ASX ANNOUNCEMENT

7 September 2026

Bayan
Mining and Minerals Limited

BAYAN'S RARE EARTH PROCESSING TECHNOLOGY ACHIEVES UP TO 14X YTTRIUM CONCETRATION AND 2X PURITY UPGRADE IN UQ BENCH-SCALE TESTWORK

Highlights

- **Up to 14x increase in yttrium concentration and 2x purity upgrade compared with the other rare earths from a synthetic heavy rare earth feed solution (Run 6):** Bench-scale ion exchange resin-column test work achieved fourteen-fold increase in yttrium concentration and 2x purity upgrade compared with the feed solution via loading and weak acid (10 g/L HCl) stripping elution.
- **Up to 2x yttrium upgrade purity via exclusion during loading, along with 1.7x upgrade in associated weak acid strip (Run 5):** Resin-column test-work showed yttrium from a concentrated mixed rare earth solution is preferentially excluded during the loading stage resulting in a two-fold increase yttrium purity upgrade in the loading column effluent.
- **Yttrium selectivity behaviour demonstrated across multiple test conditions:** Yttrium separation consistently observed across the initial six column runs with a greater degree of separation observed under higher samarium content, slower column flowrates and at 70°C (for loading) and at ambient room temperature (30°C) for stripping.
- **Independent UQ testwork supports patented separation mechanism:** The six column trials confirmed yttrium-selective behaviour consistent with the novel ion-exchange separation method covered by the Colorado School of Mines patent exclusively licensed to Bayan.
- **Yttrium is essential for data centres and AI build-out:** Yttrium underpins AI and data centre infrastructure build-out through its use in ultra-high temperature thermal barrier coatings.
- **Feedstock sourcing expands commercial pathway:** Bayan intends to source additional MREC and HREE concentrate feeds from Australian and international developers to widen the technology's applicability across ore types.
- **Program led by recognised hydrometallurgy experts:** The program will be led by Professor James Vaughan and UQ's Hydrometallurgy Research Group, which has extensive expertise in ion exchange, hydrometallurgy and critical minerals processing.

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- **Technical data to support future pilot-scale assessment and development:** The phase 1 research program is designed to generate the technical data required to assess future pilot-scale test work and further development opportunities for the Yttrium Upgrade Technology.
- **Research partnership established with The University of Queensland:** Bayan has entered into a research agreement with The University of Queensland ("UQ") to advance Bayan's exclusively licensed Yttrium Upgrade Processing Technology Patent US10696562B2 (the "Yttrium Upgrade Patent") *(see ASX Announcement dated 1 July 2026)*, originally developed at the Colorado School of Mines *(see ASX Announcement dated 10 December 2025).*

Bayan Mining and Minerals Ltd (ASX: BMM; "BMM", "Bayan" or "the Company") is pleased to announce the initial results from bench-scale test work under its Phase 1 Research Program at the University of Queensland ("UQ"), using Bayan's licensed Yttrium Upgrade Technology (US Patent 10,696,562 B2) (the "Yttrium Upgrade Technology").

The test work achieved up to a two-fold increase in yttrium assemblage purity upgrade from a representative synthetic mixed rare earth feedstock in the loading stage, and up to a fourteen-fold increase in yttrium concentration in the stripping eluate from a representative synthetic heavy rare earth feedstock.

The Yttrium Upgrade Technology, originally developed at the Colorado School of Mines ("Mines") and now exclusively licensed to Bayan, utilises an iminodiacetic acid (IDA) functionalised resin in an ion-exchange process to separate yttrium from mixed rare earth solution.

Chief Executive Officer, Nathan Kong commented:

"This bench-scale program delivers the first independent validation of Bayan's licensed Yttrium Upgrade Technology, demonstrating its ability to selectively upgrade yttrium purity from a representative mixed rare earth feed solution, achieving up to a two-fold purity increase in the loading stage effluent, and a 14x yttrium concentration increase in the initial stripping elution from a representative synthetic heavy rare earth feedstock.

These results confirm the commercial potential of the technology to improve yttrium supply at a time when yttrium demand is accelerating on the back of AI and data centre infrastructure build-out.

We plan to expand the program across additional mixed and heavy rare earth feed compositions to broaden its commercial application and generate the technical data needed for a potential pilot-scale program."

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Yttrium is a critical ingredient in the AI and data centre build-out

Yttrium is used globally in catalysts, ceramics, electronics, lasers, metallurgy and phosphors, including advanced applications such as gas turbine thermal barrier coatings and semiconductor manufacturing equipment relevant to AI and data-centre chip production. Global supply is highly concentrated: the U.S. Geological Survey (USGS) reports that China supplied 93% of U.S. yttrium compound imports between 2020 and 2023, with nearly all yttrium metal and compounds derived from mineral concentrates processed in China[1].

Since China introduced export licensing on yttrium and six other medium and heavy rare earths in April 2025, yttrium oxide prices outside China have risen roughly 140-fold, according to Argus data cited by Reuters, with shipments of yttrium, dysprosium and terbium remaining around 50% below pre-control levels[2]. This supply disruption underscores the strategic and commercial importance of new, ex-China sources of separated yttrium, an opportunity Bayan's licensed Yttrium Upgrade Technology is designed to address.

Yttrium Upgrade Technology via Ion-Exchange

Ion exchange resin is an established technology in hydrometallurgical processes. It is used industry-wide, alongside solvent extraction, to separate mixed rare earth streams into individual high-purity elements and is increasingly applied to recover rare earths from secondary and waste sources. It is also a standard step in uranium recovery from mining and metallurgical process solutions, and in removing residual base and heavy metals from mine-affected waters. This broad, proven industrial track record underpins the reliability of Bayan's approach to yttrium recovery.

Bayan's licensed Yttrium Upgrade Technology is a two-stage process, involving loading and stripping metal onto and from the resin. The technology is engineered to selectively concentrate and purify yttrium from a mixed rare earth stream, facilitating the recovery of an yttrium by-product and upgrading the residual rare earths. The process is built around a specialised resin, comprising three-dimensional macroporous polymer beads functionalised with iminodiacetic acid (IDA), that preferentially binds other rare earth elements ahead of yttrium from solution.

In the loading stage, a mixed rare earth liquor, containing light rare earths, yttrium and other rare earth elements such as samarium and gadolinium, is passed through a column

[1] U.S. Geological Survey, Mineral Commodity Summaries 2025 — Yttrium chapter (January 2025)
[2] The Oregon Group, "Rare Earth prices surge as China keeps export restrictions" (10 June 2026), citing Argus data reported by Reuters, https://theoregongroup.com/commodities/rare-earths/rare-earth-prices-surge-as-china-keeps-export-restrictions/

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packed with the IDA resin. As the weak acid liquor (pH 2-5) flows through the column, the resin selectively captures rare earth element cations in exchange for acid, while excluding yttrium.

In the stripping stage, also referred to as elution, an acid solution (pH <2) is passed through the same column which selectively releases yttrium that had bonded to the resin. Because the resin releases yttrium more easily than the other elements, the recovered solution is enriched in yttrium relative to the original feed. As loading and stripping operate as a single, modular process step, the technology is designed to be integrated into an existing rare earth separation circuit without requiring a full redesign of the underlying flowsheet, supporting a capital-efficient pathway to a dedicated yttrium product stream.

Refer to Figure 1 for a schematic of Bayan's Yttrium Upgrade Technology flowsheet.

