RAREX
Phosphate Enabled Rare Earths

57-71 RE Rare Earths | 15 P Phosphorus

ASX Release
28 November 2023

Testwork Confirms Favourable Mineralogy for Rare Earths Beneficiation

Rare earths enriched residue mineralogical testwork further supports the Cummins Range Product Strategy[1]

Highlights

- **Recent mineralogical testwork further supports RareX's proposed product strategy[1] for the Cummins Range Project**, focused on the sale of a combined apatite and monazite mineral concentrate to an existing phosphoric acid production plant for apatite leaching and further upgrade of the rare earths (RE) enriched leach residue by flotation.
- The testwork comprised Quantitative Evaluation of Materials by Scanning Electron Microscopy (QEMSCAN) performed on a **leach residue sample** to confirm the RE mineralogy.
- **Results showed favourable leach residue mineralogy,** post apatite removal, supporting the RE beneficiation step of the proposed product strategy[1].
- **Monazite identified to be the main RE-bearing mineral,** accounting for ~70% of the total rare earths in the leach residue.
- **Mineralogy of leach residue shown to be similar to the initial head sample,** suggesting the RE minerals remain intact during the dilute acid leach step. The acid leaching also improved the monazite liberation according to the mineralogy results.
- **The same head sample** was tested at Baotou Mengrong Fine Materials[2] (BTMR), with excellent upgrade results (>20x RE upgrade). The improved RE grade, distribution and liberation of the leach residue should yield similar or better flotation results.
- **Bulk float underway** to prepare samples for additional apatite leaching and leach residue RE beneficiation.

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RareX Limited (ASX: REE – **RareX** or **the Company**) is pleased to advise that recent mineralogy analysis on a leach residue sample from the 100%-owned Cummins Range Rare Earths and Phosphate Project (the **Project**, **Cummins Range**), located in the Kimberley region of Western Australia, has shown positive results, confirming positive mineralogy for rare earths beneficiation.

The Cummins Range Project will produce a dual mineral concentrate that will contain high purity apatite and NdPr-rich monazite. Following the completion of recent positive testwork[2,3], RareX has proposed a product

[1] ASX announcement 12 October 2023: Cummins Range Product Strategy Update
[2] ASX announcement 28 October 2023: Rare Earths Beneficiation Work Delivers Strong TREO Upgrades
[3] ASX announcement 11 July 2023: Phosphoric Acid Leach Test Supports RareX Stage-3 Operations

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strategy whereby the mineral concentrate from Cummins Range will first be treated at an existing phosphoric acid production plant to extract the apatite. This will be followed by the onward sale of the leach residue, containing elevated RE grades, which can be further upgraded via simple flotation. The positive mineralogy results of the leach residue outlined in this announcement further support this proposed product strategy and the hypothesis that a saleable RE concentrate (>30% TREO grade) can be produced from the leach residue.

RareX Chief Executive Officer, James Durrant, said: *"These latest mineralogical and metallurgical results continue to support our product strategy for the Cummins Range Project. These results are very encouraging and are highly suggestive of excellent flotation performance of the leach residue, which will be the next phase of our testwork program. This positive news comes on the back of the fantastic flotation performance achieved on similar mineralogical samples, where a twenty-times upgrade was achieved, and follows very positive apatite leach results. Collectively, our metallurgical testwork to date shows we are well on the path to being able to provide battery-grade apatite phosphate and magnet-grade monazite rare earths to a strategic offtaker. "*

Leach Residue Mineralogy Analysis

Following the positive dilute acid leach and RE flotation results at BTMR, the next important step of RareX's metallurgical testwork program was to demonstrate good mineralogy of the leach residue to support the proposed product strategy. A Quantitative Evaluation of Materials by Scanning Electron Microscopy (QEMSCAN) analysis was performed at ALS Metallurgy to better understand the mineralogy of the leach residue and confirm favourable RE mineral distribution that will be used to support further RE beneficiation testwork.

The major RE deportment data and monazite liberations are shown in Figure 1 and Figure 2 respectively.

