24 March 2023

MAKUUTU PROJECT
STAGE 1 DFS CLARIFICATION

The Board of Ionic Rare Earths Limited ("**IonicRE**" or "**The Company**") (ASX: IXR) advises that further to the Company's announcement on 20 March 2023 detailing the results of the Definitive Feasibility Study (DFS or Study) for the Stage 1 development of the Makuutu Rare Earths Project ("Makuutu" or "the Project") it is pleased to provide the following information in accordance with ASX Listing Rule 5.9.1 in respect of its maiden Ore Reserve (first reported to ASX on 20 March 2023) for Makuutu Stage 1 of 172.9MT at 848 ppm TREO, or 584 ppm TREO – CEO_2, and 30 ppm Sc_2O_3.

As set out in the 20 March 2023 announcement the Stage 1 DFS contemplates a proposed open pit mining operation, and evaluation of an annualised mining rate of 5 Mtpa of mineralisation from the Project. Several scenarios were run to determine the optimal mine plan design. The revised Mineral Resource Estimate (MRE) prepared in May 2022 was used as the basis for the preliminary mine plans and mining optimisation studies.

The Stage 1 Project NPV, with Scandium production assumed, using a discount rate of 8%, was pre-tax, A$580 million (US$406 million), and post-tax A$397 million (US$278 million), and an IRR of 32.7%. The payback period was determined at three (3) years from first production.

In determining the results of the DFS and Ore Reserves the following factors were considered.

Assumptions

Ionic Rare Earths developed a detailed project financial capital and operating model for the Project and in that model the following material assumptions were made.

The capital cost of the Project is US$120.8 M (including 10% Contingency) and were estimated within the DFS by Mincore Pty Ltd and IonicRE with expected accuracy of -10% to +15% with construction duration for the project of 12 months from Financial Investment Decision (FID).

Operating costs were estimated within the DFS and included allowances for mining, administration, reagent costs, transport to Mombasa and shipping to rare earth refineries, with a nominated east coast of the USA location.

- All In Sustaining Cost (AISC) for the operation is ~US$12.40/t ROM feed;
- AISC for the operation is ~US$53/kg REO equivalent produced;
- AISC for the operation is ~US$46/kg REO equivalent produced (including Sc_2O_3 by-product credit);

Freight prices are derived from an independent logistic consultant for the DFS and include port costs and charges, road and sea transportation.

A range of forecast long-term rare earth prices were provided by leading external economic forecasters (Adamas Intelligence) and were used in the financial modelling.

- A range of forecast long-term rare earth prices provided by leading external economic forecasters were considered. IonicRE provided detail of the pricing basis on page 19 of the announcement, with an escalating basket price to 2035, excluding Sc_2O_3.
- A long term Sc_2O_3 price of $775/kg has been applied based on leading external economic forecasters. Assumption is that the Sc_2O_3 pricing is based upon nominated purity of 99.9%.

Exchange rates are derived from external economic forecasters. An exchange rate if AUD/USD of $0.70 was used.

The DFS assumes that a Mixed Rare Earth Carbonate (MREC) containing scandium will be produced on site and sent to a refinery for processing. No allowances were made for penalties for failure to meet specification.

Financial commitments are outlined in the Mining Act by the Ugandan Government. These have been incorporated in the detailed project financial model, including production royalties at the rate of 5% of mine-gate gross revenue for Uganda and an income tax rate of 30 percent has been applied.

Average overall recovery estimates for each rare earth oxides are given in the table below:

La_2O_3	24%	Dy_2O_3	49%
CeO_2	10%	Ho_2O_3	49%
Pr_6O_{11}	28%	Er_2O_3	51%
Nd_2O_3	33%	Tm_2O_3	45%
Sm_2O_3	33%	Yb_2O_3	43%
Eu_2O_3	38%	Lu_2O_3	46%
Gd_2O_3	45%	Y_2O_3	52%
Tb_4O_7	45%	Sc_2O_3	10%

A payability factor of 70 per cent of the forecast rare earth and scandium prices has been applied for calculating revenue. This aligns with advice received from independent consultants and potential offtake partners.