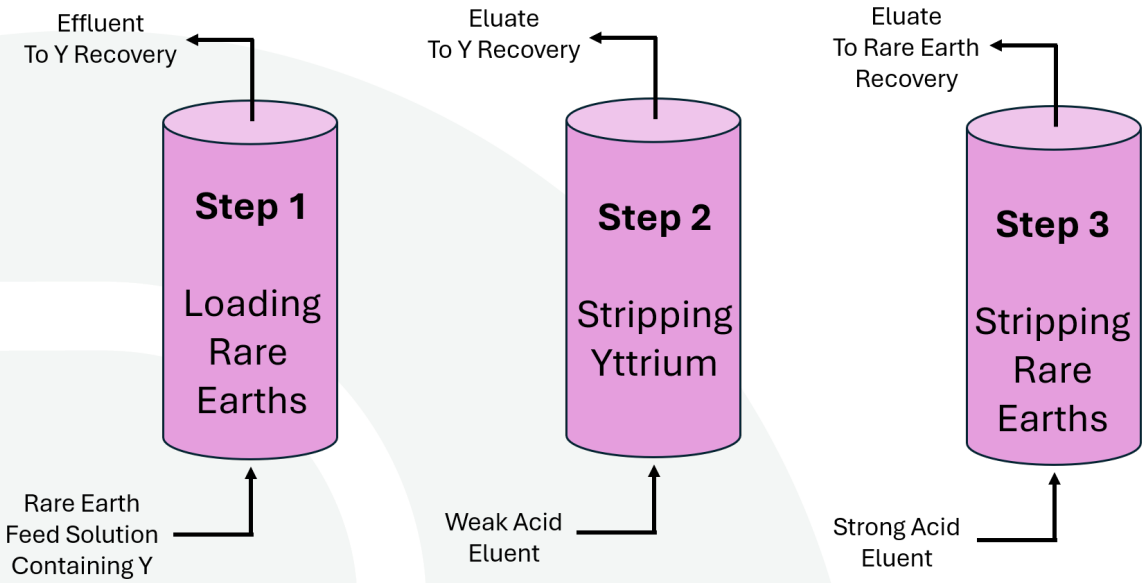

Figure 1: The Yttrium Upgrade Technology flowsheet, showing the resin ion-exchange column process that separates yttrium from mixed rare earths

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Phase 1 Research Program Status

Bayan has completed six ion-exchange column test runs ("Runs") to date under the Phase 1 Research Program. Each Run passes rare earth-bearing liquid through an IDA-functionalised resin engineered to selectively bind rare earth elements, a step known as loading, before acid is used to release and recover the elements for analysis, a step known as stripping.

Run 1 established the baseline using rare earth liquid sourced from the Mary Kathleen tailings ("MK Liquor"). Runs 2 to 5 used a synthetic feed created by adding yttrium, samarium and gadolinium to the MK Liquor to match the mixed rare earth feedstock of prospective customers.

Runs 3 to 5 varied loading and stripping temperatures and flow rates against Run 2 to identify the conditions that deliver the best yttrium separation. Run 6 used a synthetic heavy rare earth element ("HREE") leach liquor to test yttrium separation under a different feedstock. Full Run conditions and the rare earth composition of each feedstock are set out in Appendix A.

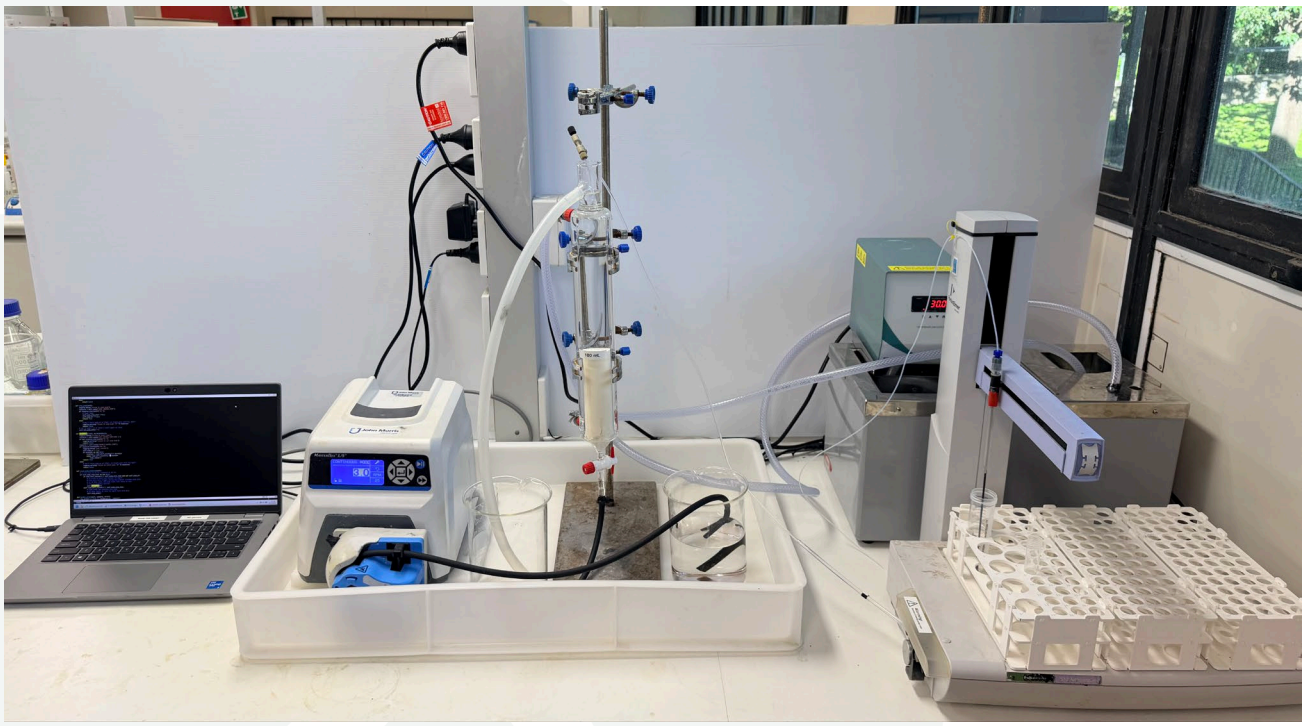

Figure 2: Ion exchange resin experimental set-up. A flow-calibrated peristaltic pump drives solution from the feed reservoir through the bottom of the column and out the top, where a computer-controlled auto-sampler extracts samples at set intervals and collects column effluent and eluate from the same exit point. A continuously circulating hot water bath maintains temperature in the water-jacketed column.

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Initial Yttrium Separation and Upgrade Results

The Company's Yttrium Upgrade Technology has demonstrated upgrading yttrium purity into the loading stage effluent, with the potential to increase yttrium concentration and purity at two key stages of the process.

In the column loading step, yttrium is selectively excluded from bonding to the resin in the ion-exchange column, while in the column stripping step, yttrium is preferentially released using dilute hydrochloric acid (HCl). This dual-stage effect is significant, as it indicates the Yttrium Upgrade Technology may be able to concentrate yttrium at multiple points in the process. In the column loading step specifically, yttrium exclusion was highest when the concentrated rare earth solution was passed through the resin ion-exchange column at 70°C at a flow rate of 2 bed volumes per hour for loading and 30°C at flow rate of 2 bed volumes (Bv)[3] per hour for stripping as demonstrated in Run 5.

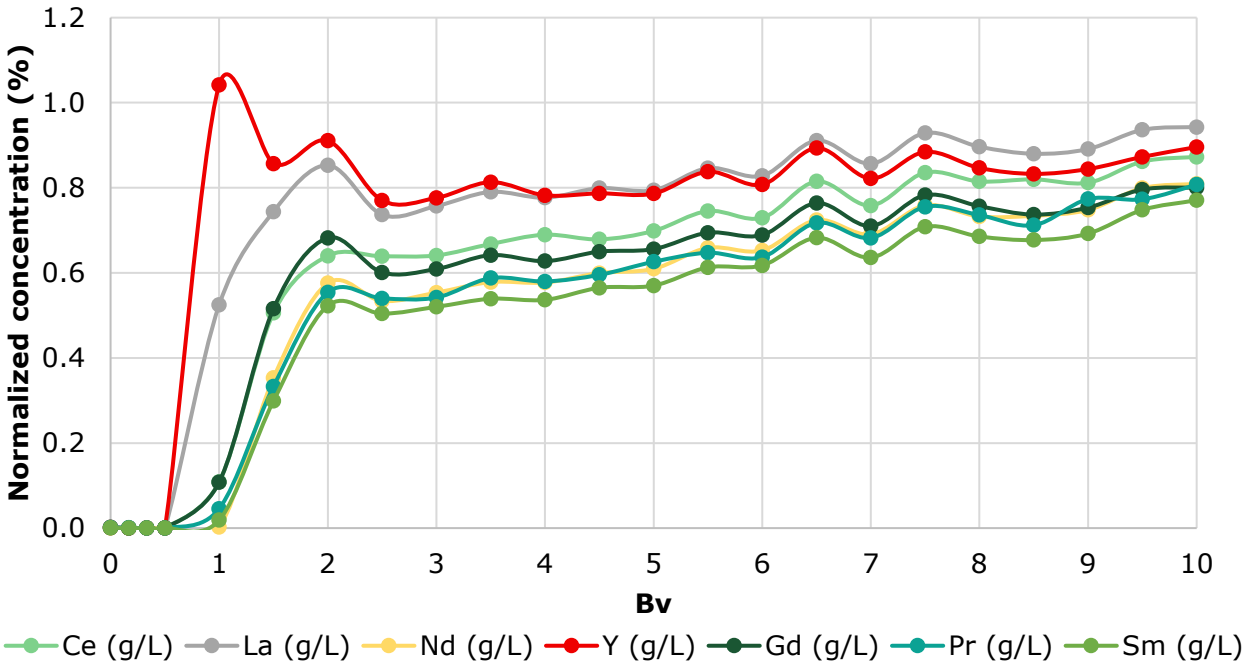

Figure 3: Run 5 Normalised (with respect to feed solution where 1.0 is the element concentration in the feed solution) REE concentration in loading stage effluent.