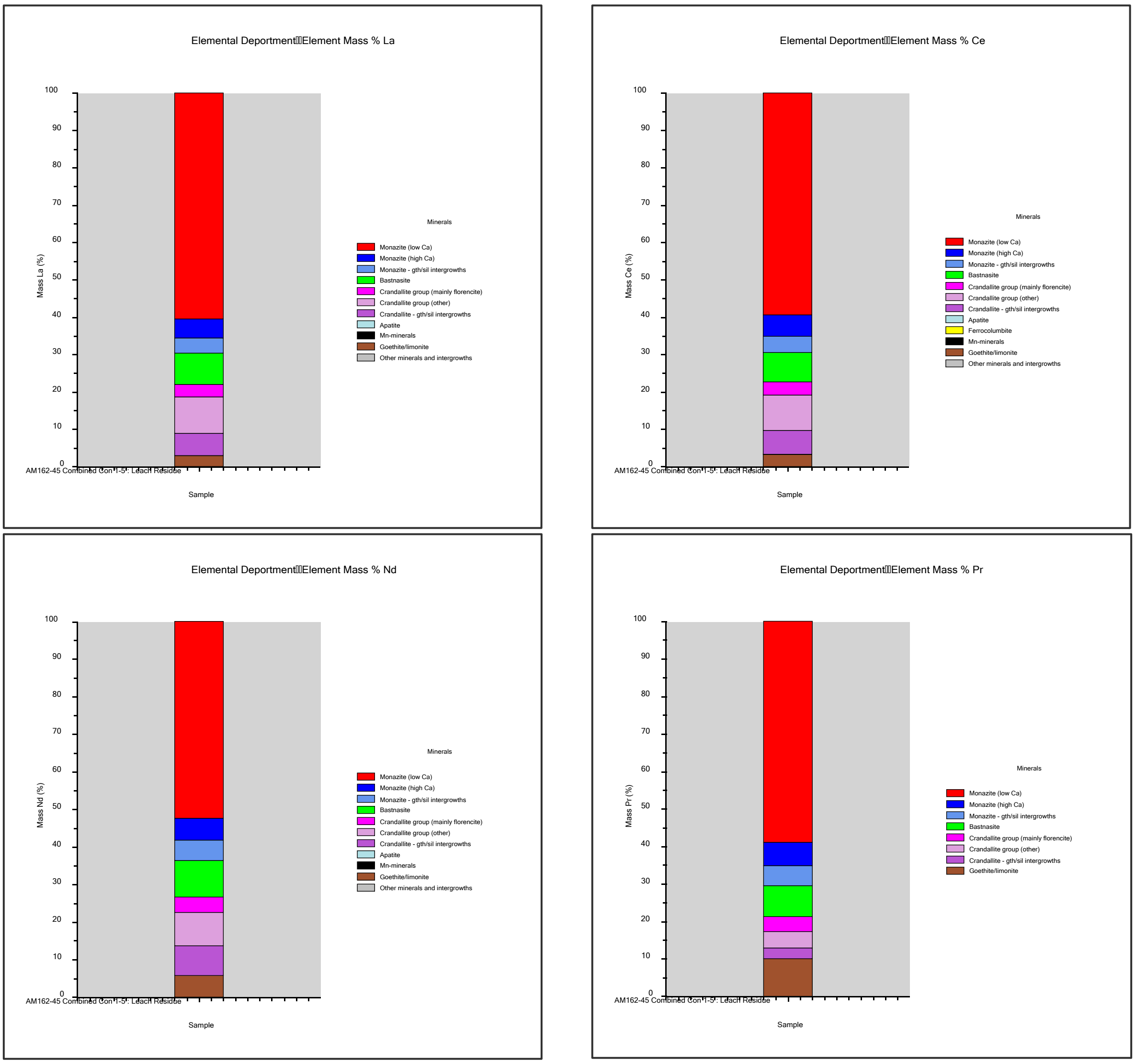

Figure 1. La, Ce, Nd and Pr element deportment to minerals

As indicated, monazite is the main RE hosting mineral, accounting for approximately ~70% of the total rare earth elements. Bastnasite (10%) and crandallite (20%) host the remaining RE. The RE deportment is very well aligned to the mineralogy analysis on the head sample that was used for generating this leach residue, suggesting that the RE minerals remained intact during the dilute phosphoric acid leaching process.

