

29 April 2021

## QUARTERLY ACTIVITIES REPORT Quarter Ended 31 March 2021

Zeotech Limited (ASX: ZEO, “Zeotech” or “the Company”) an emerging mineral processing technology company provides the following quarterly update and commentary for the March 2021 quarter.

### HIGHLIGHTS

- Intellectual Property Assignment Relating to Zeolite Mineral Processing Technology Completed;
- Executed UQ Research Agreement ‘Carbon Capture using Synthetic Zeolites’;
- Synthetic Zeolite Pilot Plant Program Commences; and
- Successful capital raising of \$1.7 million.

### SYNTHETIC ZEOLITE MINERAL PROCESSING TECHNOLOGY

#### *Intellectual Property Assignment Relating to Zeolite Mineral Processing Technology Completed*

Zeotech advised on 7 December 2020<sup>1</sup> that binding terms within the exclusive global licence agreement<sup>2</sup> executed on 6 April 2020 with UniQuest included clauses which had been triggered based on the successful achievement of certain conditions by Zeotech, enabling Zeotech to give notice to UniQuest requesting the assignment of the Licensed IP, which facilitate the transfer of ownership of the Licensed IP to Zeotech.

On 29 January 2021 Zeotech and UniQuest executed the Deed of Assignment that formed part of the Licence Agreement and paid the \$500,000 Assignment Fee. All rights, title, and interest in the Licensed IP (free of any encumbrances) have been legally assigned to Zeotech from UniQuest.

The ownership of the Licensed IP by Zeotech is a major step for the Company, offering Zeotech shareholders and potential commercial partners the assurance that the Licensed IP is owned directly by the Company, without any encumbrances, beyond Zeotech’s ongoing obligation to pay royalties and performance milestone shares (or cash equivalent) to UniQuest.

Zeotech considers the ability to produce high value zeolites from low value mineral and/or zero-cost mine tailing/process residues is a compelling advantage and will enable higher margin monetization of Abercorn kaolin, which is an optimal feedstock for zeolite production using the patent-pending mineral processing technology.

<sup>1</sup> Refer to ASX announcement dated 07/12/2020 “Notice of Assignment of Intellectual Property”

<sup>2</sup> Refer to ASX announcement dated 07/04/2020 “Exclusive Licence Agreement to Produce Synthetic Zeolite”

### ***Executed UQ Research Agreement ‘Carbon Capture using Synthetic Zeolites’***

On 8 February 2021, the Company executed a dedicated research agreement with The University of Queensland (“UQ”) to evaluate the performance of synthetic zeolites in the field of carbon capture, a market that is projected to reach USD 6.15 billion by 2027.<sup>3</sup>

Zeotech is leveraging its novel and proprietary mineral processing technology for the low-cost synthesis of synthetic zeolites to deliver economically feasible environmental management solutions for carbon capture and conversion.

The carbon capture research program commenced in March 2021 and will be carried out over a nine-month period. The program will consist of the following stages:

1. **Characterisation of synthetic zeolites and commercial adsorbents** – this will involve building a database of different types of the synthetic zeolites and commercial adsorbents, following their characterisation, and comparing properties;
2. **Carbon dioxide adsorption capacity and selectivity measurement** – this will involve measuring and comparing the carbon dioxide (CO<sub>2</sub>) adsorption capacity of the synthetic zeolites and commercial adsorbents. The synthetic zeolites selectivity of CO<sub>2</sub> over other gases such as N<sub>2</sub> will also be investigated; and
3. **Granulation study of synthetic zeolite products** – this will involve an agglomeration study of synthetic zeolites will be carried out in this stage. The preparation process of the synthetic zeolite agglomerate will be explored, and the carbon capture performance of these bulk adsorbents will be evaluated.

Zeotech’s carbon capture research program will also incorporate detailed economic analysis of:

- a) The use of different synthetic zeolites produced by Zeotech and the commercial adsorbents for carbon capture and selectivity; and
- b) Granulation of synthetic zeolite products and the commercial adsorbents for carbon capture and selectivity.

