

## Maiden Mixed Rare Earth Carbonate with Very High Dysprosium and Terbium Content

Engage with this announcement on our interactive [Investor Hub](#)

ANSTO has produced first mixed rare earth carbonate (MREC) sample product from Deep Leads deposit in northern Tasmania

Dysprosium and terbium (DyTb) content is 2.8 to 4.7 times higher than peer MRECs

Calculated basket price is up to 51% higher than peer MRECs

On behalf of ABx Group Limited (ASX: ABX) (**ABx** or the **Company**), the Australian Nuclear Science and Technology Organisation (**ANSTO**) has produced the first mixed rare earth carbonate (**MREC**) sample from the Deep Leads resource in northern Tasmania (Figure 2). The ABx MREC contains 4.0% dysprosium (Dy) and 0.7% terbium (Tb) as a percentage of total rare earth oxides (TREO), more than twice that of any other peer MREC (Table 1). Furthermore, the ABx MREC also contains the highest amounts of other valuable heavy rare earths and very low impurities, including aluminium, uranium and thorium.

The high proportions of these high value rare earths means that the ABx MREC basket price is 17% to 51% higher than all peer MRECs (Figure 1).

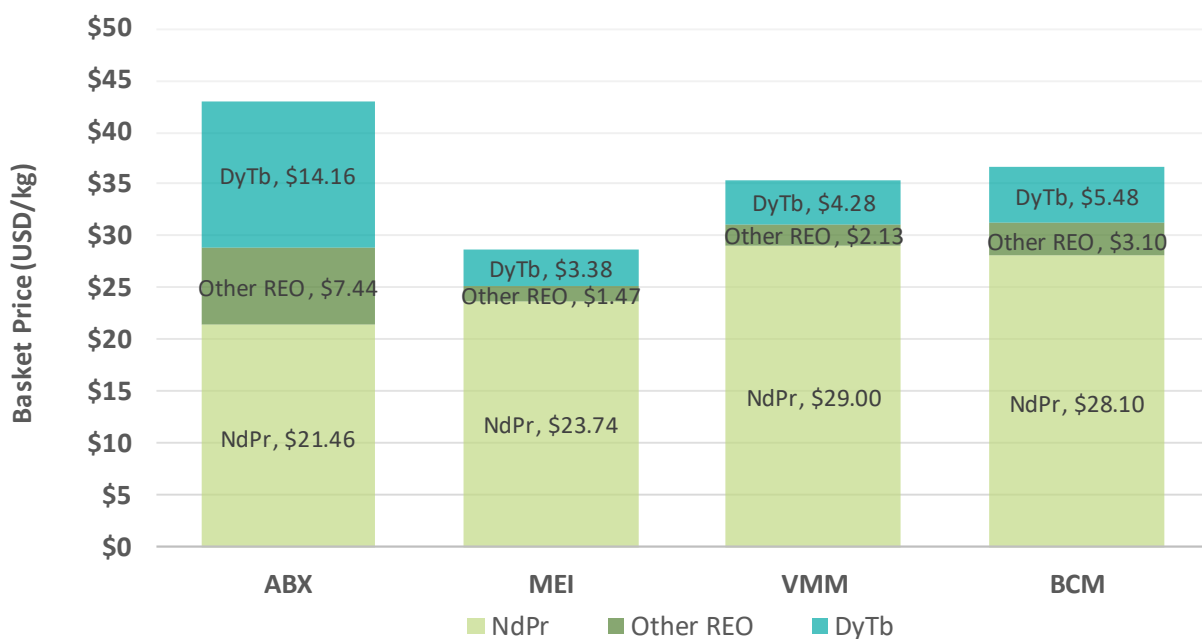


Figure 1: MREC basket price. See Table 6 for data.