[3] A bed volume (Bv) is simply the volume of resin packed inside the column, in these experiments, 100 mL. Measuring flow in "bed volumes per hour" (Bv/h) tells you how many times that resin's own volume worth of liquid passes through it every hour, a simple way to compare test results fairly, whether the column is a small lab-scale tube or a much larger commercial unit. In Run 5, for example, a flow rate of 2 Bv/hour equalled 200 mL/hour, meaning the 10 Bv loading experiment ran for five hours in total. Notably, yttrium showed a significant exclusion effect within just the first two bed volumes of liquid passed through the column, compared with the other rare earth elements, which loaded onto the resin to a much greater extent.

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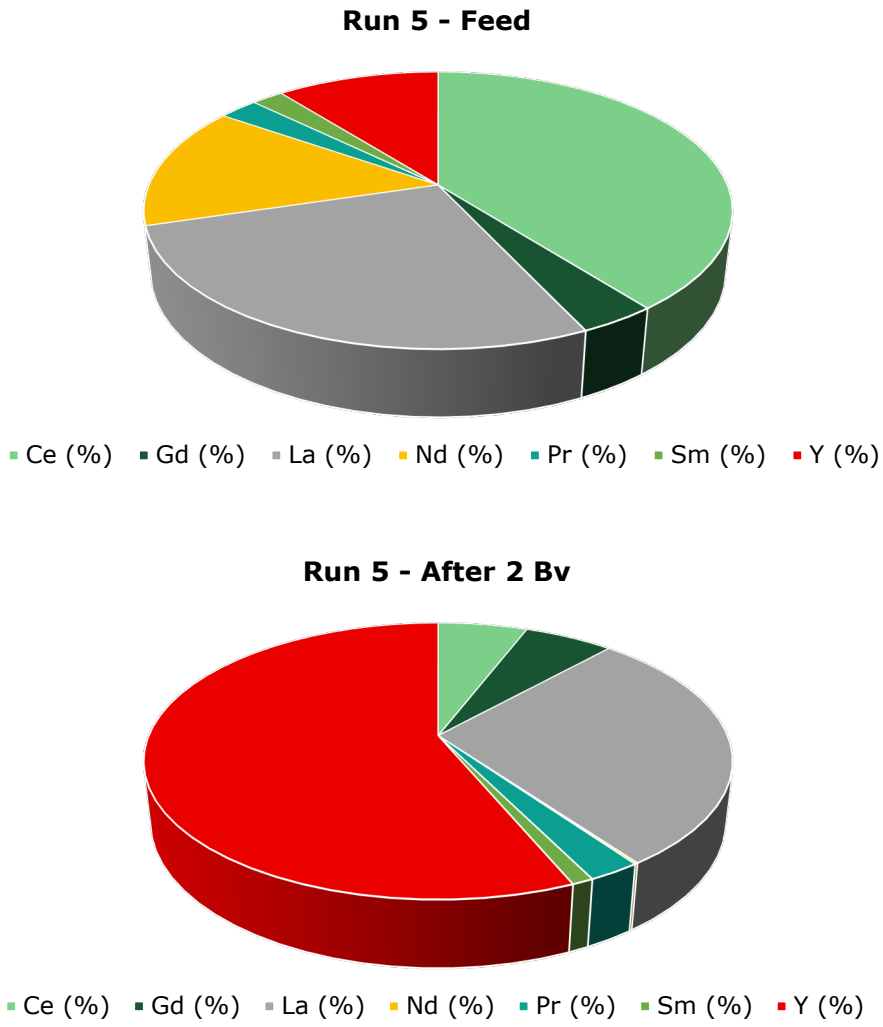

Figure 4: Comparison of yttrium fraction (%) in the feed (pH = 4), and in the effluent after 1 Bv for Run 5, at 70 °C and 2 Bv/h.

The resin stripping stage from Run 6 shows selective yttrium elution from the other HREEs using a dilute (10 g/L HCl) acid solution. Yttrium concentration in the selective (weak acid) eluate represents 87% of the TREE, with an increase in concentration of 14x when compared with the feed from the column during loading. This increase in concentration represents a 2x yttrium purity upgrade compared to the feed solution.

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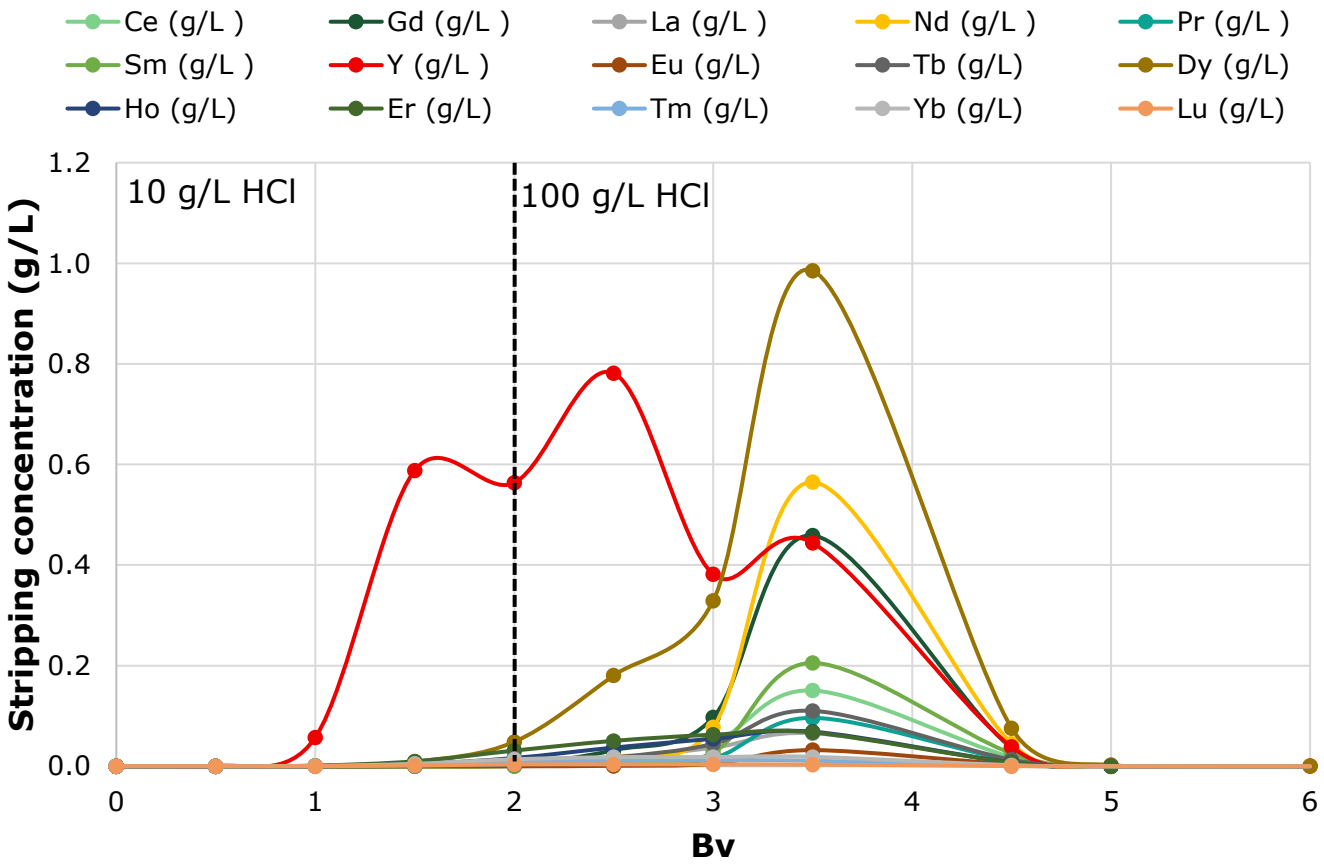

Figure 5: Run 6 column stripping at 30°C and 2 Bv/h using different acid concentrations. Yttrium strips off preferentially and early, delivering a yttrium-enriched eluate.