As IonicRE is targeting selling MREC ex-China, prices should be taken at face value, i.e. excluding Chinese VAT deductions.

No impurity penalties have been applied. Assuming all elements contained in the MREC attract the highest prices in the market – that is high purity carbonate/oxides.

Ionic Rare Earths Limited (IonicRE) will own 60% of Ugandan incorporated joint venture company Rwenzori Rare Metals Limited (“RRM”), which in turn owns 100% of the Makuutu Rare Earth Project.

The DFS focused on the central Retention Licence (RL) 1693 and contains an Indicated Resource of 259 million tonnes at 740 ppm TREO (ASX 3 May 2022).

Maiden Ore Reserve for the Makuutu Stage 1 over RL 1693 of 172.9 Mt at 848 ppm TREO, or 584 ppm TREO – CeO_2, and 30 ppm Sc_2O_3 (ASX: 21 March 2023).

The Makuutu Stage 1 Study has been prepared to support the application for the granting of the Mining Licence over RL 1693, via Mining Licence Application (MLA) TN03834 which Rwenzori Rare Metals Limited (“RRM”) initiated in September 2022, and as such covered only the central tenement of the greater Makuutu resource area. It is anticipated that following the DFS, the Mining Licence over RL 1693 will be granted in the second quarter of 2023. A further staged development approach, including additional MLAs over the other five (5) tenements at Makuutu will progressively be considered which will cover the total Mineral Resource at Makuutu.

Mineral Resource and Ore Reserve Classification

The Mineral Resource estimate for the Makuutu Rare Earth Project was first released by the Company to ASX on 3 May 2022 and titled “Substantial Increase To Makuutu Resource To Over 500 Million Tonnes and estimated methods are further described in Sections 2 of JORC Table 1 attached to the DFS announcement made on 21 March 2023.

Classification of the mineral resource considered the interpretation confidence, drilling density, demonstrated continuity, estimation statistics (conditional bias, kriging efficiency) and block model validation results.

The Makuutu Mineral Resource has been classified into Indicated (76%) and Inferred (24%) categories. The assigned Mineral Resource classification reflects the Competent Person’s view of the deposit.

The Mineral Resource was reported using a cut-off grade of 200 parts per million (ppm) TREO minus CeO_2 (TREO-CeO_2) which was used to generate the 2023 Ore Reserves.

The DFS focused on the central Retention Licence (RL) 1693 and contains an Indicated Resource of 259 million tonnes at 740 ppm TREO which was used to generate the 2023 Ore Reserves. The Mineral Resources outside RL 1693 are excluded from the Ore Reserves.

The Mineral Resources reported are inclusive of the Ore Reserves for the Project.

The economic portions of the Indicated Mineral Resources were converted to Probable Ore Reserves from pit optimisation, mine scheduling and pit design studies. No inferred resources were utilised.

The Ore Reserve estimate and the confidence in the modifying factors applied is the outcome of a study undertaken to a Feasibility Study level with geological, metallurgical, geotechnical, engineering and mining engineering considerations. It has a nominal accuracy of ± 15% and applies to global estimates.

Mining method selected and other mining assumptions

The economic portions of the Mineral Resource were converted to Ore Reserves from pit optimisation, mine scheduling and pit design studies.

The Company proposes to mine the Makuutu deposits by conventional open pit mining methods using a selective mining approach. Mining of Ore is planned to be undertaken on 2m benches.

The mine designs include pits, haul roads, dump and stockpile designs and water management bunds and dams.

An allowance for grade control and pre-production drilling was included in the mining cost.

A regularised mining block model, as distinct from the sub-blocked resource model, was developed from the resource model by the application of a regular block size and estimation of the Mineral Resource model to a Standard Mining Unit (SMU) mining block model. An SMU of 10.0 m (X) by 10.0m (Y) by 2.0 m (Z) was used for the Makuutu deposits. Grades were re-estimated into the SMU but no other dilution is applied other than the inherent dilution built within the geological modelling as precursor to the Resource Modelling and Estimation. Appropriate mining recovery factors have been added to the regularised mining block model, which has been optimised using Datamine NPVS Optimisation software. The resultant optimal shell was then used as the basis for the detailed design to include pit wall angles and access ramps.