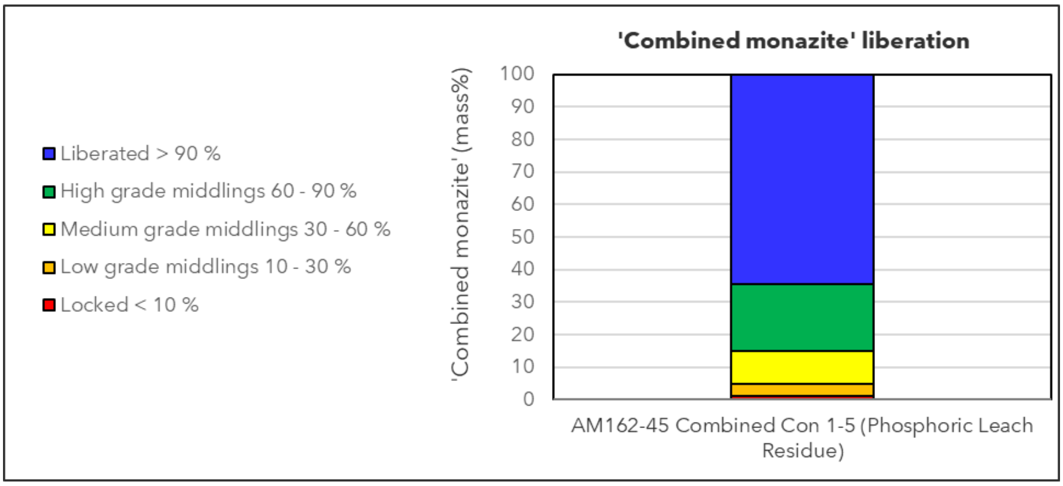

Figure 2. Combined monazite liberations

Monazite locking and liberation analysis showed minimal locking of monazite with other minerals post the dilute acid leach. Improved liberations were also observed, showing 64.4% 'well liberated' (at -53µm grind size) monazite (i.e., >90% monazite) and another 20.5% classified as 'high grade middlings' (60-90% monazite).

It should also be noted that this leach residue is generated from the same head sample that was tested at BTMR and achieved >20 times RE upgrade[2]. This result is well aligned to RareX expectations and further supports the proposed product processing strategy at the offtaker's facility. The similar mineralogy and the improved RE mineral liberations provide further confidence to RareX that a >30% RE concentrate can be produced from the leach residue suitable for typical RE refineries.

Next Steps

RareX is currently working toward the production of mineral concentrate and product derivatives (leach liquor and RE residue) samples to advance offtake discussions and refine process design criteria. RE flotation will also be carried out on leach residues to confirm that similar, if not better, flotation upgrades can be achieved.

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

Competent Person's Statement

The information in this release that relates to metallurgical testwork is based on information compiled and / or reviewed by Mr Gavin Beer who is a Member of The Australasian Institute of Mining and Metallurgy (AusIMM) and a Chartered Professional. Mr Beer is a consulting metallurgist with sufficient experience relevant to the activity which he is undertaking to be recognised as competent to compile and report such information. Mr Beer consents to the inclusion in the report of the matters based on his information in the form and context in which it appears. Mr Beer does not hold securities in RareX.

About RareX Limited – ASX: REE

RareX Limited (ASX: REE), a Perth based project development and exploration Company, was founded on the fundamental belief of the electronics revolution and the electric vehicle mega-trend. Our focus is rare earths and associated battery and electronic metals.

Cummins Range, in the East Kimberley region of Western Australia, is our flagship project which aims to produce a sustainable, ethical, transparent and secure low carbon rare earth and phosphate supply chain solution for its products which satisfy the two global mega-trends of population growth and electrification.

RareX maintains exploration upside programs in the immediate vicinity of the Cummins Range Project and also more broadly to identify targets and progress projects complementary to the founding beliefs and expertise of the core team.