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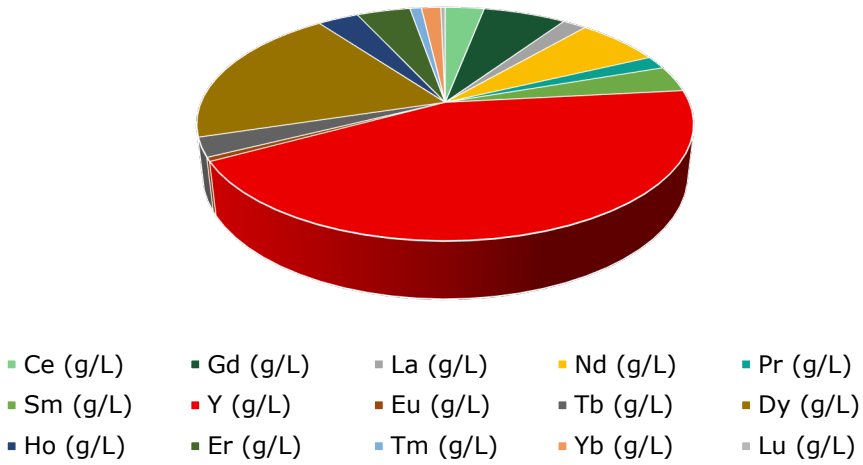
Resin Loading Feed Solution Composition - Run 6



Resin Stripping Weak Acid Eluate Solution Composition - Run 6

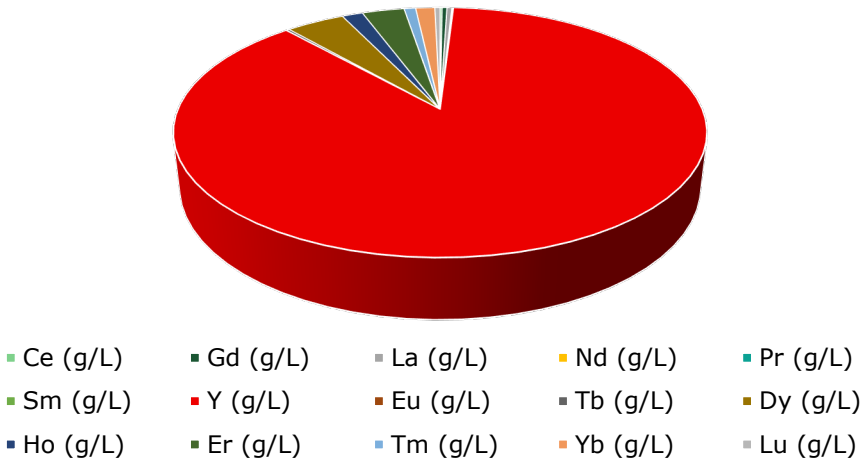


Figure 6: Comparison of yttrium concentration in the feed (pH = 4) for Run 6, and column stripping at 10 g/L.

A summary of the Run results to date and run conditions are summarised below in Table 1. The full set of assays over the course of the Runs are detailed in Appendix B.

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Run #	REE feedstock solution	Yttrium % of REE feedstock	Yttrium % in loading effluent	Yttrium upgrade in first 2 Bv of effluent (vs TotalREE)	Yttrium on column prior to stripping (vs TotalREE)	Yttrium in weak acid strip (vs Total Y)	Yttrium upgrade factor in weak acid stripping (Y/TotalREE)
1	MK Liquor (Baseline)	-	-	-	-	-	-
2	MK Liquor+ Y, Sm, Gd	11%	7%	1.3x	7%	9%	1.3x
3			9%	0.6x	9%	14%	1.5x
4			8%	2.0x	8%	7%	0.9x
5*			8%	2.0x	8%	13%	1.7x
6*	HREE mix synthetic solution	44%	45%	-	45%	88%	2.0x

*Table 1: Summary of column loading and elution results. *Sampling frequency increased.*

Effect of temperature and flow rate

Runs 2 to 5 tested the effects of temperature and flow rate. The Company has determined that a slower flow rate combined with a higher loading temperature (70°C) delivers the best yttrium exclusion. For stripping, a lower temperature (30°C) and a higher flow rate (5 Bv/h) increase the yttrium purity upgrade factor, with further testwork to confirm the optimal elution flow rate.

Pathway to Commercialisation

Bayan plans to secure additional mixed rare earth carbonate (MREC) and HREE concentrate feeds from Australian and international rare earth developers, broadening the range of ore types and REE assemblages against which the technology is tested and widening its potential customer base beyond the representative synthetic feedstocks used in the Phase 1 Research Program to date.

The technical data generated under the Phase 1 Research Program is designed to inform the design basis, scale and configuration of a subsequent pilot-scale program. As loading and stripping operate as a single, modular process step, the technology is designed to be integrated into an existing rare earth separation circuit without requiring a full flowsheet redesign, supporting a capital-efficient pathway to a dedicated yttrium product stream for prospective customers and partners.

Having been tested across a comprehensive spectrum of rare earth assemblages, including yttrium in an LREE mix as well as the HREE mix originally tested by Mines, the technology presents two distinct opportunities for integration into existing flowsheets:

1. In an LREE circuit, the technology could be used to produce an upgraded yttrium MREC.

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2. In existing solvent-extraction (SX) circuits, the technology could be used to produce a concentrated yttrium stream and an HREE stream reduced in yttrium, and hence overall loading, resulting in a significantly smaller HREE separation circuit.

This flexibility underpins a capital-efficient pathway to either a dedicated yttrium product stream or a simplified HRE circuit a significant commercial advantage for prospective customers and partners seeking to upgrade existing infrastructure without a full flowsheet redesign.

Next steps

The Company has planned the next steps for the Yttrium Upgrade Technology include:

- Source additional MREC and HREE feedstocks from Australian and international rare earth developers and producers and prepare representative test solutions where appropriate, to assess the technology across a wider range of rare earth compositions.
- Undertake conformity test work using the resin type (Amberlite IRC-748) and validate against a specific Mines patent example, to complete the patented process parameters, building on six process runs completed to date, which established optimal performance with loading at 70°C, stripping at 30°C, and a flow rate of 2 and 5 bed volumes per hour, respectively.
- Test REE liquor with a metal composition representative of bastnaesite sourced from the Mountain Pass deposit, California, to assess process performance against an additional, commercially significant ore type.
- Refine the scope of a potential Stage 2 Research Program with UQ based on the technical results generated during Phase 1.

The Company will provide further updates as material results from the research program become available.

For further information, please contact:

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Authorised for release by the Board of Bayan Mining and Minerals Limited

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About Bayan's Rare Earth Processing Technology Portfolio

Bayan holds the exclusive license to four rare earth processing technologies originally developed by the Colorado School of Mines comprising of:

- Advanced Systems and Methods for Leaching Rare Earths from Ore (bastnaesite single-stage HCI leach) (US12442059);
- Compounds, Methods, and Systems for Beneficiation of Rare Earth Elements by Flotation and Gravity concentration (US20220040707);
- Upgrade of Yttrium in a Mixed Rare Earth Stream Using Iminodiacetic Acid Functionalized Resin (US10696562B2); and
- Beneficiation of Rare Earth Elements Bearing Ancylite (US10618058).

Bayan intends to systematically develop and commercialise these patents and technologies for Bayan's resource assets, third-party rare-earth resources and downstream applications.

Competent Persons Statement

The information in this release that relates to Exploration Targets or Exploration Results is based on information compiled by Professor James Vaughan, a Competent Person who is a Member of the Australian Institute of Mining and Metallurgy (AusIMM). The AusIMM is a Joint Ore Reserves Committee (JORC) Code 'Recognised Professional Organisation' (RPO). An RPO is an accredited organisation to which the Competent Person under JORC Code Reporting Standards must belong to report Exploration Results, Mineral Resources, or Ore Reserves through the ASX. Mr Vaughan is a consultant of the Company. Mr Vaughan has sufficient experience that is relevant to the style of mineralisation and type of deposit under consideration and to the activity being undertaken to qualify as a Competent Person as defined in the 2012 Edition of the JORC 'Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves'. Mr Vaughan consents to the inclusion in the release of the matters based on his information in the form and context in which it appears.

The Company confirms that it is not aware of any new information or data that materially affects the information included in the original market announcements.

The Company confirms that the form and context in which the Competent Persons' findings are presented have not been materially modified from the original market announcements.

Forward-looking Statements

Certain statements included in this release constitute forward-looking information. Statements regarding BMM's plans with respect to its mineral properties and programs are forward-looking statements. There can be no assurance that BMM's plans for development of its mineral properties will proceed as currently expected. There can also be no assurance that BMM will be able to confirm the presence of additional mineral resources, that any mineralisation will prove to be economic or that a mine will successfully be developed on any of BMM's mineral properties. The performance of BMM may be influenced by a number of factors which are outside the control of the Company and its Directors, staff, and contractors.

