

ASX RELEASE

6th September 2024

PROGRESS UPDATE ON 1 TON PER DAY FLASH JOULE HEATING DEMONSTRATION PLANT

HIGHLIGHTS:

- **Design Progress:** Detailed mechanical and process design of the 1 TPD Flash Joule Heating (FJH) demonstration plant currently underway. Design on track for completion by the end of 4Q 2024.
- **Construction Timeline:** Sourcing and construction to start in 1Q 2025, with commercial operation targeted by 2Q 2025.
- **Objectives:** The ultimate goal of the FJH technology commercialisation is to produce critical metals with lower carbon emissions, significantly reduced energy consumption, and substantially lower costs.
- **Strategic Partnerships:** Ongoing discussions with potential strategic and international partners, alongside active pursuit of non-dilutive funding.
- **Technology Applications:** The plant will be designed to process various feedstocks, including e-waste (gallium & precious metals), refractory minerals like spodumene (lithium), monazite (rare earths), pyrochlore (niobium); lithium & cobalt from 'black mass' battery waste; and alumina and titanium from 'red mud'.
- **Progress & Results:** Significant progress has been made with the development & testing so far, including successful conversion of spodumene to lithium chloride¹ & gallium recovery from semiconductor scrap².
- **Commercial Viability:** Demonstration plant is a key milestone in proving the commercialization of the FJH technology, and it has attracted strong interest for from testing to date.

MTM Critical Metals Limited (ASX: MTM) (MTM or the Company) is pleased to provide an interim update on the design and implementation of its 1 ton per day (TPD) Flash Joule Heating (FJH) demonstration plant. The detailed mechanical & process design work is being undertaken by KnightHawk Engineering (KnightHawk), a firm selected for its expertise across a range of engineering disciplines and experience with heat transfer equipment. KnightHawk was founded in 1991 and has a rich history of scaling-up innovative technology swiftly, with a client roster that includes industry giants such as Shell, ExxonMobil, Chevron, and NASA.

The 1 TPD demonstration plant is a critical milestone in proving the commercial viability of FJH technology, which has attracted strong interest from parties seeking to secure supply of strategic and critical metals, as well as those interested in more economical and efficient methods of metals recovery and mineral processing. The ultimate goal of MTM's FJH technology commercialisation is to produce critical metals with lower carbon emissions, significantly reduced energy consumption, and substantially lower costs.

¹ ASX:MTM ASX announcement dated 21/08/2024, 'Flash Joule Heating converts Spodumene to Lithium Chloride'.

² ASX:MTM ASX announcement dated 26/08/2024, 'Gallium successfully recovered from semiconductor waste using Flash Joule Heating'.

MTM Chief Executive Officer, Michael Walshe, commented *“The progress on our demonstration plant marks a significant step forward in the commercialisation pathway for the FJH technology. The strong interest from strategic partners & governmental agencies underscores the critical need for reliable strategic metal supplies and the adoption of innovative, efficient, and environmentally sustainable solutions. We remain committed to driving this project forward on schedule and are excited about the transformative potential it holds for the industry and our shareholders”.*

Demonstration Plant Schematic



Figure 1: Conceptual FJH 1 TPD Demonstration Plant.



Figure 2: Knighthawk Engineering, FJH Team, Houston Texas

Design and Process Overview

Drawing on the groundbreaking FJH research conducted at Rice University, KnightHawk Engineering is focused on scaling up the flashing process for a diverse range of feedstocks, including semiconductor scrap for gallium recovery, e-waste for the extraction of gold and other valuable metals, spodumene for lithium, and spent lithium-ion batteries ("black mass").

KnightHawk has successfully scaled the FJH process by approximately 100x during the prototype testing phase compared to lab testing thus far, covering a range of target metals including lithium and rare earth elements (REEs). The design phase is advancing well, incorporating insights from ongoing prototype testing.

The conceptual design of the Demonstration Plant includes multiple parallel process trains, each equipped with its own material handling system. The plant is designed for versatility, allowing for the processing of a wide range of feedstocks to recover critical metals. Central to the process is a downstream water-washing unit that leverages the solubility of metal chlorides to produce concentrated brines of target metals. Design work is looking to address, amongst other things, continuous material processing via a semi-batch management system, power control, atmosphere gas handling and metal isolation systems.