Rare earths and in particular, NdPr, are core enablers of decarbonisation and electrification of our society. NdPr supports high strength magnets which enables low carbon technologies, especially in the electric mobility sector, robotics solutions and renewable energy, particularly the wind energy sector.

Phosphate is the feedstock for the emerging dominant battery technology; lithium-ferro-phosphate (LFP). The global LFP battery market is projected to grow from $10 billion in 2021 to $50 billion by 2028 as more EVs adopt the safer and longer life technology and grid stabilization batteries expand to balance intermittent renewable generation.

RareX maintains material investments in Kincora Copper (ASX:KCC), Cosmos Exploration (ASX:C1X) and Canada Rare Earth Corporation (LL.V).

For further information on the Company and its projects visit www.rarex.com.au

Appendix 1: JORC Table

JORC Code, 2012 Edition – Table 1		
Cummins Range Section 1 Sampling Techniques and Data		
Criteria	**JORC Code explanation**	**Commentary**
Sampling techniques	• Nature and quality of sampling (e.g., 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.	• Diamond drill cores and RC chips were sampled for the metallurgical testwork. Samples were selected based on drill assays, drill hole location and intervals, geological and mineralogical data. Samples were riffle split from bulk samples and sent to Auralia Metallurgy Perth and/or BV Perth and/or ALS Perth and/or Nagrom Perth for assays and further testwork.
	• Include reference to measures taken to ensure sample representivity and the appropriate calibration of any measurement tools or systems used.	• For RC chips, the entire bulk samples were riffle split to ensure a representative sample from the selected interval. Quarter diamond drill cores were sent to laboratories to conduct crushing, sampling and assaying. All laboratories used in the assaying of the Cummins Range material were checked for sampling and assaying equipment and equipment calibrations / accuracy.
	• 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 (e.g., 'reverse circulation drilling was used to obtain 1m 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 (e.g., submarine nodules) may warrant disclosure of detailed information.	• Sample interval selection for the metallurgical testwork was based on geological controls and mineralisation of the deposit, the samples were considered representative of the mineralisation that were intended to be tested.
Drilling techniques	• Drill type (e.g., core, reverse circulation, open-hole hammer, rotary air blast, auger, Bangka, sonic, etc) and details (e.g., 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).	• Drilling techniques used for the Cummins Range samples used for the metallurgical testwork were: ○ Reverse Circulation (RC) drilling in 2020-2021, 2022 using 5 ½ inch diameter hammer. ○ Diamond drilling in 2021- 2022 using HQ and PQ sized rods.
Drill sample recovery	• Method of recording and assessing core and chip sample recoveries and results assessed.	• Samples used for the metallurgical testwork were collected by riffle split. Additional laboratory assays were undertaken on the samples submitted for the testwork and showed good alignments to the drill assays.

JORC Code, 2012 Edition – Table 1		
Cummins Range Section 1 Sampling Techniques and Data		
Criteria	**JORC Code explanation**	**Commentary**
	• Measures taken to maximise sample recovery and ensure representative nature of the samples.	• Larger and more capable rigs were used for collection of the metallurgical samples which allowed for good recoveries of samples. During each drill program, all drill rigs were checked by professional geologists, and all drill holes were logged and monitored for recoveries and accuracy prior to sample splitting and logging.
	• 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.	• Holes used for the metallurgical testwork had good sample recovery hence minor sample bias. There is no distinctive relationship exist between sample recovery and grade.
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.	• All samples used for the metallurgical testwork were geologically logged to a detail level that supported the metallurgical studies.
	• Whether logging is qualitative or quantitative in nature. Core (or costean, channel, etc) photography.	• The logging is qualitative and quantitative in nature for the metallurgy samples. The recorded details included: lithology, grainsize, weathering, colour, alteration, sulphide quantity and type, structure and veining. Photos were taken for all core samples.
	• The total length and percentage of the relevant intersections logged.	• Logging of all metallurgical samples were carried out on geological intervals.
Sub-sampling techniques and sample preparation	• If core, whether cut or sawn and whether quarter, half or all core taken.	• Cores were cut in half and quarter, quarter cores from each selected interval were used for this metallurgical testwork.
	• If non-core, whether riffled, tube sampled, rotary split, etc and whether sampled wet or dry.	• RC chips were riffle split from the bulk bags. Samples were dry when riffle split.
	• For all sample types, the nature, quality and appropriateness of the sample preparation technique.	• Samples used for the metallurgical testwork were diamond drill cores and RC chips which were split and prepared with appropriate equipment. Where required, the samples were crushed and ground to ensure the samples were properly prepared for the required testwork.
	• Quality control procedures adopted for all sub-sampling stages to maximise representivity of samples.	• All sample preparation and sampling equipment was cleaned with adequate procedures before taking of each sample to ensure there is no cross-contamination between 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.	• Drill assays, mineralogical and geological information were reviewed for selection testwork samples. Additional assays on the samples showed high repeatability of drill assays suggesting good representivity of the in-situ material hence no further

