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ASX : QEM

Julia Creek Project:

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ASX Announcement

4 April 2024

Vanadium pentoxide 99.93% purity recovered from industrial waste

Highlights:

- → **The University of Queensland (UQ) successfully completes Circular Economy project for QEM, extracting high purity (99.93%) vanadium pentoxide (V2O5) from Queensland industrial waste.**
- → **UQ confirms technically viable method of recycling spent catalyst to produce high-purity V2O5, the essential component of the electrolyte used in vanadium flow batteries.**
- → **The encouraging results lay foundations for optimisation and pilot-scale work.**

Critical minerals explorer and developer QEM Limited (ASX: QEM) (**QEM** or **Company**) is pleased to announce the successful extraction of vanadium pentoxide 99.93% pure (V2O5) from industrial waste and completion of process flowsheet in a small-scale laboratory setting.

These results complete the study carried out on the Company's behalf by The University of Queensland Hydrometallurgy Research Laboratories (UQ), part of the School of Chemical Engineering (Refer: ASX announcement 22 February 2024). The successful results set the groundwork to commence optimisation and pilot-scale work.

QEM supplied UQ with vanadium-bearing spent catalyst from Incitec Pivot Limited's Mount Isa Sulphuric Acid Plant (Refer: ASX announcement 27 June 2023). UQ concluded that an acid leach followed by solvent extraction, crystallisation and calcining is a technically viable method of recycling spent catalyst to produce high-purity V2O5.

Vanadium electrolyte is one of the critical components of vanadium flow batteries (VFB) for long-duration energy storage, complementing renewable electricity generation. The purity of the electrolyte has an impact on the electrochemical performance and life of the battery. Using high-purity vanadium is key to increasing battery performance, capacity and efficiency. High-purity means free from impurities and chemical residue that can often be left behind and negatively impact the electrochemical stability, charging and discharging, and ultimately battery life.

QEM Managing Director Gavin Loyden stated, "UQ has been an optimal partner for QEM to build out our knowledge and experience in optimising vanadium beneficiation to further improve vanadium pentoxide yields for our flagship Julia Creek Project.

"QEM first engaged UQ's Sustainable Minerals Institute (UQ SMI) in September 2022 in mineral characterisation and beneficiation work on ore drilled at our Julia Creek critical minerals project and now UQ's Hydrometallurgy Research Laboratories have successfully upcycled industrial waste to produce high purity V2O5. With UQ's assistance, QEM seeks to accelerate the introduction of Queensland-sourced and processed V2O5 into the market.

"This Queensland-based circular economy project with UQ strengthens our ESG credentials to seek innovative ways of fulfilling our environmental and social responsibilities as a junior explorer. QEM remains committed to its goal of supplying V2O5 from our primary vanadium resource at Julia Creek," said Mr Loyden.

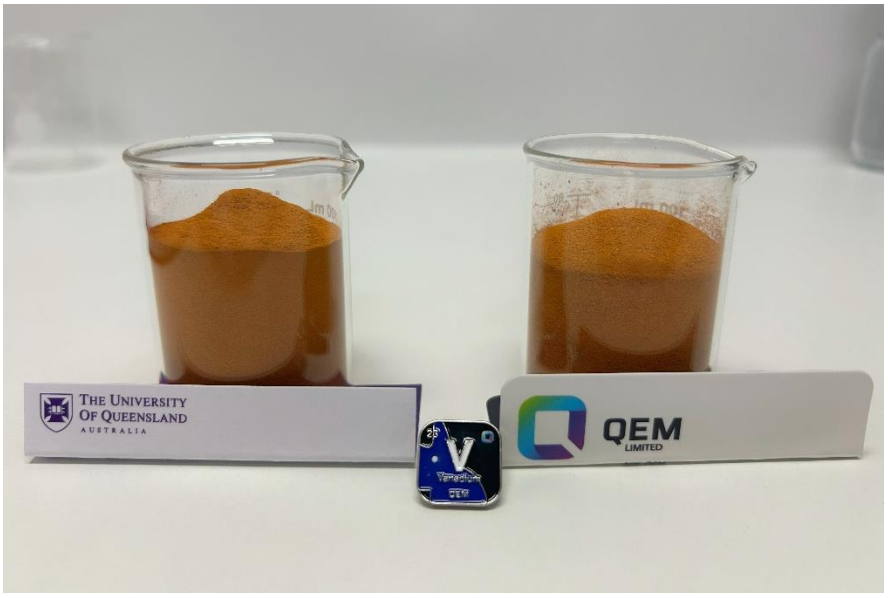

Figure 1 - High purity (99.93%) vanadium pentoxide (V2O5) extracted from Queensland industrial waste at The University of Queensland.