The Ore Reserve model is a recoverable reserve estimate that considers estimation of dilution and ore losses in the estimation based on a SMU.

No Inferred Mineral Resources are utilised in the Mining Studies.

The Makuutu DFS considered infrastructure requirements associated with the conventional excavator and truck mining operations and processing facilities including: heap desorption and conveying systems, dump & stockpile locations, plant and maintenance facilities, access routes, fuel, water and power, etc.

Mining will involve a pre-strip of 1m of topsoil which will be stockpiled adjacent to the pit. ROM mining will be selective with lower recovered rare earth grade open pit material stockpiled adjacent to the pit, whilst waste will be mined and paddock dumped adjacent to the pit. Open pit material will be hauled to the process plant. Once areas are completely mined out, the mined waste and heap desorption leach residue will be reclaimed and the mining void will be backfilled (progressive rehabilitation), prior to the topsoil spread back on the area disturbed.

Open pit mining equipment has been selected based on the mining methods production rates, short open pit haul distances for waste and plant feed, and relatively flat terrain at Makuutu. A Ugandan mining and drilling contractor has provided the mining operating costs for Chinese supplied equipment, on an owner operated basis and consistent with that used and operated in Uganda at other mining operations, inclusive of the following;

- 70 tonne Excavators (e.g. Liugong CLG970E)
- 40 tonne dump trucks (e.g. SinoTruk HOWO 40 Ton 8X4)
- 8 tonne Front End Loaders (e.g. Liugong CLG890H)
- Bulldozers (e.g. Liugong CLGB320)
- Graders (e.g. Liugong CLG4180)
- Fuel Trucks (e.g. SinoTruk 25m^3 Fuel Tanker Truck 6X4)
- Water trucks (e.g. SinoTruk 20m^3 Sino Water Tank Truck)
- Light utility vehicles
- Lighting towers are required for nightshift open pit and dumping activities

Processing method selected and other processing assumptions

The proposed metallurgical process for the Makuutu ore will apply heap desorption leach extraction with membrane solution purification and staged carbonate precipitation. This process has been demonstrated in the laboratory to be appropriate for the ionic adsorption clay style deposit present at Makuutu, the results of which have been used to develop the process design criteria for the process plant design as part of the DFS.

Heap desorption leach extraction and staged carbonate precipitation are both mature processing technologies that have been used extensively at commercial scale on ionic adsorption clay style deposits in China, for over 40 years, as an appropriate method of extracting rare earth elements from this type of ore. Membrane liquid separation is a mature processing technology that is used extensively on a commercial scale in many industrial applications, but is considered novel for the concentration and purification of rare earth elements leached from ionic adsorption clay style deposits.

Significant metallurgical test work has been undertaken on Makuutu samples to support the selected recovery factors. These include:

- Head characterisation (ALS Metallurgy, ANSTO Minerals, BV Minerals, SGS Lakefield);
- Bottle roll desorption leaches (712 tests at ALS Metallurgy and 330 tests at BV Minerals);
- Column desorption leaches, mostly at 3 m height, but up to 5 m height (39 tests at BV Minerals and 20 tests at ANSTO Minerals);
- Agglomeration testing (16 tests at BV Minerals, 10 tests at ANSTO Minerals, and 18 tests at HydroGeoSense);
- Nanofiltration testing (Ecotechnol);
- Precipitation testing (124 tests at ALS Metallurgy);
- Material handling testing (Jenike and Johanson);
- A variability bottle roll program was performed incorporating 528 drill intervals from various locations across RL1693. TREE-Ce extraction values ranged from 2%-83%; and
- A variability column desorption leach program was performed using 3 m columns and incorporating 22 composite samples from RL1693. Composites were prepared based on geographical domains and regolith types. TREE-Ce extraction values ranged from 24%-53%.