The Company is planning to expand its carbon capture program by exploring CO<sub>2</sub> conversion technologies, which utilize captured CO<sub>2</sub> to produce value-added chemicals, through hydrogenation of CO<sub>2</sub> process using synthetic zeolites as catalysts.

### ***Synthetic Zeolite Pilot Plant Program Commences***

During the quarter, the Company committed to the development and construction of a pilot plant and is undertaking an extensive test-work-program to further optimise the flowsheet of the Company’s low-cost synthetic zeolite manufacturing technology to de-risk future commercial investment.

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<sup>3</sup> Verified Market Research “Carbon Capture and Storage Market Size & Forecast Report to 2027”

## Highlights

- The pilot plant will allow Zeotech to produce customer-scale samples of suitable quantities of synthetic zeolite product for potential end users for:
  - product application testing to assist negotiating off-take agreements; and
  - to support commercial plant project financing;
- The pilot plant research program is fully funded, and expenditure is eligible for the R&D tax rebate;
- The pilot plant research program will be supported by researchers from The University of Queensland's School of Chemical Engineering ("UQ") and commissioning of the pilot plant is expected in the fourth quarter of 2021;
- The pilot plant will increase confidence and certainty for the technology's flowsheet design and operational performance of the circuit before committing to full scale commercial production; and
- The pilot plant will incorporate artificial intelligence (machine learning) to enhance understanding and application of piloting results, by building a comprehensive dataset and predictive capabilities.

Following the positive outcomes of extensive lab-scale work undertaken by researchers from UQ, since lodging a core provisional patent application in June 2019, for the manufacture (synthesis) of synthetic zeolites from kaolin or clay-based materials i.e., mine tailings or process residues, Zeotech has committed to undertake a comprehensive pilot plant program.

The program will incorporate an artificial intelligence (machine learning) component to enhance understanding and application of piloting results, by building a comprehensive dataset and predictive capabilities.

The pilot plant will provide Zeotech with increased confidence and certainty on the engineered flowsheet design and operational performance of the process circuit before committing to commercial zeolite production facilities.

Zeotech's decision to proceed with the pilot plant is supported by continued positive lab-scale results delivered by research funded at UQ and based on the understanding that a well designed and constructed pilot plant is an integral component in the decision-making process required to determine critical economics and underpin future commercial plant strategy and financing.

The pilot plant program and associated data modelling should:

- Validate the patent-pending technology;
- Lower commercial plant project risk / verify process efficiency, yields and target grades;
- Support the findings and data generated throughout UQ bench-scale research;
- Finalise mass and energy balances;

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- Test variability of feed;
- Further optimise system design and capacity;
- Assist METSIM modelling to verify future production CapEx and OpEx requirements;
- Determine system limitations and optimise process design for continuous production;
- Reduce commercial financing risk;
- Develop standard operating procedures;
- Produce a range of synthetic zeolite products for test applications and verification; and
- Support commencement of a Pre-Feasibility Study (PFS).

The pilot plant should also demonstrate the efficiency of Zeotech's novel and proprietary mineral processing technology and proficiency of the process design by producing very high-grade material on a continuous, customer sample scale, basis.

The program's aim is to commission pilot plant in the December Quarter 2021.

### **Pilot Plant Funding**

As announced on 5 January 2021<sup>4</sup>, the Company raised \$1.7m to support funding of the pilot plant program. It is important to note that as the pilot plant research program revolves around validating Zeotech's patent-pending technology, it is classified as Research and Development and accordingly it will be eligible for the Australian Government's R&D tax incentive scheme.

### **Zeotech targeting Type A zeolites**

The Company's novel and proprietary mineral processing technology provides potential access to the A\$2.6 billion global Type A zeolite market<sup>5</sup>, with a focus on high value molecular sieve zeolites, which achieve prices in excess of A\$2,850 per tonne.

Type A molecular sieves are used in the following industries:

- Steel Industries;
- Petrochemical Industries;
- Refineries;
- Agricultural Industries (Soil amendment and Animal Feed);
- Cryogenic Air Separation Units;
- Pharmaceutical (Bulk Drug);
- Paint Processing;
- Insulating Glass Industries;
- Polyurethane Process; and
- Waste-Water Treatment.