For more information, please join ABx Group's interactive [Investor Hub](#)  
**ABx Group Limited**

Suite 2, Level 11, 385 Bourke St, Melbourne VIC 3000, Australia  
 ABN 14 139 494 885 | P: +61 3 9692 7222 | F: +61 2 9956 7355



For personal use only



**Figure 2: MREC produced from ABx Deep Leads deposit in northern Tasmania**

The production of MREC is a major milestone for ABx as it represents the saleable product used in downstream refining to produce separated rare earth oxides, rare earth metals and magnets essential for electric vehicle motors, wind turbines, robots and guidance systems.

**ABx Group Managing Director and CEO Mark Cooksey said:**

*"This is one of the most significant achievements of our rare earths project and we are simply delighted with this result, especially since it is our first MREC product and there is significant scope for optimisation. We've been eagerly anticipating confirmation of this MREC product, which is simply the best we know of from any ionic rare earth resource outside of China. Combined with the resource size, grade and ideal location near existing infrastructure, this means that the Deep Leads project is a highly compelling opportunity. We can't wait to share this result with our prospective customers and receive their feedback. The ABx MREC is likely to be particularly sought after by customers seeking high DyTb and low uranium and thorium."*

**Strategic Importance of MREC Production**

Producing a high-purity MREC from a bulk sample represents a critical milestone for ABx in the development of the Deep Leads project. Existing and prospective rare earth refineries are seeking high quality MRECs produced at low cost. MRECs with high proportions of Dy and Tb are in particular demand, because these elements have the most acute supply risk.<sup>1</sup> ABx has excellent prospects of meeting these requirements because:

1. Achieving high extractions at ambient temperatures and pressures with minimal acid in a short time is likely to lead to lower cost and lower impurities in the MREC product. For most clay-hosted rare earth deposits globally, minimal rare earth extraction is achieved using these process conditions;
2. The ABx MREC has a significantly higher proportion of Dy and Tb compared to peers.

<sup>1</sup> ASX Announcement, 23 April 2025

For personal use only

Magnet rare earth prices remain high, with Benchmark<sup>2</sup> reporting Dy oxide (DDP China) at over US\$200/kg and Tb oxide (DDP China) at over US\$900/kg. Furthermore, CIF Europe prices for Dy and Tb are over three times higher than Chinese domestic prices, illustrating the potential premium for non-China sources of rare earths.

ABx has already executed a Memorandum of Understanding with Ucore Rare Metals Inc. (TSXV: UCU) (OTCQX: UURAF)<sup>3</sup>, which is focussed on rare-earth processing facilities in North America, and ABx is also in discussions with additional potential offtake partners.

### Next Steps

The ABx MREC composition and samples of the MREC product will be shared with prospective customers and offtake partners for evaluation. ABx expects discussions and negotiations to deepen based on these results.

For the next stage of project development, ANSTO is conducting column leach tests on a bulk sample from the Deep Leads deposits. Preliminary results are expected in December.

### Bulk Sample Material

The source of the material for the MREC sample is a 100 kg bulk sample from trial pit DLP002 from the Deep Leads resource (Figure 4).<sup>4</sup>

### Mixed Rare Earth Carbonate (MREC) Production

This MREC was produced using the standard three-step process for ionic rare earths: leaching, impurity removal and precipitation. Firstly, 50 kg of the bulk sample was dried at 100 °C, ground to below <600 micron and leached in 150 kg of 0.3M ammonium sulfate (25wt% solids loading) at pH 4.5 for 30 minutes. Ammonium bicarbonate was added to raise the pH of the leached solution to 6.2, where it was held for 30 minutes, to remove impurities such as aluminium. Finally, additional ammonium bicarbonate was added to raise the pH to 7.4, where it was held for 2 hours to precipitate 72 g of MREC product.

Preliminary results from ANSTO indicate that the leaching and impurity removal performance were similar to those previously reported in leaching<sup>5</sup> and impurity removal<sup>6,7</sup> tests.

### Peer Identification

Ionic rare earths are defined here as those that can be leached from a deposit under the conditions listed in Table 2. This is commercially significant because these are the standard conditions under which MRECs have been commercially produced in China for many years.