These statements include, but are not limited to statements regarding future production, resources or reserves and exploration results. All such statements are subject to certain risks and uncertainties, many of which are difficult to predict and generally beyond the control of the Company, that could cause actual results to differ materially from those expressed in, or implied or projected by, the forward-looking information and statements.

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There is no certainty that the research program will achieve its technical objectives, result in pilot-scale development, or ultimately support a commercially viable processing operation.

The Company confirms that is it not currently aware of any environmental restrictions or requirements that would impede the continuation of planned activities.

Except for statutory liability which cannot be excluded, each of BMM, its officers, employees and advisors expressly disclaim any responsibility for the accuracy or completeness of the material contained in these forward-looking statements and excludes all liability whatsoever (including in negligence) for any loss or damage which may be suffered by any person as a consequence of any information in forward-looking statements or any error or omission. BMM undertakes no obligation to update publicly or release any revisions to these forward-looking statements to reflect events or circumstances after today's date or to reflect the occurrence of unanticipated events other than required by the Corporations Act and ASX Listing Rules. Accordingly, you should not place undue reliance on any forward-looking statement.

Appendix A: Ion Exchange Run Conditions and Input REE feedstock composition using TP208 (Lewatit) resin

Run #	REE Feedstock	Loading Flow Rate (Bv/h)	Loading Temp (°C)	pH (Initial)	Stripping Flow Rate (Bv/h)	Stripping Temp (°C)	Striping Acid (g/L HCl)
1	MK Liquor (Baseline)	2	30	4	2	30	1, 10, 100
2	MK Liquor + Y, Sm, Gd	2	30		2	30	
3		5	70		5	70	
4		2	70		2	70	10, 100
5		2	70		2	30	
6	HREE mix synthetic solution	2	70		2	30	

REE input feedstock composition

Run #	Ce (g/L)	Gd (g/L)	La (g/L)	Nd (g/L)	Pr (g/L)	Sm (g/L)	Y (g/L)	Dy (g/L)	Tb (g/L)
1	11.5	0.1	8.2	2.1	0.8	0.1	-	-	-
2	4.8	0.5	3.2	1.8	0.3	0.2	1.3	-	-
3	4.9	0.5	3.3	1.8	0.3	0.2	1.3	-	-
4	4.7	0.5	3.4	1.7	0.3	0.2	1.3	-	-
5	5.0	0.5	3.5	1.8	0.3	0.3	1.4	-	-

Run #	Ce (mg/L)	Gd (mg/L)	La (mg/L)	Nd (mg/L)	Pr (mg/L)	Sm (mg/L)	Y (mg/L)	Eu (mg/L)	Tb (mg/L)
6	6.0	13.0	4.0	13.0	3.5	7.0	86.0	1.1	5.0

Run #	Dy (mg/L)	Ho (mg/L)	Er (mg/L)	Tm (mg/L)	Yb (mg/L)	Lu (mg/L)
6	39.0	6.0	8.0	2.0	3.0	0.7

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Appendix B – Concentrations of REE in the elution post loading and stripping

Normalized effluent concentrations using TP208 IDA resin during Run 1 loading (Baseline – MK liquor) at 30°C, 2 Bv/h (a normalised concentration of 1.0 means the effluent concentration is the same as the feed solution concentration).

Bv	Ce	Gd	La	Nd	Pr	Sm	Tb
0	0.9	0.7	0.9	0.8	0.8	0.7	0.9
1	0.9	0.7	0.9	0.8	0.8	0.7	0.9
2	0.9	0.7	0.9	0.8	0.8	0.7	0.9
3	0.9	0.7	0.9	0.8	0.8	0.7	0.9
4	0.9	0.8	0.9	0.8	0.8	0.8	0.9
5	0.9	0.8	0.9	0.8	0.9	0.8	0.9
6	0.9	0.8	0.9	0.9	0.9	0.8	0.9
7	1.1	1.0	1.2	1.2	1.2	1.0	1.1
8	0.9	0.9	1.0	1.0	1.0	1.0	0.9
9	0.8	0.9	0.8	0.9	0.9	0.9	0.8
10	0.8	0.9	0.8	0.8	0.8	0.8	0.8
12	0.8	0.9	0.8	0.8	0.8	0.8	0.8
14	0.7	0.8	0.7	0.7	0.7	0.8	0.7
16	0.8	0.9	0.8	0.8	0.8	0.8	0.8
18	0.8	0.9	0.8	0.8	0.8	0.8	0.8
20	0.7	0.8	0.7	0.8	0.8	0.8	0.7
22	0.7	0.8	0.7	0.8	0.8	0.8	0.7
24	0.8	1.0	0.8	0.8	0.8	0.9	0.8
26	0.8	0.8	0.8	0.8	0.8	0.8	0.8
28	0.8	0.9	0.8	0.8	0.8	0.9	0.8
30	0.8	0.8	0.8	0.8	0.9	0.8	0.8
32	0.9	0.8	0.9	1.0	1.0	0.8	0.9
34	0.9	0.9	0.9	1.0	1.0	0.9	0.9
36	1.0	0.9	1.0	1.0	1.0	0.9	1.0
38	0.9	0.8	0.9	0.9	1.0	0.7	0.9
40	1.0	1.1	0.9	1.0	1.0	1.0	1.0
42	0.8	1.0	0.8	0.9	0.9	0.9	0.8
44	0.8	0.8	0.8	0.9	0.9	0.8	0.8
46	0.8	0.8	0.8	0.8	0.8	0.8	0.8
48	0.8	0.9	0.8	0.8	0.8	0.8	0.8

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Stripping eluate concentrations in solution using different eluent acid concentrations for Run 1 (Baseline – MK liquor) at 30°C, 2 Bv/h.

HCl concentration in eluent	Bv	Ce (g/L)	Gd (g/L)	La (g/L)	Nd (g/L)	Pr (g/L)	Sm (g/L)	Tb (g/L)
1 g/L HCl	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	1	0.5	0.0	0.4	0.1	0.0	0.0	0.0
	2	0.6	0.0	0.4	0.1	0.0	0.0	0.0
	3	0.7	0.0	0.5	0.1	0.0	0.0	0.0
	4	0.6	0.0	0.4	0.1	0.0	0.0	0.0
10 g/L HCl	5	6.0	0.0	3.4	1.1	0.4	0.0	0.0
	6	6.9	0.0	3.1	1.4	0.5	0.1	0.0
	7	7.4	0.1	2.9	1.7	0.6	0.1	0.0
	8	4.5	0.0	1.5	1.1	0.4	0.1	0.0
100 g/L HCl	9	2.1	0.0	0.7	0.6	0.2	0.1	0.0
	9.5	0.4	0.0	0.1	0.1	0.0	0.0	0.0
	10	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	11	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	12	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	13	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	14	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	15	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	16	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	17	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	18	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	19	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	20	0.0	0.0	0.0	0.0	0.0	0.0	0.0

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Normalized effluent concentrations in TP208 IDA resin during loading for Run 2 (MK liquor + Y, Sm, Gd) at 30°C, 2 Bv/h (Light green rows represent the 2 Bv used in the calculation for Y purity upgrade).

Bv	Ce	Gd	La	Nd	Pr	Sm	Y
0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1.5	0.6	0.7	0.8	0.6	0.6	0.5	0.9
2	0.7	0.8	0.8	0.7	0.7	0.6	0.9
3	0.8	0.8	0.8	0.7	0.7	0.7	0.9
4	0.8	0.8	0.8	0.7	0.7	0.7	1.0
5	0.8	0.8	0.9	0.8	0.8	0.7	0.9
6	0.8	0.8	0.9	0.8	0.8	0.7	0.9
7	0.8	0.8	0.8	0.7	0.7	0.7	0.9
8	0.9	0.8	0.9	0.8	0.8	0.8	0.9
9	0.7	0.7	0.8	0.7	0.7	0.7	0.8
10	0.7	0.7	0.8	0.7	0.7	0.7	0.8
11	0.8	0.8	0.8	0.8	0.8	0.7	0.9
12	0.9	0.9	1.0	0.9	0.9	0.9	1.0
13	0.8	0.8	0.9	0.8	0.8	0.8	0.9
14	0.9	0.9	1.0	0.9	0.9	0.9	1.0
15	1.0	0.9	1.0	0.9	0.9	0.9	1.0
16	0.7	0.7	0.7	0.7	0.7	0.7	0.8
17	1.0	1.0	1.0	1.0	1.0	0.9	1.0
18	0.9	0.9	0.9	0.9	0.9	0.8	0.9
19	0.8	0.8	0.8	0.8	0.8	0.8	0.8
20	0.8	0.8	0.8	0.8	0.8	0.8	0.8

Stripping eluate concentrations using different eluent acid concentrations for Run 2 (MK liquor + Y, Sm, Gd) at 30°C, 2 Bv/h. (Light green rows represent dilute acid strip concentrations= used in the calculation for Y purity upgrade).