### ***Expansion of in-house technical resources***

During the quarter, Zeotech continued to grow its in-house technical team, with the employment of Dr. John Vogrin on a full-time basis. Dr Vogrin has a PhD in Chemical

<sup>4</sup> Refer to ASX announcement 05/01/2021 "Placement Secures \$1.7m to Advance Company's Zeolite Project"

<sup>5</sup> Aranca: Global Analysis 4A detergent grade and 3A, 4A and 5A molecular sieves grade Nov 2020

Engineering from The University of Queensland and is Alumina Quality Workshop scholar.

Dr. Vogrin has recently submitted his thesis on the hydrothermal synthesis of zeolites in industrial processes such as the Bayer process and anion incorporation into their structure.

Dr. Vogrin's expertise includes XRD (quantitative/qualitative), ICP, XRF, FE-SEM, TGA, PSD and UV-Raman spectroscopy for materials characterisation. His latest publication is 'Influence of Chloride on Sodium Aluminosilicate Solubility in Bayer Liquor'. He holds a Bachelor of Engineering (B.E.) in Chemical and Metallurgical Engineering (Honours).

## THE ABERCORN PROJECT

The Abercorn Project is a large-scale kaolin prospect, located in central Queensland and has demonstrated it contains a resource of significant scale, and a very consistent, high quality grade of kaolinite mineralisation.

The resource remains open in all directions with less than circa 10% of the Project area being drilled, leaving potential for substantial future upgrade.

The total number of holes drilled into the project is now 86 for a total of 3,172m.

- Large scale mineralised system from surface;
- 86 RC holes drilled - kaolinite intersected in every hole;
- Resource remains open in all directions;
- Low-cost operation - straight forward open cut mining;
- Little to no overburden;
- Low impurities;
- Mains power on site / major power transmission line within 5km of site; and
- Large water supply nearby and within EPM.

The Abercorn Project is situated approximately 135km south of the deep-water port of Gladstone and 125km west of the deep-water port of Bundaberg in central Queensland. Both major ports are connected to the Abercorn Project by sealed roads. The Burnett highway bisects the tenements.

No on-groundwork was undertaken during the quarter.

## KRAAIPAN PROJECT, BOTSWANA

### *Kraaipan Gold-Nickel-Copper-PGM Project*

Zeotech's 100% owned Kraaipan Gold-Nickel-Copper-PGM Project comprises Prospecting Licence, PL232/2016 and covers approximately 50 kilometre strike extent of the Kraaipan Greenstone Belt in southern Botswana. The Kraaipan Project is part of the larger NNW trending Amalia-Kraaipan-Greenstone-Terrane ('AKGT') of the Kaapvaal Craton. The AKGT in Botswana is directly along strike from significant gold deposits, as well as adjacent to significant PGM deposits, across the border in South Africa.

No on-groundwork was undertaken during the quarter.

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## CORPORATE

- In January, the Company completed a \$1.7 million placement at \$0.05 per share to sophisticated and professional investors. The placement was strongly supported by existing major shareholders and investors.

Proceeds from the Placement will be used to:

- Further advancing the Group's zeolite pilot plant program; and
  - Further expand research opportunities to enhance and develop diverse commercial applications of the novel and proprietary mineral processing technology.
- On 12 January 2021, Mr John Goody resigned as a non-executive director of the Company.
  - On 12 March 2021, the Company's Chair, Sylvia Tulloch, presented to the ShareCafe 'Clean & Green' Hidden Gems Webinar. Ms Tulloch discussed the important role zeolites play in a cleaner and safer environment and cleantech applications that Zeotech is seeking to develop by leveraging novel and proprietary zeolite technologies.

## APPENDIX 5B – QUARTERLY CASH FLOW REPORT

The cash position of the Company on 31 March 2021 was \$2.659 million.

### *Details of mining exploration activities*

Details of exploration activities during the quarter are set out above.

Exploration and evaluation expenditure for the quarter comprised Abercorn resource evaluation work \$16,000 and rents, rates, tenement management and miscellaneous expenses \$1,000. Other associated R&D project costs were \$534,000.

### *Details of mining production and development activities*

No production and development activities were undertaken during the quarter.