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Cummins Range Section 1 Sampling Techniques and Data		
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		sampling was required.
	• Whether sample sizes are appropriate to the grain size of the material being sampled.	• The metallurgical sample sizes were appropriate to the grain size of the material being sampled. Where necessary, material was crushed and/or pulverised before riffle / rotary split to ensure good consistency of sampling representivity.
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.	• The assay analyses of all samples were conducted by registered laboratories (i.e., ALS, BV and Nagrom etc.) with suitable equipment and well-known quality assurance accreditation to ensure the accuracy of the assay results. Samples were assayed by X-ray fluorescence (XRF) and Inductively Coupled Plasma (ICP).
	• 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.	• There was no reliance upon geophysical tools, spectrometers, or any other techniques for the required metallurgical testwork. All assays were undertaken with appropriate XRF and ICP equipment at registered laboratories.
	• Nature of quality control procedures adopted (e.g. standards, blanks, duplicates, external laboratory checks) and whether acceptable levels of accuracy (i.e. lack of bias) and precision have been established.	• The metallurgical samples were tested against the standards and the good alignments to drill assays confirmed the accuracy of the results.
Verification of sampling and assaying	• The verification of significant intersections by either independent or alternative company personnel.	• There are no significant intercepts mentioned in this announcement.
	• The use of twinned holes.	• Twin holes were not used for collection of metallurgical samples.
	• Documentation of primary data, data entry procedures, data verification, data storage (physical and electronic) protocols.	• An electronic geological database was used for data storage. For metallurgical testwork, all raw data from laboratories, results analysis and summary reports were documented in a metallurgy database.
	• Discuss any adjustment to assay data.	• No adjustment was made to the assay data.
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.	• Drill hole collar locations for the metallurgical testwork have been surveyed using a differential GPS with accuracy to 0.1 m.
	• Specification of the grid system used.	• MGA2020 Zone 52

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	• Quality and adequacy of topographic control.	• Topographic control of the metallurgical testwork has been established from surveyed drill collars and are within 0.1 m. The Cummins Range deposit is located on flat terrain.
Data spacing and distribution	• Data spacing for reporting of Exploration Results.	• All the samples tested were selected from 6 holes from Rare Dyke and Phos Dyke from a range of depth and weathering profiles with varying TREO and P_2O_5 grades.
	• 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.	• The data spacing is considered appropriate for the metallurgical testwork at this study level.
	• Whether sample compositing has been applied.	• Samples were composited for the metallurgical testwork. Representative portion of each selected intervals were sent to the designated laboratories to undergo staged crushing and grinding before being composited and homogenised with suitable equipment. Where drill cores were used for the testwork, quarter cores were crushed into suitable sizes before splitting the representative samples used for composition.
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.	• The orientation of the metallurgical sampling is not considered to be biased towards any geological characteristics.
	• 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.	• No sampling bias to report.
Sample security	• The measures taken to ensure sample security.	• All metallurgical samples were secured with appropriate labelling system. Samples were labelled with standard designations and were stored in locked shed. Samples were transported to Perth from site by reputable transport companies. Individual bags are cable tied and the pallets are wrapped in plastic with detailed logging sheet included.
Audits or reviews	• The results of any audits or reviews of sampling techniques and data.	• No audits were undertaken however the Competent Person was involved in all stages of the metallurgical sampling and tests. In-house reviews were also completed on the sampling techniques and testwork results.