<sup>2</sup> Benchmark Mineral Intelligence, 27 November 2025

<sup>3</sup> ASX Announcement, 4 September 2024

<sup>4</sup> ASX Announcement, 6 August 2025

<sup>5</sup> ASX Announcement, 17 September 2025

<sup>6</sup> ASX Announcement, 13 October 2025

<sup>7</sup> ASX Announcement, 6 November 2025

The peers considered here are those that meet the following criteria:

1. Publicly reported leaching tests indicated that the resource contains a significant proportion of ionic rare earths, i.e. numerous leach tests achieving more than 50% rare earth extraction under the conditions listed in Table 2;
2. An MREC sample has been produced, and the results publicly reported, by leaching under conditions listed in Table 2,<sup>8</sup> followed by impurity removal and MREC precipitation, both by raising the pH, with no other beneficiation or processing steps;
3. Deposit is not in China, Myanmar or Laos

The peer MRECs are listed in Table 3, along with the conditions under which each MREC was produced.

### Peer Comparison

MRECs can contain a variable level of moisture and hydration, which is removed when the MREC is calcined<sup>9</sup> to create a mixed rare earth oxide (**MREO**). It is more appropriate to compare the compositions of MREOs than MRECs, to eliminate the confounding effects of moisture and hydration. For this peer comparison, the anticipated MREO composition of each MREC has been calculated by normalising the sum of TREO + impurity oxides to 100%.

The compositions of each MREO are listed in Table 4, which also includes the Chinese Standard for mixed rare earth oxides produced from ionic rare earth deposits.<sup>10</sup> Most customers are likely to have their own specifications.

All MRECs assessed here meet the China Standard of minimum 93.4% TREO and the maximums for specified impurities, and their uranium and thorium contents are low. The ABx MREC has the lowest aluminium content, which is an impurity often of particular concern to customers.

The relative amount of each rare earth in each MREC are summarised in Table 1 and Figure 3. Crucially, the ABx MREC contains 2.8 to 4.7 times the proportion of DyTb compared to any other MREC. The ABx MREC also has the highest proportion of other valuable rare earths.

The relative amount of each rare earth dictates the basket price of the MREC, as shown in Table 6 and Figure 3. These have been calculated based on the compositions in Table 4 and the REO prices listed in Table 5.<sup>11</sup> The ABx basket price is US\$43/kg, 17-51% higher than the other MRECs. This is primarily due to the contribution of Dy and Tb.

<sup>8</sup> MRECs produced by heap or in-situ leaching are included even though this takes much longer than 30 minutes, provided that separate leach tests were conducted using the conditions listed in Table 2.