Two separate bulk samples were tested at two separate laboratories (ANSTO Minerals and BV Minerals) to confirm the suitability of heap desorption leaching for the Makuutu Ore. The samples constituting the composites were prepared from a range of intervals sourced from RL 1693, and were selected based on a wide spatial location and targeted proportions of regolith types approximately equal to the Resource tonnages. The samples were prepared, agglomerated, and loaded into 5 m columns, with test masses being 65-67 kg on a dry basis. Successful irrigation of these bulk samples and extraction of rare earth elements provided assurance that the processes are suitable for the Makuutu Ore. Pregnant desorption liquor solution recovered from these bulk tests was used for nanofiltration testing and precipitation testing.

The reagent consumption values for sulfuric acid, ammonium sulfate, and ammonium carbonate were derived from SysCAD simulation of the process. Inputs to the SysCAD model were taken from Makuutu test work results and thermodynamic data included with the software.

Based on the results of the metallurgical testing and process modelling, average overall recovery estimates for each rare earth oxide are given in the section headed assumptions.

Deleterious elements for the Makuutu Rare Earths Project are present in the form of semi-soluble gangue minerals that cannot be easily separated, or constitute, the minerals of interest. These deleterious elements include aluminium, calcium, iron, silicon, thorium, uranium, and zinc, all of which are present in the pregnant liquor solution to some extent. These deleterious minerals are rejected using membrane solution purification and staged carbonate precipitation, which allow production of a marketable mixed rare earth carbonate product.

The Basis of the cut-off grade(s)

For the 2023 Ore Reserves, a cut-off grade of 200 parts per million (ppm) TREO minus CeO_2 (TREO-CeO_2) was used to generate the Ore Reserves. IonicRE have completed numerous metallurgical studies on composite samples of mineralisation at Makuutu as previously announced to the ASX on 18 February 2020, 26 May 2020, and most recently 4 August 2020.

These results together with indicative mining and processing costs and other cost inputs supports application of a marginal cut-off grade of 200 ppm TREO (excluding CeO_2). This cut-off is comparable to peer projects with similar mineralisation types and processing assumptions.

Additionally, the cut-off grade of 200 ppm TREO (excluding CeO_2) criteria has been applied during pit optimisation and mine scheduling along with other modifying factors applied, which include rare earth prices, mining factors including ore loss and dilution, process recoveries for each rare earth oxide, operating costs, general and administration costs, royalties and payability factor.

The cut off parameters were estimated from profit algorithms which utilised the processing recoveries (based on metallurgical test work), costs (based on the DFS cost estimates) and revenues (based on independent marketing) for rare earth pricing.

Only material that generated a profit was considered as potential ore. Other material, such as Domain 1,2,3 – Cover zone, and Domain 8,9 – Basement zone are all classified as waste prior to pit optimisation.

Estimation Methodology

Mineral Resource

The Mineral Resource Estimate for the DFS was first disclosed to ASX on 3 May 2022.

The geological interpretation utilised lithological logging data, and assay data to guide and control the Mineral Resource estimation. Leapfrog™ implicit modelling software was utilised to generate three-dimensional wireframes of the applicable regolith units. Estimation domains were based on grouping of the regolith domains into six zones as defined by regolith rheology, and by comparison of regolith statistics:

- Domain 1,2,3 – Cover zone (Soil, Hardcap and Transition regolith zones)
- Domain 4 – Mottled zone (Mottled regolith zone)
- Domain 5 – Clay zone (Clay regolith zone)
- Domain 6 – Upper Saprolite zone
- Domain 7 – Lower Saprolite zone
- Domain 8,9 – Basement zone (Saprock and Fresh Rock regolith zones)

Drill hole sample data was flagged using domain codes generated from three-dimensional mineralisation domains. Sample data was composited to one-metre downhole lengths using a best fit-method. No residuals were generated. Statistical analysis was carried out on data from all estimated domains, with hard boundary techniques employed within each estimation domain.