Figure 3: Conceptual 1 TPD Flash Joule Heating Pilot Facility – Inside the Plant

Strategic Importance of the Demonstration Plant

The 1 TPD demonstration plant will serve as a pivotal proof-of-concept, showcasing the scalability and commercial potential of the FJH technology. This facility will be capable of processing various feedstocks, making it an attractive proposition for potential partners concerned about supply security and interested in adopting the latest metal extraction technology advancements that deliver economic and environmental advantages.

Interest in this technology has been robust, driven by the pressing need to secure critical metal supplies and the desire to leverage innovative technologies that offer improved efficiency and a reduced environmental impact. The rapid progress made to date, particularly in spodumene conversion to lithium chloride and gallium recovery from semiconductor scrap, highlights the technology's promise and the Company's capability to deliver tangible results in the near term.

Next Steps:

The timeline for the project remains on track, with procurement and fabrication of the 1TPD unit slated for early 2025. The plant is expected to undergo testing and optimisation following the installation.

- **Completion of Design:** Targeting the end of Q4 2024.
- **Material Sourcing and Plant Construction:** Set to begin in Q1 2025.
- **Commercial Operations:** Expected by the end of Q2 2025.

The Company will continue its active engagement with potential strategic partners and international collaborators while exploring additional funding avenues to accelerate the commercialization of this transformative technology. Additionally, test work is completed, underway or planned on a range of additional sample streams including:

- **refractory minerals** such as spodumene (lithium), monazite (rare earths), & pyrochlore (niobium);
- **precious metal recovery** from e-waste; and
- **alumina & titanium recycling** from 'red mud'.

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

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Chief Executive Officer

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MTM Critical Metals Limited is a dynamic company with a dual focus on mineral exploration and metal recovery technology development. We hold exploration assets prospective for niobium (Nb), rare earth elements (REE), and gold, strategically located in Western Australia and Québec. Additionally, we possess exclusive licensing rights to the innovative Flash Joule Heating technology, a cutting-edge metal recovery and mineral processing method developed by esteemed researchers at Rice University, USA.

Flash Joule Heating (FJH) is an advanced electrothermal process that enhances metal recovery and mineral processing compared to traditional methods. By rapidly heating materials in a controlled atmosphere, FJH efficiently extracts metals like lithium from spodumene, gallium from scrap, and gold from e-waste, among others. This technology has the potential to revolutionise metal recovery by reducing energy consumption, reagent use, and waste, offering a more economical and environmentally friendly alternative.

MTM's West Arunta Nb-REE exploration assets are situated in one of Australia's premier exploration hotspots, where over \$60 million has been invested by ASX-listed companies such as WA1 Resources, Encounter Resources, Rio Tinto (in JV with Tali Resources), and IGO Limited. MTM also holds tenements in other key mineral regions across Western Australia, including the Mukinbudin Nb-REE Project, East Laverton Gold & Base Metals Project, and Mt Monger Gold Project. In Québec, the Pomme Project is a highly promising carbonatite intrusion rich in REE and niobium, located near the world-class Montviel deposit.

ABOUT KNIGHTHAWK ENGINEERING

KnightHawk was founded in 1991 and specializes in identifying high technology solutions in a short timeframe. They have executed projects throughout the United States, Europe, and Asia. Their clients range from individual entrepreneurs to the large industrial organisations such as Shell, Exxon Mobil, Chevron and NASA. They have a depth of experience and expertise and are leaders in design, failure analysis and troubleshooting across a range of engineering disciplines. KnightHawk was selected for its expertise across a wide range of disciplines and their focus on ensuring outcomes in a timely manner.

PREVIOUS DISCLOSURE

The information in this announcement is based on the following MTM Critical Metals Limited ASX announcements, which are all available from the MTM Critical Metals Limited website www.mtmcriticalmetals.com.au and the ASX website www.asx.com.au.

Date	Description
09 July 2024	Positive Lithium Extraction Results from flash Joule Heating
21 August 2024	Flash Joule Heating converts Spodumene to Lithium Chloride
26 August 2024	Gallium successfully recovered from semiconductor waste using Flash Joule Heating'

The Company confirms that it is not aware of any new information or data that materially affects the information included in the original ASX announcements and that all material assumptions and technical parameters underpinning the relevant ASX announcements continue to apply and have not materially changed. The Company confirms that the form and context in which the Competent Person's findings are represented have not been materially modified from the original ASX announcements.

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