33)	(120)

Consolidated statement of cash flows	Current quarter \$A'000	Year to date (12 months) \$A'000
(f) other non-current assets	-	-
2.2 Proceeds from disposal of:		
(a) entities	-	-
(b) businesses	-	-
(c) property, plant and equipment	-	45
(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	(50)	(94)

3. Cash flows from financing activities		
3.1 Proceeds from issues of equity securities (excluding convertible debt securities)	-	25,000
3.2 Proceeds from issue of convertible debt securities	-	-
3.3 Proceeds from exercise of options	136	620
3.4 Transaction costs related to issues of equity securities or convertible debt securities	-	(990)
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	136	24,630

4. Net increase / (decrease) in cash and cash equivalents for the period		
4.1 Cash and cash equivalents at beginning of period	28,366	6,239
4.2 Net cash from / (used in) operating activities (item 1.9 above)	(1,988)	(4,311)
4.3 Net cash from / (used in) investing activities (item 2.6 above)	(50)	(94)

Appendix 4C
Quarterly cash flow report for entities subject to Listing Rule 4.7B

Consolidated statement of cash flows		Current quarter \$A'000	Year to date (12 months) \$A'000
4.4	Net cash from / (used in) financing activities (item 3.10 above)	136	24,630
4.5	Effect of movement in exchange rates on cash held	-	-
4.6	Cash and cash equivalents at end of period	26,464	26,464

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	1,419	1,821
5.2	Call deposits	25,045	26,545
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)	26,464	28,366

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.	94
6.2	Aggregate amount of payments to related parties and their associates included in item 2	-
<i>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.</i>		

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

7. Financing facilities	Total facility amount at quarter end \$A'000	Amount drawn at quarter end \$A'000
<i>Note: the term "facility" includes all forms of financing arrangements available to the entity.</i>		
<i>Add notes as necessary for an understanding of the sources of finance available to the entity.</i>		
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)	(1,988)
8.2 Cash and cash equivalents at quarter end (item 4.6)	26,464
8.3 Unused finance facilities available at quarter end (item 7.5)	-
8.4 Total available funding (item 8.2 + item 8.3)	26,464
8.5 Estimated quarters of funding available (item 8.4 divided by item 8.1)	13.31 quarters
<i>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.</i>	
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	
<i>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.</i>	

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: 26 July 2022.....

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.