Analysis of the composite data indicated the presence of outlier values indicating grade capping was required for Ce, Dy, Er, Eu, Gd, Ho, La, Lu, Nd, Pr, Sc, Sm, Tb, Th, Tm, U, Y and Yb. Capped values were generally selected above the 99th percentile.

A total of 15 REE grade attributes (Y, La, Ce, Pr, Nd, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb, and Lu), the associated element Sc, and 2 deleterious elements (U, and Th) were estimated. Final estimated values are converted to stoichiometric oxide values by calculation using published ratios to support reporting of rare earth oxides (REO). The grade estimation process was completed using Maptek Vulcan software using Ordinary Kriging (OK) together with dynamic anisotropy to guide the grade interpolation parallel to the regolith boundaries. For estimation domains with insufficient sample data a variogram model from a comparable domain was assigned.

Interpolation parameters were derived using standard exploratory data analysis techniques of statistical and continuity analysis. Appropriate interpolation strategies were developed on a domain basis using kriging neighbourhood analysis (“KNA”) with a minimum number of 8 composites and a maximum number of 20 composites, with an octant search applied with a restriction on the number of composites per octant set to five. Blocks were estimated in a two-pass strategy with first pass maximum search distances of 320 and 3,350 metres depending on estimation variable and domain. The second pass relaxed the minimum samples to four and removed the octant restriction.

The model has a block size of 100 m (X) by 100 m (Y) by 2 m (Z) with sub-celling of 25 m (X) by 25 m (Y) by 1m (Z). Within the Central Main area drilling has been completed at an average of 100 m (X) by 100 m (Y), with the parent cells in this area reduced to 50 m (X) by 50 m (Y) by 2 m (Z) with sub-celling of 25 m (X) by 25 m (Y) by 1m (Z). Grades were estimated into the parent cells.

The block model was validated using a combination of visual and statistical techniques including global statistics comparisons, correlation coefficients comparisons, and trend plots.

Ore Reserve

The ore reserve estimates underpinning the DFS are based on the Mineral Resource Estimates as well as mining methods, designs, schedules, cost estimates and modifying factors determined as part of the DFS and is set out in Appendix 2.

The process to establish an integrated DFS case was iterative, meaning that by working through this optimisation process, the individual mine schedules, mining sequences and models were optimised a number of times to deliver the DFS plan and ore reserves.

Material modifying factors

All required environmental approvals from the Ugandan Government were received in October 2022 for the Makuutu Rare Earths Project following the approval of the Environment Impact Study Analysis (ESIA) for the development of mining and processing infrastructure in Uganda.

The main Makuutu deposits (Central Makuutu and Central Makuutu East) containing the majority of the Mineral Resources and Ore Reserves are located in Uganda on Retention Licence 1693. This permit was granted to RRM on 2 November 2017 for an initial period of 3 years and was renewed (2 November 2020) for another 2 years. On 1st September 2022, Rwenzori Rare Metals Ltd (RRM) applied for a Mining licence (MLA TN03834) over RL1693, it is anticipated that this will be granted during the second quarter of 2023.

The other Makuutu deposits containing the remaining Mineral Resources are contained in retention licences (RL00234 and RL00007) and are in good standing.

Land Ownership is established through Land Access Agreements. The Company, via RRM, has initiated the next phase of land access agreements over the MLA at RL 1693, to agree a staged development at Makuutu with local landowners. Discussions and engagement with landowners are progressing well and the Company will update the market accordingly

Mining of the Makuutu deposits is dependent on new development of the following infrastructure:

- Open cut operations, haul roads, hydrometallurgical processing plant and associated infrastructure, reagent storage; and
- Power reticulation to the mine site from the Iganga-Busesa towns.

The capital costs for this infrastructure were estimated within the DFS.

Transport of all bulk commodities and reagents to site are via road delivered into Mombasa, Kenya and to site, with the main transport routes identified. Acid is proposed to be supplied from an existing sulfuric acid producer on the Kenya-Ugandan border.