JORC Code, 2012 Edition – Table 1		
Cummins Range Section 2 Reporting of Exploration Results		
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 Cummins Range deposit is located on tenement E80/5092 and is 100% owned by Cummins Range Pty Ltd which is a wholly owned subsidiary of RareX Ltd. Cummins Range Pty Ltd purchased the tenement from Element 25 with a potential capped royalty payment of AU$1m should a positive PFS be completed within 36 months of purchase finalisation.
	• 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.	• No security or impediments with tenement E80/5092.
Exploration done by other parties	• Acknowledgment and appraisal of exploration by other parties.	• CRA Exploration defined REO mineralisation at Cummins Range in 1978 using predominantly aircore drilling. Navigator Resources progressed this discovery with additional drilling after purchasing the tenement in 2006. Navigator announced a resource estimate in 2008. Kimberly Rare Earths drilled additional holes and upgraded the resource estimate in 2012.
Geology	• Deposit type, geological setting and style of mineralisation.	• The Cummins Range REO deposit occurs within the Cummins Range carbonatite complex which is a 2.0 km diameter near-vertical diatreme pipe that has been deeply weathered but essentially outcropping with only thin aeolian sand cover in places. The diatreme pipe consists of various mafic to ultramafic rocks with later carbonatite intrusions. The primary ultramafic and carbonatite rocks host low to high-grade rare-earth elements with background levels of 1000-2000 ppm TREO and high-grade zones up to 20% TREO. Disseminated apatite is through all rock types and is also contained in phoscorite. Above the carbonatite dykes is a well-developed regolith profile that extends to 100 m below the surface where a combination of residual, or eluvial and chemical weathering have redistributed and upgraded rare earths and phosphate. • QEMSCAN and MicroXRF results have showed that all the phosphate is contained in Apatite and Monazite. The Apatite contains low UTh, no cadmium and chlorine, and elevated levels of Fl that are well below acceptable limits. • QEMSCAN and MicoXRF have showed the REO in the Regolith are deporting mostly to monazite, with lesser amounts deporting to bastnaesite, crandallite, and REE intergrowths. • QEMSCAN and MicoXRF indicate the REO in the fresh rock are deporting to monazite, bastnaesite, parisite and REE intergrowths.

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Cummins Range Section 2 Reporting of Exploration Results		
Criteria	**JORC Code explanation**	**Commentary**
Drillhole 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.	• All drill hole details used in this metallurgical testwork have been previously announced on the ASX between 2019 and 2023.
	• 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.	• Previously released to the market.
Data aggregation methods	• In reporting Exploration Results, weighting averaging techniques, maximum and/or minimum grade truncations (e.g., cutting of high grades) and cut-off grades are usually Material and should be stated.	• No maximum or minimum cut-off grades are used in this announcement.
	• 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.	• No aggregation.
	• The assumptions used for any reporting of metal equivalent values should be clearly stated.	• No metal equivalent values are used in this report.
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.	• Not applicable as no drilling reported.

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Criteria	**JORC Code explanation**	**Commentary**
	• 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').	• Not applicable as no drilling 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.	• The report is relating to metallurgical beneficiation testwork and no significant discovery is being reported.
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 avoiding misleading reporting of Exploration Results.	• Not applicable as no drilling reported.
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.	• This report includes meaningful metallurgical results where mineralogical analysis was performed on a leach residue and showed favourable mineralogy that supports further RE beneficiation: ○ ~70% TREO in monazite ○ ~85% monazite was well liberated or as high grade middlings
Further work	• The nature and scale of planned further work (e.g. 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.	• Baseline Environmental studies have commenced with the instalment of 14 water monitoring bores in 2022. • Further apatite and monazite beneficiation and refining testwork. • Beneficiation plant pre-feasibility study. • DSO feasibility study.