HCl concentration	Bv	Ce (g/L)	Gd (g/L)	La (g/L)	Nd (g/L)	Pr (g/L)	Sm (g/L)	Y (g/L)
1 g/L HCl	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	1.25	2.1	0.1	1.4	0.8	0.1	0.0	0.5
	2.50	1.0	0.1	0.6	0.4	0.1	0.0	0.2
	3.75	0.6	0.0	0.2	0.1	0.0	0.0	0.1
	5.00	0.3	0.0	0.2	0.1	0.0	0.0	0.1
	6.25	0.2	0.0	0.1	0.1	0.0	0.0	0.0
	7.50	0.1	0.0	0.1	0.0	0.0	0.0	0.0
	8.75	0.1	0.0	0.1	0.0	0.0	0.0	0.0

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HCl concentration	Bv	Ce (g/L)	Gd (g/L)	La (g/L)	Nd (g/L)	Pr (g/L)	Sm (g/L)	Y (g/L)
	10.00	0.1	0.0	0.1	0.0	0.0	0.0	0.0
	11.25	0.1	0.0	0.1	0.0	0.0	0.0	0.0
	12.50	0.1	0.0	0.0	0.0	0.0	0.0	0.0
	13.75	0.1	0.0	0.0	0.0	0.0	0.0	0.0
	15.00	0.1	0.0	0.0	0.0	0.0	0.0	0.0
10 g/L HCl	16.25	0.1	0.0	0.0	0.0	0.0	0.0	0.0
	17.50	0.1	0.0	0.0	0.0	0.0	0.0	0.0
	18.75	0.1	0.0	0.1	0.0	0.0	0.0	0.0
	20.00	1.5	0.1	1.0	0.5	0.1	0.1	0.3
	21.25	1.5	0.1	1.0	0.5	0.1	0.1	0.4
	22.50	1.6	0.1	1.1	0.5	0.1	0.1	0.4
	23.75	1.6	0.1	1.1	0.6	0.1	0.1	0.4
	25.00	1.6	0.1	1.1	0.6	0.1	0.1	0.4
	26.25	1.8	0.1	1.2	0.6	0.1	0.1	0.4
	27.50	1.7	0.1	1.1	0.6	0.1	0.1	0.3
	28.75	1.7	0.1	1.0	0.6	0.1	0.1	0.3
	30.00	1.6	0.1	0.9	0.6	0.1	0.1	0.3
100 g/L HCl	31.25	0.2	0.0	0.1	0.1	0.0	0.0	0.0
	32.50	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	33.75	0.1	0.0	0.0	0.0	0.0	0.0	0.0
	35.00	8.0	0.8	3.1	3.5	0.6	0.4	0.5
	36.25	0.2	0.0	0.1	0.1	0.0	0.0	0.0

Normalized effluent concentrations in TP208 IDA resin during loading for Run 3 (MK liquor + Y, Sm, Gd) at 70°C, 5 Bv/h. (Light green rows represent the 2 Bv used in the calculation for Y purity upgrade).

Bv	Ce	Gd	La	Nd	Pr	Sm	Y
0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1.25	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2.50	0.5	0.6	0.7	0.5	0.4	0.3	0.8
3.75	0.6	0.6	0.7	0.5	0.5	0.4	0.8
5	0.6	0.6	0.8	0.6	0.6	0.4	0.8
10	0.8	0.7	0.8	0.7	0.7	0.5	0.8
20	0.9	0.9	1.0	0.9	0.9	0.8	0.9
30	1.0	0.9	1.0	1.0	1.0	0.8	0.9
40	0.9	0.9	0.9	0.9	0.9	0.9	1.0
50	1.0	1.0	1.0	1.0	1.0	0.9	1.0
100	1.0	1.0	1.0	1.0	1.0	0.8	1.0

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Stripping eluate concentrations using different eluent acid concentrations for Run 3 (MK liquor + Y, Sm, Gd) at 70°C, 5 Bv/h. (Light green rows represent dilute acid strip concentrations= used in the calculation for Y purity upgrade).

HCl concentration	Bv	Ce (g/L)	Gd (g/L)	La (g/L)	Nd (g/L)	Pr (g/L)	Sm (g/L)	Y (g/L)
1 g/L HCl	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	1.25	0.2	0.0	0.1	0.1	0.0	0.0	0.1
	2.50	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	3.75	0.1	0.0	0.1	0.0	0.0	0.0	0.0
	5.00	0.1	0.0	0.0	0.0	0.0	0.0	0.0
	6.25	0.1	0.0	0.1	0.0	0.0	0.0	0.0
	7.50	0.1	0.0	0.1	0.0	0.0	0.0	0.0
	8.75	0.1	0.0	0.1	0.1	0.0	0.0	0.0
	10.00	0.1	0.0	0.1	0.0	0.0	0.0	0.0
	11.25	0.1	0.0	0.1	0.0	0.0	0.0	0.0
	12.50	0.1	0.0	0.1	0.0	0.0	0.0	0.0
	13.75	0.1	0.0	0.1	0.0	0.0	0.0	0.0
	15.00	0.1	0.0	0.1	0.0	0.0	0.0	0.0
10 g/L HCl	16.25	1.3	0.1	0.7	0.5	0.1	0.0	0.4
	17.50	1.6	0.1	0.8	0.7	0.1	0.0	0.5
	18.75	0.9	0.1	0.4	0.4	0.1	0.1	0.4
	20.00	1.0	0.1	0.4	0.4	0.1	0.1	0.4
	21.25	1.7	0.2	0.7	0.8	0.1	0.1	0.6
	22.50	1.8	0.2	0.7	0.8	0.1	0.1	0.6
	23.75	1.0	0.2	0.4	0.5	0.1	0.1	0.4
	25.00	1.0	0.1	0.4	0.5	0.1	0.0	0.4
	26.25	1.6	0.2	0.6	0.8	0.1	0.1	0.5
	27.50	1.8	0.2	0.6	0.9	0.1	0.1	0.6
	28.75	1.5	0.2	0.5	0.8	0.1	0.1	0.5
	30.00	1.4	0.2	0.5	0.8	0.1	0.1	0.5
100 g/L HCl	31.25	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	32.50	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	33.75	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	35.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	36.25	0.0	0.0	0.0	0.0	0.0	0.0	0.0

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Normalized effluent concentrations in TP208 IDA resin during loading for Run 4 (MK liquor + Y, Sm, Gd) at 70°C, 2 Bv/h. (Light green rows represent the 2 Bv used in the calculation for Y purity upgrade).

Bv	Ce	Gd	La	Nd	Pr	Sm	Y
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	0.0	0.0	0.3	0.0	0.0	0.0	1.0
1.5	0.5	0.5	0.7	0.3	0.3	0.3	0.9
2	0.6	0.6	0.8	0.5	0.4	0.4	0.8
4	0.6	0.6	0.8	0.6	0.5	0.5	0.8
8	0.7	0.7	0.8	0.7	0.6	0.6	0.8
16	0.9	0.8	0.9	0.9	0.8	0.8	0.8
20	1.0	0.9	1.0	1.0	1.0	0.9	0.9

Stripping eluate concentrations using different eluent acid concentrations for Run 4 (MK liquor + Y, Sm, Gd) at 70°C, 2 Bv/h. (Light green rows represent dilute acid strip concentrations= used in the calculation for Y purity upgrade).

HCl concentration	Bv	Ce (g/L)	Gd (g/L)	La (g/L)	Nd (g/L)	Pr (g/L)	Sm (g/L)	Y (g/L)
10 g/L HCl	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	1.0	0.9	0.1	0.7	0.3	0.0	0.0	0.1
	1.5	1.3	0.1	1.0	0.5	0.1	0.0	0.2
	2.0	1.3	0.1	1.0	0.4	0.1	0.1	0.2
	6.0	1.6	0.1	1.1	0.6	0.1	0.0	0.2
100 g/L HCl	6.5	5.4	0.5	3.2	1.9	0.4	0.3	1.6
	7.0	11.9	1.5	5.0	5.3	1.0	0.8	4.2
	7.5	14.3	2.1	5.1	7.0	1.3	1.3	4.2
	8.0	10.4	1.6	3.2	5.5	1.1	1.1	2.7
	10.0	0.5	0.1	0.1	0.3	0.1	0.1	0.2

Normalized effluent concentrations using TP208 IDA resin during loading for Run 5 (MK liquor + Y, Sm, Gd) at 70°C, 2 Bv/h. (Light green rows represent the 2 Bv used in the calculation for Y purity upgrade).