Authorised for release by the Board of Ionic Rare Earths Limited

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The information in this report that relates to Mineral Resources for the Makuutu Rare Earths deposit was first released to the ASX on 3 May 2022 and is available to view on www.asx.com.au. Ionic Rare Earths Limited confirms that it is not aware of any new information or data that materially affects information included in the relevant market announcement, and that all material assumptions and technical parameters underpinning the estimates in the announcement continue to apply and have not materially changed.

The information in this report that relates to Ore Reserves for the Makuutu Rare Earths deposit was first released to the ASX on 21 March 2023 and is available to view on www.asx.com.au. Ionic Rare Earths Limited confirms that it is not aware of any new information or data that materially affects information included in the relevant market announcement, and that all material assumptions and technical parameters underpinning the estimates in the announcement continue to apply and have not materially changed.

The information in this report that relates to Production Targets or forecast financial information derived from production the production target for the Makuutu Rare Earths deposit was first released to the ASX on 21 March 2023 and is available to view on www.asx.com.au. Ionic Rare Earths Limited confirms that all material assumptions and technical parameters underpinning the Production Targets or forecast financial estimates in the announcement continue to apply and have not materially changed.

Appendix 1: Makuutu Rare Earths Project 3 May 2022 Mineral Resource Estimate Tabulations

Table 1: Makuutu Rare Earth Resource Tabulation at 200ppm TREO- CeO_2 Cut-off Grade.

Resource Classification	Tonnes (millions)	La_2O_3 (ppm)	CeO_2 (ppm)	Pr_6O_{11} (ppm)	Nd_2O_3 (ppm)	Sm_2O_3 (ppm)	Eu_2O_3 (ppm)	Gd_2O_3 (ppm)	Tb_4O_7 (ppm)	Dy_2O_3 (ppm)	Ho_2O_3 (ppm)	Er_2O_3 (ppm)	Tm_2O_3 (ppm)	Yb_2O_3 (ppm)	Lu_2O_3 (ppm)	Y_2O_3 (ppm)
Indicated	404	130	220	30	110	20	4	20	3	10	3	10	1	10	1	100
Inferred	127	110	180	30	90	20	3	10	2	10	2	10	1	10	1	80
Total	**532**	**130**	**210**	**30**	**110**	**20**	**4**	**20**	**2**	**10**	**3**	**10**	**1**	**10**	**1**	**90**

Notes: Tonnes are dry tonnes rounded to the nearest 1Mt.
All material REO grades are rounded to the nearest 10 ppm except Eu_2O_3, Tb_4O_7, Ho_2O_3, Tm_2O_3, Lu_2O_3 which are immaterial to overall resource grade.

Table 2: Makuutu Rare Earth Project Resource Tabulation of REO Reporting Groups at 200ppm TREO- CeO_2 Cut-off Grade.

Resource Classification	Tonnes (millions)	TREO (ppm)	TREO- CeO_2 (ppm)	CREO (ppm)	HREO (ppm)	LREO (ppm)	NdPr (ppm)	Sc_2O_3 (ppm)	U_3O_8 (ppm)	ThO_2 (ppm)
Indicated	404	670	450	230	170	500	150	30	10	30
Inferred	127	540	360	180	140	400	120	30	10	30
Total	**532**	**640**	**430**	**220**	**160**	**480**	**140**	**30**	**10**	**30**

Notes: All ppm rounded from original estimate to the nearest 10 ppm which may lead to differences in averages from Table 1.
Y_2O_3 is included in the TREO, HREO and CREO calculation.
TREO (Total Rare Earth Oxide) = $La_2O_3 + CeO_2 + Pr_6O_{11} + Nd_2O_3 + Sm_2O_3 + Eu_2O_3 + Gd_2O_3 + Tb_4O_7 + Dy_2O_3 + Ho_2O_3 + Er_2O_3 + Tm_2O_3 + Yb_2O_3 + Y_2O_3 + Lu_2O_3$.
CREO[1] (Critical Rare Earth Oxide) = $Nd_2O_3 + Eu_2O_3 + Tb_4O_7 + Dy_2O_3 + Y_2O_3$
HREO (Heavy Rare Earth Oxide) = $Sm_2O_3 + Eu_2O_3 + Gd_2O_3 + Tb_4O_7 + Dy_2O_3 + Ho_2O_3 + Er_2O_3 + Tm_2O_3 + Yb_2O_3$, + $Y_2O_3 + Lu_2O_3$
LREO (Light Rare Earth Oxide) = $La_2O_3 + CeO_2 + Pr_6O_{11} + Nd_2O_3$
NdPr = $Nd_2O_3 + Pr_6O_{11}$
U_3O_8 and ThO_2 are deleterious elements being reported in accordance with JORC (2012) Guidelines.