UQ assayed the three produced batches in duplicate by Digestion and Inductively Coupled Plasma Optical Emission Spectroscopy (ICP-OES). Accounting for solids dilution and ICP calibration range, the Limits of Detection (LOD) were set at 100ppm (0.01%). The elements identified above LOD range are shown in Table-1 below while 26 other elements presented below Limit of Detection values (Al, Ar, B, Ba, Bi, Ca, Cd, Co, Cr, Cu, K, Li, Mg, Mo, Na, Ni, P, Pb, S, Sb, Si, Sn, W, Y, Zn, Zr).

	As	Fe	Mn	Ti	V	V_2O_5
C01-1	0.01	0.01	*<0.02*	0.05	55.90	99.93
C01-2	0.01	0.01	*<0.02*	0.06	56.03	99.93
C02-1	0.02	0.02	0.02	0.06	55.57	99.88
C02-2	0.02	0.02	0.02	0.06	54.76	99.88
C03-1	*<0.01*	0.01	0.06	0.03	53.40	99.90
C03-2	*<0.01*	0.01	0.06	0.03	56.50	99.90

Table 1 - ICP assays of three produced batches (C01 to C03) in duplicate. All values in %; only elements with at least one measurement above LOD are listed here. While vanadium pentoxide was not measured directly with these methods, the inferred value was calculated from measured elemental vanadium.

ENDS

This announcement was authorised for release on the ASX by the Board of QEM Limited.

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ABOUT QEM

QEM Limited (ASX: QEM) is a publicly listed company which is focused on the exploration and development of its flagship Julia Creek Project, covering 250km² in the Julia Creek area of North Western Queensland.

The Julia Creek vanadium and oil shale project is a unique world class resource with the potential to utilise and deliver innovative and sustainable energy solutions, through the production of energy fuels and vanadium pentoxide. QEM strives to become a leading producer of liquid fuels and in response to a global vanadium deficit, also aims to become a global supplier of high-quality vanadium pentoxide, to both the nascent energy storage sector and the Australian steel industry.

This globally significant JORC (2012) Mineral Resource of 2,870 Mt @ 0.31% V2O5 is one of the single largest ASX listed vanadium resources and represents a significant opportunity for development. The resource is comprised of 461Mt @ 0.28% V2O5 in the Indicated category and 2,406Mt @ 0.31% V2O5 in the Inferred category, with the added benefit of a contingent (SPE-PRMS 2018) in-situ oil resource of 6.3 MMBBls of Oil equivalent in the 1C category, 94MMBBls in the 2C category, and 654MMBBLs in the 3C category, contained within the same ore body.

The tenements form part of the vast Toolebuc Formation, which is recognised as one of the largest deposits of vanadium and oil shale in the world and located less than 6km east of the township of Julia Creek. In close proximity to all major infrastructure and services, the project is intersected by the main infrastructure corridor of the Flinders Highway and Great Northern Railway, connecting Mt Isa to Townsville.

**The information in this announcement that relates to the mineral resource and contingent resource estimates for the Company's Julia Creek Project was first reported by the Company in its IPO prospectus dated 20 August 2018 and supplementary prospectus dated 12 September 2018 (together, the "Prospectus") and the subsequent resource upgrade announcements ("Resource Upgrade") dated 14 October 2019, 7 April 2022 and 5 March 2024. The Company confirms that it is not aware of any new information or data that materially affects the information included in the Prospectus and Resource Upgrade, and in the case of estimates of Mineral Resources and Contingent Resources, that all material assumptions and technical parameters underpinning the estimates in the Prospectus and Resource Upgrade continue to apply and have not materially changed.*

Forward Looking Statements

This announcement contains certain forward looking statements which have not been based solely on historical facts but, rather, on QEM's current expectations about future events and on a number of assumptions which are subject to significant uncertainties and contingencies many of which are outside the control of QEM and its directors, officers and advisers.

The information contained within this announcement relates to a small-scale laboratory demonstration of all the processing steps in recycling spent vanadium-bearing catalysts into a high purity vanadium oxide product. For the avoidance of any doubt, this announcement does not contain any public report of Exploration Results, Mineral Resources or Ore Reserves for the purposes of the JORC Code (2012)