Bv	Ce	Gd	La	Nd	Pr	Sm	Y
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0

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Bv	Ce	Gd	La	Nd	Pr	Sm	Y
1.0	0.1	0.1	0.5	0.0	0.0	0.0	1.0
1.5	0.5	0.5	0.7	0.4	0.3	0.3	0.9
2.0	0.6	0.7	0.9	0.6	0.6	0.5	0.9
2.5	0.6	0.6	0.7	0.5	0.5	0.5	0.8
3.0	0.6	0.6	0.8	0.6	0.5	0.5	0.8
3.5	0.7	0.6	0.8	0.6	0.6	0.5	0.8
4.0	0.7	0.6	0.8	0.6	0.6	0.5	0.8
4.5	0.7	0.6	0.8	0.6	0.6	0.6	0.8
5.0	0.7	0.7	0.8	0.6	0.6	0.6	0.8
5.5	0.7	0.7	0.8	0.7	0.6	0.6	0.8
6.0	0.7	0.7	0.8	0.7	0.6	0.6	0.8
6.5	0.8	0.8	0.9	0.7	0.7	0.7	0.9
7.0	0.8	0.7	0.9	0.7	0.7	0.6	0.8
7.5	0.8	0.8	0.9	0.8	0.8	0.7	0.9
8.0	0.8	0.8	0.9	0.7	0.7	0.7	0.8
8.5	0.8	0.7	0.9	0.7	0.7	0.7	0.8
9.0	0.8	0.8	0.9	0.7	0.8	0.7	0.8
9.5	0.9	0.8	0.9	0.8	0.8	0.7	0.9
10.0	0.9	0.8	0.9	0.8	0.8	0.8	0.9

Stripping concentrations in solution using different acid concentrations for Run 5 (MK liquor + Y, Sm, Gd) at 30°C, 2 Bv/h. (Light green rows represent dilute acid strip concentrations= used in the calculation for Y purity upgrade).

HCl concentration	Bv	Ce (g/L)	Gd (g/L)	La (g/L)	Nd (g/L)	Pr (g/L)	Sm (g/L)	Y (g/L)
10 g/L HCl	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	1.0	0.9	0.1	0.7	0.3	0.0	0.0	0.3
	1.5	1.4	0.1	1.0	0.4	0.1	0.1	0.4
	2.0	1.5	0.1	1.0	0.5	0.1	0.1	0.5
100 g/L HCl	2.5	1.4	0.1	0.9	0.4	0.1	0.1	0.5
	3.0	1.5	0.1	1.0	0.5	0.1	0.1	0.5
	3.5	2.0	0.2	1.2	0.7	0.1	0.1	0.6
	4.0	12.0	1.3	5.3	5.3	1.0	0.8	2.1
	4.5	10.7	1.1	4.3	5.0	0.9	0.8	1.4
	5.0	5.4	0.5	2.0	2.5	0.4	0.4	0.6
	5.5	2.4	0.2	0.9	1.1	0.2	0.2	0.3
	6.0	1.0	0.1	0.4	0.4	0.1	0.1	0.1

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Effluent metal concentrations in TP208 IDA resin during loading for Run 6 (HREE mix synthetic solution) at 70°C, 2 Bv/h. (Light green rows represent the 2 Bv used in the calculation for Y purity upgrade).

Bv	Ce (mg/L)	Gd (mg/L)	La (mg/L)	Nd (mg/L)	Pr (mg/L)	Sm (mg/L)	Y (mg/L)	Eu (mg/L)	Tb (mg/L)	Dy (mg/L)	Ho (mg/L)	Er (mg/L)	Tm (mg/L)	Yb (mg/L)	Lu (mg/L)
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1.5	0.2	0.0	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2.0	0.1	0.0	-	3.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3.0	0.1	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3.5	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6.0	0.1	0.0	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7.0	0.2	0.0	0.1	0.0	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8.0	0.2	0.0	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9.0	0.5	0.0	0.3	0.1	0.1	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11.0	8.3	0.8	3.8	3.4	0.6	0.6	1.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12.0	7.5	0.7	3.4	3.1	0.7	0.5	1.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
13.0	9.9	1.0	4.5	4.2	0.8	0.6	1.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
14.0	8.6	0.8	4.0	3.6	0.7	0.6	1.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
15.0	1.8	0.1	1.2	0.5	0.2	0.1	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
16.0	2.1	0.2	1.6	0.6	0.2	0.1	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
17.0	2.1	0.2	1.5	0.6	0.2	0.1	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
18.0	1.6	0.1	1.1	0.5	0.2	0.1	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

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Stripping eluate concentrations using different eluent acid concentrations for Run 6 (HREE mix synthetic solution) at 30°C, 2 Bv/h. (Light green rows represent dilute acid strip concentrations used in the calculation for Y purity upgrade factor).

HCl concentration	Bv	Ce (g/L)	Gd (g/L)	La (g/L)	Nd (g/L)	Pr (g/L)	Sm (g/L)	Y (g/L)	Eu (g/L)	Tb (g/L)	Dy (g/L)	Ho (g/L)	Er (g/L)	Tm (g/L)	Yb (g/L)	Lu (g/L)
10 g/L HCl	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	1.5	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
100 g/L HCl	2.5	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.0	0.0	0.2	0.0	0.1	0.0	0.0	0.0
	3.0	0.0	0.1	0.0	0.1	0.0	0.0	0.4	0.0	0.0	0.3	0.1	0.1	0.0	0.0	0.0
	3.5	0.2	0.5	0.1	0.6	0.1	0.2	0.4	0.0	0.1	1.0	0.1	0.1	0.0	0.0	0.0
	4.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0
	5.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	6.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

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Appendix C: JORC Table 1

JORC Code, 2012 Edition – Table 1

Section 1 Sampling Techniques and Data
(Criteria in this section apply to all succeeding sections.)

Criteria	JORC Code explanation	Commentary
Sampling techniques	• *Nature and quality of sampling (eg cut channels, random chips, or specific specialised industry standard measurement tools appropriate to the minerals under investigation, such as down hole gamma sondes, or handheld XRF instruments, etc). These examples should not be taken as limiting the broad meaning of sampling.* • *Include reference to measures taken to ensure sample representivity and the appropriate calibration of any measurement tools or systems used.* • *Aspects of the determination of mineralisation that are Material to the Public Report.* • *In cases where 'industry standard' work has been done this would be relatively simple (eg 'reverse circulation drilling was used to obtain 1 m samples from which 3 kg was pulverised to produce a 30 g charge for fire assay'). In other cases more explanation may be required, such as where there is coarse gold that has inherent sampling problems. Unusual commodities or mineralisation types (eg submarine nodules) may warrant disclosure of detailed information.*	• Sampling techniques are not relevant for this announcement as it relates to hydrometallurgical testwork on synthetic rare earth liquor samples with known geochemical properties. • Rare earth solutions were derived from a mixed rare earth hydroxide sample generated in a previous UQ project ("Previous UQ Project"). Details of how the rare earth hydroxide sample was generated are published in the following paper: Vaughan, J., Guan, Y., Loureiro Gontijo, V. L., and Sultana, U. (2024). *Mary Kathleen tailings derived rare earth concentrate via double salt precipitation and caustic conversion.* Southern African Rare Earths 2nd International Symposium 2024, Swakopmund, Namibia, 19-20 June 2024. Johannesburg, South Africa: Southern African Institute of Mining and Metallurgy. • In the Previous UQ Project, a composite of Mary Kathleen tailings was leached, precipitated as mixed double salt, then converted to a rare earth hydroxide similar to the procedure described in Vaughan et al. (2024). • For this study the mixed rare earth hydroxide was leached, then thorium was separate from the solution by pH adjustment precipitation. The resulting solution was used as the Baseline solution for this work in Runs 1-5.
Drilling techniques	• *Drill type (eg core, reverse circulation, open-hole hammer, rotary air blast, auger, Bangka, sonic, etc) and details (eg core diameter, triple or standard tube, depth of diamond tails, face-sampling bit or other type, whether core is oriented and if so, by what method, etc).*	• No drilling results are being reported.
Drill sample recovery	• *Method of recording and assessing core and chip sample recoveries and results assessed.* • *Measures taken to maximise sample recovery and ensure representative nature of the samples.* • *Whether a relationship exists between sample recovery and grade and whether sample bias may have occurred due to preferential loss/gain of fine/coarse material.*	• No drilling results are being reported.