[1] U.S. Department of Energy, Critical Materials Strategy, December 2011

Appendix 2: Makuutu Rare Earths Project Stage 1 Ore Reserve Estimate Tabulations – Areas C, Central Zone, Central Zone East and F Only.

Table 3: Makuutu Stage 1 Ore Reserve Estimate Tabulation.

Classification	Tonnes (millions)	La_2O_3 (ppm)	CeO_2 (ppm)	Pr_6O_{11} (ppm)	Nd_2O_3 (ppm)	Sm_2O_3 (ppm)	Eu_2O_3 (ppm)	Gd_2O_3 (ppm)	Tb_4O_7 (ppm)	Dy_2O_3 (ppm)	Ho_2O_3 (ppm)	Er_2O_3 (ppm)	Tm_2O_3 (ppm)	Yb_2O_3 (ppm)	Lu_2O_3 (ppm)	Y_2O_3 (ppm)
Proven	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Probable	172.9	173	264	42	150	26	5	22	3	18	4	10	1	9	1	119
Total	**172.9**	**173**	**264**	**42**	**150**	**26**	**5**	**22**	**3**	**18**	**4**	**10**	**1**	**9**	**1**	**119**

Table 4: Maiden Makuutu Stage 1 Ore Reserve Estimate.

Classification	Tonnage (Mt)	TREO Grade (ppm)	TREO-CeO_2 Grade (ppm)	NdPr (ppm)	DyTb (ppm)	LREO (ppm)	HREO (ppm)	CREO (ppm)	Sc_2O_3 (ppm)	U_3O_8 (ppm)	ThO_2 (ppm)
Proven	-	-	-	-	-	-	-	-	-	-	-
Probable	172.9	848	584	192	21	629	219	295	30	16	31
Total	**172.9**	**848**	**584**	**192**	**21**	**629**	**219**	**295**	**30**	**16**	**31**

Notes: All ppm rounded from original estimate to the nearest 10 ppm which may lead to differences in averages from Table 1.

Y_2O_3 is included in the TREO, HREO and CREO calculation.

TREO (Total Rare Earth Oxide) = $La_2O_3 + CeO_2 + Pr_6O_{11} + Nd_2O_3 + Sm_2O_3 + Eu_2O_3 + Gd_2O_3 + Tb_4O_7 + Dy_2O_3 + Ho_2O_3 + Er_2O_3 + Tm_2O_3 + Yb_2O_3 + Y_2O_3 + Lu_2O_3$.

CREO[2] (Critical Rare Earth Oxide) = $Nd_2O_3 + Eu_2O_3 + Tb_4O_7 + Dy_2O_3 + Y_2O_3$

HREO (Heavy Rare Earth Oxide) = $Sm_2O_3 + Eu_2O_3 + Gd_2O_3 + Tb_4O_7 + Dy_2O_3 + Ho_2O_3 + Er_2O_3 + Tm_2O_3 + Yb_2O_3, + Y_2O_3 + Lu_2O_3$

LREO (Light Rare Earth Oxide) = $La_2O_3 + CeO_2 + Pr_6O_{11} + Nd_2O_3$

NdPr = $Nd_2O_3 + Pr_6O_{11}$

DyTb = $Dy_2O_3 + Tb_4O_7$

U_3O_8 and ThO_2 are deleterious elements being reported in accordance with JORC (2012) Guidelines.

[2] U.S. Department of Energy, Critical Materials Strategy, December 2011