### *Details of related party payments*

The aggregate amount of payments to related parties and their associates included in the current quarter Cash flows from operating activities were \$96,000, comprising director salaries (inclusive of superannuation), directors fees and consulting fees.

This Announcement has been approved by the Board.

- End -

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## About Zeotech

Zeotech Limited (ASX: ZEO) is a Queensland based company that is focusing on the development of innovative materials technology solutions, using the unique adsorbent and catalytic properties of synthetic zeolites. Zeotech holds novel and proprietary technologies for the low-cost production of synthetic zeolites developed by The University of Queensland.

Zeotech aspires to improve environmental outcomes by building on the potential of its proprietary mineral processing technology to be applied as a commercial remediation solution, capable of utilising suitable mine/process tailings as zero-cost feed for low cost production of high value zeolites. In addition, it is exploring the development of economically viable carbon capture and conversion solutions, revolving around the economic benefit of low-cost adsorbents produced using Zeotech's patent-pending technology.

## About Zeolites

Synthetic zeolites are manufactured aluminosilicate minerals with a sponge-like structure, made up of tiny pores (frameworks) that make them useful as catalysts or ultrafine filters. They are commonly known as molecular sieves and can be designed to selectively adsorb molecules or ions dependant on their unique construction and have the ability to be regenerated over and over again for re-use (recycled).

Zeolites play an important role in a cleaner and safer environment.

- zeolites are an effective substitute for harmful phosphates in powder detergent, now banned in many parts of the world because of blue green algae toxicity in waterways;
- as catalysts, zeolites increase process efficiencies = decrease in energy consumption;
- zeolites can act as solid acids and reduce the need for more corrosive liquid acids;
- zeolites adsorbent capabilities see them widely used in water treatment i.e., heavy metal removal including those produced by nuclear fission; and
- as redox catalyst sorbents, zeolites can help remove exhaust gases and CFC's.

## Forward-looking Statements

This release may contain certain forward-looking statements with respect to matters including but not limited to the financial condition, results of operations and business of Zeotech and certainty of the plans and objectives of Zeotech with respect to these items.

These forward-looking statements are not historical facts but rather are based on Zeotech current expectations, estimates and projections about the industry in which Zeotech operates, and its beliefs and assumptions.

Words such as "anticipates," "expects," "intends," "plans," "believes," "seeks," "estimates", "guidance" and similar expressions are intended to identify forward looking statements and should be considered an at-risk statement.

Such statements are subject to certain risks and uncertainties, particularly those risks or uncertainties inherent in the process of developing technology and in the endeavour of building a business around such products and services.

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These statements are not guarantees of future performance and are subject to known and unknown risks, uncertainties, and other factors, some of which are beyond the control of Zeotech, are difficult to predict and could cause actual results to differ materially from those expressed or forecasted in the forward looking statements.

Zeotech cautions shareholders and prospective shareholders not to place undue reliance on these forward-looking statements, which reflect the view of Zeotech only as of the date of this release. The forward-looking statements made in this announcement relate only to events as of the date on which the statements are made. Zeotech will not undertake any obligation to release publicly any revisions or updates to these forward-looking statements to reflect events, circumstances or unanticipated events occurring after the date of this announcement except as required by law or by any appropriate regulatory authority.





### Tenement Information as required by Listing Rule 5.3.3

The following is a table setting out the information as required by ASX Listing Rule 5.3.3, namely:

1. Mining tenements held at the end of the Quarter and their location;
2. Mining tenements disposed during the Quarter and location;
3. Beneficial percentage interests held in farm-in or farm-out agreements at end of Quarter; and
4. Beneficial percentage interests held in farm-in or farm-out agreements acquired or disposed of during the Quarter.

Location	Tenement	Interest at beginning of quarter (%)	Interests relinquished, reduced or lapsed (%)	Interests acquired or increased (%)	Interest at end of quarter (%)
Australia	EPM 19081	100%	Nil	Nil	100%
Australia	EPM 26837	100%	Nil	Nil	100%
Australia	EPM 26903	100%	Nil	Nil	100%
Australia	EPM 27427	100%	Nil	Nil	100%
Botswana	PL232/2016	100%	Nil	Nil	100%