ASX RELEASE

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TOPAZ MULLITE FIBRE RESEARCH AT THE UNSW

Chase Mining Corporation Limited ("CML" or "The Company") provides the following update on the collaborative topaz research project undertaken with the University of New South Wales ("UNSW") which has reached its termination date.

The research was undertaken by the Company's wholly owned subsidiary Topfibre Pty Ltd. as the industry partner and co-funded through an Australian Research Council (ARC) Linkage Grant.

The ARC project proposal was as follows:

> *The main aim of the project is to develop the means of fabricating single-crystal mullite fibres from Torrington topaz that are suitable for reinforcement of metal and ceramic matrix composites. As single-crystal mullite is the most sought-after fibrous additive but it is not available commercially, it is expected to attract an immediate clientele in laboratories and companies servicing the aviation industry and the military. A secondary commodity, which will utilise all of the fluorine by-product, is sodium silicofluoride, which is used widely in water fluoridation. This project will allow the very large deposit of topaz in Torrington, NSW to be used to develop a high-value niche product (fibres) and a large-volume, low-value product (fluoride).*

The project work concentrated on the development of single-crystal mullite fibres because this was complex and difficult while the recovery of sodium silicofluoride was relatively straightforward. Further, the work on fibre reinforcement was focussed on metal matrix composites (MMCs) as these represent a much larger market and the processing technology is less complex than for ceramic matrix composites (CMCs). However, it was recognised that there were some significant technical and commercial advantages to the fabrication of MMCs fabricated by metal infiltration of porous compacts. Consequently, the work was supplemented to investigate the feasibility of (a) fabrication of porous mullite preforms and (b) infiltration by promising metal alloys.

This work has resulted in the demonstration of proof-of-concept that Torrington topaz derived mullite-fibre reinforced composites can be processed into MMCs using different alloys suitable for different products. These applications include the automotive, mining, chemical, and military industries. Following this work, a range of commercial trajectories became apparent. In generally matched order of commercial potential and technical simplicity (high to low):

Fibres for Laboratory Development: As single-crystal mullite fibres long have been considered the holy grail of fibre reinforcements but they are not available commercially, there are literally hundreds, if not thousands, of industrial and research laboratories that are potential customers. However, this product would require coarsening of the fibres so that they are not respirable.

Impact and Wear Pads: The transfer of minerals by the mining industry during processing results in high deterioration rates of conveyancing systems. Small MMC tiles with aluminium infiltration, even with some residual porosity, are likely to have considerable commercial potential.

Brake Pads: The replacement of existing braking systems by copper-infiltrated mullite has considerable market potential. The metal must be pure copper owing to its high thermal conductivity. However, these MMCs must be fully dense.

Military Armour: The military industry is an important potential customer as cost is less important than performance. Small MMC tiles with aluminium infiltration are ideal for body, vehicular, and possibly aircraft armour as they are lightweight and have the potential to compete technically and economically with existing armour. It is critical for these to be fully dense.

Catalytic Convertors: Although the Palladium products are established in the automotive industry, this application is attractive because no precious metal is required, thus reducing the price significantly, and the engineering is relatively straightforward as it requires only sufficient gas flow rate. There are many other chemical processes that require catalytic convertors.

Filters: The chemical industries have little choice with high-temperature high-throughput filters. Again, as this product involves only a preform, the engineering would appear to be straightforward. However, early experimentation has shown that it is not easy to engineer a controlled pore size distribution.

It is noted that several of the applications highlighted above will require extensive industry 'live' testing.

Although the initial goal included Pilot Plant Design and commercial studies, no work in this area was formalised partly due to COVID-19 restrictions, but also due to lack of suitable equipment availability at the UNSW. Conceptually however, the design, even for full commercial production, is straightforward owing to the present programme's exposure of the key technical issues that must be overcome.

Synopsis: After receiving final copies of all the research reports from Professor Charles C Sorrell and the UNSW team of researchers involved in the project, the Company and its advisors have decided to seek either a financial or commercial partner to progress the proof of concept outcomes with the best commercial application potential. This process will commence soon.

This announcement has been authorised for release to the ASX by the CML Board of Directors.

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