13 November 2023

METHANE EMISSIONS CONTROL PROGRAM DELIVERS PROMISING OXIDATION EFFICIENCY

Emerging mineral processing technology company, Zeotech Limited (ASX: ZEO, "Zeotech" or "the Company") is pleased to provide an update on its methane emissions control program ("Program") at Griffith University ("Griffith").

The Program aims to develop zeolite-based technology to be deployed within the surface capping soil of landfills to eliminate methane emissions, mitigating a greenhouse gas which has 28 times the global warming potential of carbon dioxide[1].

HIGHLIGHTS

- Batch experiments display promising early methane oxidation efficiency of up to 70-80%.
- Methane oxidising bacteria are actively colonising and co-existing with the Company's zeoteCH$_4$™ products.
- Results to date show promise for stand-alone chemical oxidation at ambient temperature and pressure, which is contributing toward the overall effectiveness of zeoteCH$_4$™ as a practical methane abatement technology.
- The Program activities continue with an aim to further optimise and maximise oxidation efficiency of the Company's zeoteCH$_4$™ products through additional experimentation and design testing.

Griffith University, School of Environment and Science, Australian Rivers Institute, Dr Chris Pratt commented:

"We are very encouraged by the early methane oxidation efficiencies observed to date, not only through primary pathway of biological oxidation, but the additional process of chemical oxidation that is facilitated by Zeotech's zeolite-based materials.

We remain excited to be working on such a valuable project which could potentially contribute to Australia's pledge to reduce methane emissions by 30 per cent by 2030."

Zeotech, Chief Executive Officer, Scott Burkhart said:

"The promising early methane oxidation outcomes have exceeded our expectations and provides confidence that zeoteCH$_4$™ products have the potential to offer a compelling fugitive methane control solution.

[1] IPCC. Climate Change 2014: Synthesis Report 2014. 100-year global warming potential (GWP)

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The program continues to build important datasets and know-how, with novel aspects being developed which could further enhance the Company's intellectual property suite.

Zeotech would like to thank Dr. Chris Pratt and his team at Griffith University, for the accelerated effort and dedication required to deliver the exciting results achieved to date, and we are looking forward to the completion of activity B and making a decision to progress with the infield phase of the landfill methane control program."

Methane Emissions Control Program

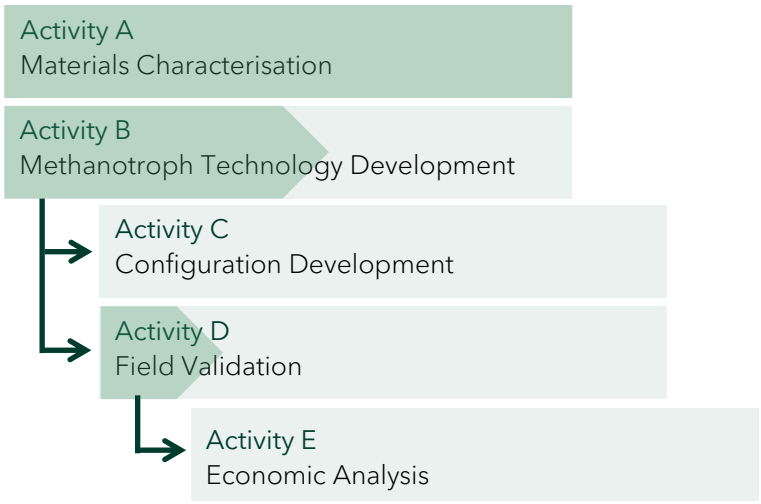

Figure 1 - Key activities under the Methane Emissions Control Program with the dark green indicating the approximate progress of each activity.

Program Background

The Program commenced at Griffith in February 2023, and aims to develop zeolite-based technology to be deployed within the surface capping soil of landfills to adsorb and eliminate methane emissions through a process of chemical or biological oxidation (or a combination thereof).

The Program has unlocked significant new knowledge, and similar to the Company's agri-soil product development program, it is taking practical steps to protect the intellectual property that is being generated.

Early research activity has focussed on collecting and evaluating the properties of the landfill capping soils gathered from the host site operated by industry partner, Cleanaway Waste Management. Four (4) field test plots measuring 20m^2 where the initial soil samples have been taken have been reserved at the host site for future field validation (activity D).

Analysis of the chemical methane and carbon dioxide adsorption capacities of the Company's targeted zeoteCH_4^{TM} products have been completed and efficient methane adsorption properties have been observed, which demonstrates that Zeotech's targeted products meet the first criteria for effective methane elimination.

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Methane Oxidation

The primary mechanism for methane abatement is expected to be from a process of biological oxidation.

Work undertaken during the Program aims to develop a biofilter for the soil by using the high surface area and adsorption properties of the Company's zeoteCH_4™ products to trap the methane emitted from the underlying refuse and provide a shelter for methane consuming bacteria named methanotrophs to mitigate methane emissions.

Bench-scale trials have shown that the presence of zeoteCH_4™ materials does not inhibit microbial growth, and that the microbes are actively colonising and co-existing with the zeoteCH_4™ products, which is an important step for pairing the zeolite materials with the methanotroph communities.

Of the four (4) methanotroph sources selected for activity B, two (2) have displayed high maximum oxidation rates and have been selected as the preferred candidates to inoculate the zeoteCH_4™ materials and advance biological oxidation experiments.

Whilst activity B is still in progress, early batch experiments have displayed promising oxidation efficiencies of 70-80% for two of the tested zeoteCH_4™ compounds, and all product formulations have achieved at least 50% oxidation.

These results complement the findings from the bench-scale trials and provide early evidence that methanotroph communities can develop on zeoteCH_4™ surfaces to the extent where they can offer promising methane oxidation rates.

Whilst biological oxidation is anticipated to be the main driver of methane elimination, the unique properties of the Company's targeted zeoteCH_4™ products also have the potential for catalysing chemical oxidation.

Results to date show promise for stand-alone chemical oxidation efficiencies of, on average, up to 15% at ambient temperature and pressure. This additional process is therefore contributing toward the overall effectiveness of the Company's zeoteCH_4™ products as a practical methane abatement technology.

Future Work

Upcoming activities will focus on approaches for inoculating the zeolite materials with methanotroph bacteria to optimise and maximise methane oxidation potential, together with adapting experiments under conditions that are closely aligned with anticipated field environment.

Whilst methane oxidation rates ranging between 70-80% are highly encouraging, activity B is still underway, and the best performing zeoteCH_4™ compounds that could advance to field validation are yet to be determined. Consequently, a decision to progress with activities C and D will be reserved until the conclusion of the current activities and provision of the associated progress report, which is expected by early Q1 2024.

The Program remains focused on landfill methane emissions. Concurrently, the Company is also evaluating the potential to apply its zeoteCH_4™ product more broadly as a methane abatement solution across other large industries including mining and agriculture.

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This announcement has been approved by the Board.

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About Zeotech

Zeotech Limited (ASX: ZEO) is a team of dedicated people, working together to build a future focused company, leveraging proprietary technology for the low-cost production of advanced materials 'manufactured zeolites' to deliver solutions aimed at addressing sustainability challenges.

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