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Logging	• *Whether core and chip samples have been geologically and geotechnically logged to a level of detail to support appropriate Mineral Resource estimation, mining studies and metallurgical studies.* • *Whether logging is qualitative or quantitative in nature. Core (or costean, channel, etc) photography.* • *The total length and percentage of the relevant intersections logged.*	• Logging details are not relevant for this announcement as it relates to hydrometallurgical testwork on synthetic rare earth liquor samples.
Sub-sampling techniques and sample preparation	• *If core, whether cut or sawn and whether quarter, half or all core taken.* • *If non-core, whether riffled, tube sampled, rotary split, etc and whether sampled wet or dry.* • *For all sample types, the nature, quality and appropriateness of the sample preparation technique.* • *Quality control procedures adopted for all sub-sampling stages to maximise representivity of samples.* • *Measures taken to ensure that the sampling is representative of the in situ material collected, including for instance results for field duplicate/second-half sampling.* • *Whether sample sizes are appropriate to the grain size of the material being sampled.*	• Details of the sub-sampling techniques for the Mary Kathleen Tailings are not available and not relevant to the current study.
Quality of assay data and laboratory tests	• *The nature, quality and appropriateness of the assaying and laboratory procedures used and whether the technique is considered partial or total.* • *For geophysical tools, spectrometers, handheld XRF instruments, etc, the parameters used in determining the analysis including instrument make and model, reading times, calibrations factors applied and their derivation, etc.* • *Nature of quality control procedures adopted (eg standards, blanks, duplicates, external laboratory checks) and whether acceptable levels of accuracy (ie lack of bias) and precision have been established.*	• Aqueous samples were analysed using Inductively Coupled Plasma Optical Emission Spectroscopy (ICP-OES) (Agilent, model 5110). • Calibration curve is prepared using Agilent single element standards in 5% HNO3 solution. In total 6 points are prepared to fit the curve, which is calibrated with R^2 > 0.999. • Samples were diluted in 5% HNO_3 solution to fit in the calibration range for the instrument. • Internal standard is run together with samples and adjusts the samples ICP results according to the internal standard. • Every 30 samples run in the ICP-OES, quality control samples are run, which are within +/- 5%. • The raw ICP data was normalized for variations in sodium content, which helps minimize error associate with dilution.
Verification of sampling and assaying	• *The verification of significant intersections by either independent or alternative company personnel.* • *The use of twinned holes.* • *Documentation of primary data, data entry procedures, data verification, data storage (physical and electronic) protocols.* • *Discuss any adjustment to assay data.*	• No drilling results are being reported; verification of significant intersections and the use of twinned holes are not applicable to the bench-scale metallurgical test work disclosed in this announcement. • Primary run data, feed compositions, flow rates, temperatures, and REE

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		concentrations in the loading and stripping eluates is generated and recorded by UQ's Hydrometallurgy Research Group under the Phase 1 Research Program, and reviewed by Professor James Vaughan, the Competent Person, prior to inclusion in this announcement. • No adjustments have been made to the assay data presented in this announcement.
Location of data points	• *Accuracy and quality of surveys used to locate drill holes (collar and down-hole surveys), trenches, mine workings and other locations used in Mineral Resource estimation.* • *Specification of the grid system used.* • *Quality and adequacy of topographic control.*	• No applicable to reporting of bench-scale metallurgical test-work of synthetic REE liquor.
Data spacing and distribution	• *Data spacing for reporting of Exploration Results.* • *Whether the data spacing and distribution is sufficient to establish the degree of geological and grade continuity appropriate for the Mineral Resource and Ore Reserve estimation procedure(s) and classifications applied.* • *Whether sample compositing has been applied.*	• Not applicable. The Phase 1 Research Program test work is metallurgical bench-scale ion-exchange testing on liquor feedstocks (the Mary Kathleen baseline liquor and synthetic mixed/heavy rare earth solutions), not spatially distributed exploration sampling, so data spacing, grade continuity and compositing concepts do not apply.
Orientation of data in relation to geological structure	• *Whether the orientation of sampling achieves unbiased sampling of possible structures and the extent to which this is known, considering the deposit type.* • *If the relationship between the drilling orientation and the orientation of key mineralised structures is considered to have introduced a sampling bias, this should be assessed and reported if material.*	• Not applicable. No samples were collected from drill holes.
Sample security	• *The measures taken to ensure sample security.*	• Mary Kathleen Tailings are stored in a designated certified radionuclide storage room at the University Hydrometallurgy laboratory.
Audits or reviews	• *The results of any audits or reviews of sampling techniques and data.*	• No audits or reviews are currently being performed.

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Section 2 Reporting Exploration Results
(Criteria listed in the preceding section also apply to this section.)

Criteria	JORC Code explanation	Commentary
Mineral tenement and land tenure status	• *Type, reference name/number, location and ownership including agreements or material issues with third parties such as joint ventures, partnerships, overriding royalties, native title interests, historical sites, wilderness or national park and environmental settings.* • *The security of the tenure held at the time of reporting along with any known impediments to obtaining a licence to operate in the area.*	• Not applicable.
Exploration done by other parties	• *Acknowledgment and appraisal of exploration by other parties.*	• No previous work was conducted on Mary Kathleen tailings for the purposes of rare earth hydrometallurgical testwork using resin-ion exchange.
Geology	• *Deposit type, geological setting and style of mineralisation.*	• Not applicable as this announcement reports metallurgical bench-scale testwork on rare earth liquors from Mary Kathleen tailings baseline liquor doped with Sm, Y, Gd, Dy, and Tb to create a synthetic feed solution. This is not a geological resource or deposit disclosure.

Drill hole Information	• *A summary of all information material to the understanding of the exploration results including a tabulation of the following information for all Material drill holes:*
	  ○ *easting and northing of the drill hole collar*
	  ○ *elevation or RL (Reduced Level – elevation above sea level in metres) of the drill hole collar*
	  ○ *dip and azimuth of the hole*
	  ○ *down hole length and interception depth*
	  ○ *hole length.*
	• *If the exclusion of this information is justified on the basis that the information is not Material and this exclusion does not detract from the understanding of the report, the Competent Person should clearly explain why this is the case.*
		• No drilling results are being reported.

Data aggregation methods	• *In reporting Exploration Results, weighting averaging techniques, maximum and/or minimum grade truncations (eg cutting of high grades) and cut-off grades are usually Material and should be stated.* • *Where aggregate intercepts incorporate short lengths of high grade results and longer lengths of low grade results, the procedure used for such aggregation should be stated and some typical examples of such aggregations should be shown in detail.* • *The assumptions used for any reporting of metal equivalent values should be clearly stated.*	• No aggregation or cut-offs applied.

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Criteria	JORC Code explanation	Commentary
Relationship between mineralisation widths and intercept lengths	• *These relationships are particularly important in the reporting of Exploration Results.* • *If the geometry of the mineralisation with respect to the drill hole angle is known, its nature should be reported.* • *If it is not known and only the down hole lengths are reported, there should be a clear statement to this effect (eg 'down hole length, true width not known').*	• No drilling results are being reported.
Diagrams	• *Appropriate maps and sections (with scales) and tabulations of intercepts should be included for any significant discovery being reported These should include, but not be limited to a plan view of drill hole collar locations and appropriate sectional views.*	• No maps and sections were included in the announcement as it relates to laboratory results.
Balanced reporting	• *Where comprehensive reporting of all Exploration Results is not practicable, representative reporting of both low and high grades and/or widths should be practiced to avoid misleading reporting of Exploration Results.*	• The announcement includes all relevant information considered material to the laboratory results.
Other substantive exploration data	• *Other exploration data, if meaningful and material, should be reported including (but not limited to): geological observations; geophysical survey results; geochemical survey results; bulk samples – size and method of treatment; metallurgical test results; bulk density, groundwater, geotechnical and rock characteristics; potential deleterious or contaminating substances.*	• The full set of metallurgical results for the metallurgical testwork using synthetic rare earth liquor is disclosed to Appendix B
Further work	• *The nature and scale of planned further work (eg tests for lateral extensions or depth extensions or large-scale step-out drilling).* • *Diagrams clearly highlighting the areas of possible extensions, including the main geological interpretations and future drilling areas, provided this information is not commercially sensitive.*	• The Company plans to run further research and development of the Yttrium Upgrade Technology to understand ideal REE feedstock inputs, operating conditions and flow sheet placement.

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