<sup>9</sup> Heated to high temperature

<sup>10</sup> GB/T 20169-2015, implemented on 1 April 2016

<sup>11</sup> SMM prices from Table 5 have been used

**Table 1: Proportions of REO in MRECs. See Peer Identification section for data sources**

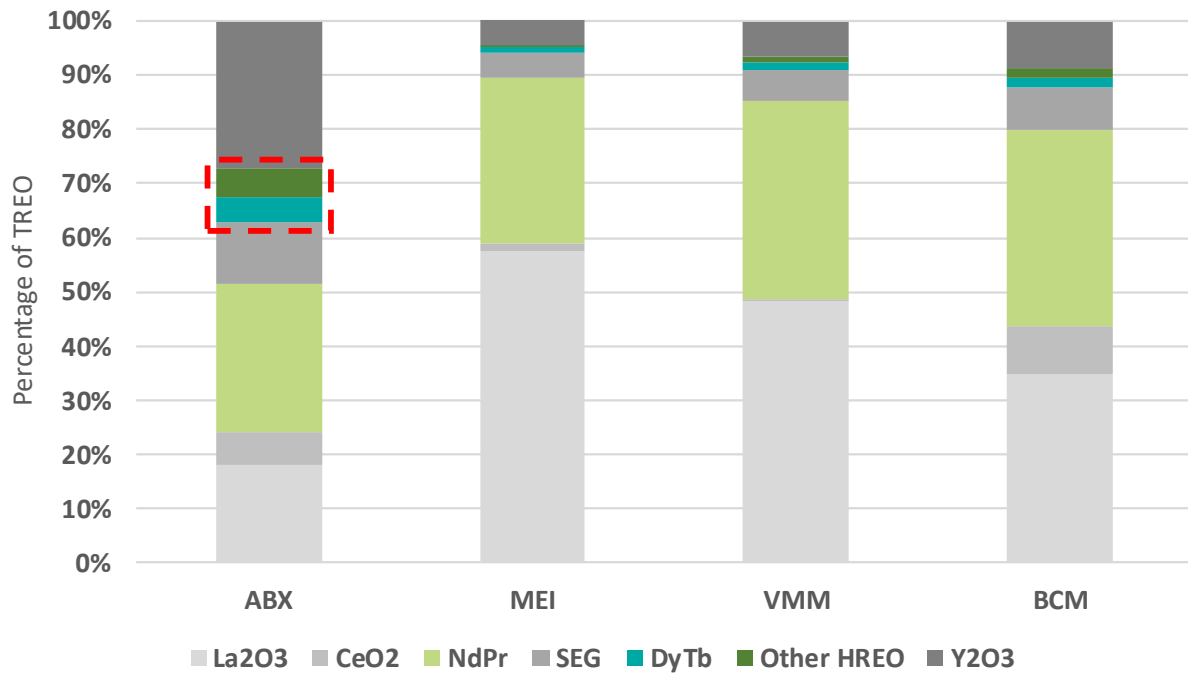
	ABX	MEI	VMM	BCM
La <sub>2</sub> O <sub>3</sub>	18.19	57.60	48.16	34.70
CeO <sub>2</sub>	5.79	1.40	0.56	8.90
NdPr	27.67	30.60	36.53	36.20
SEG	11.24	4.50	5.75	8.00
<b>DyTb</b>	<b>4.70</b>	<b>1.00</b>	<b>1.33</b>	<b>1.70</b>
Other REO	5.36	0.52	1.00	1.70
Y <sub>2</sub> O <sub>3</sub>	27.05	4.50	6.66	8.70
Total	100.0	100.0	100.0	100.0

NdPr = Pr<sub>6</sub>O<sub>11</sub> + Nd<sub>2</sub>O<sub>3</sub>

SEG = Sm<sub>2</sub>O<sub>3</sub> + Eu<sub>2</sub>O<sub>3</sub> + Gd<sub>2</sub>O<sub>3</sub>

DyTb = Tb<sub>4</sub>O<sub>7</sub> + Dy<sub>2</sub>O<sub>3</sub>

Other REO = Ho<sub>2</sub>O<sub>3</sub> + Er<sub>2</sub>O<sub>3</sub> + Tm<sub>2</sub>O<sub>3</sub> + Yb<sub>2</sub>O<sub>3</sub> + Lu<sub>2</sub>O<sub>3</sub>



**Figure 3: Relative distribution of rare earth oxides in MRECs. Red box highlights relatively high proportion of Dy, Tb and other heavy rare earth oxides in ABx MREC**

### ABx Rare Earth Resource

The Deep Leads – Rubble Mound and Wind Break discoveries contain a resource estimate of 89 million tonnes<sup>12</sup> averaging 844 ppm total rare earth oxides (TREO). The resource contains 36 ppm Dy+Tb (Dy+Tb is 4.4% of TREO), the highest of any ionic clay deposit in Australia and among the highest globally.<sup>13</sup>

This resource estimate has been defined from only 29% of the project's mineralised outline.

<sup>12</sup> 41 Mt inferred, 42 Mt indicated and 6 Mt measured

<sup>13</sup> ASX Announcement, 2 May 2024

For personal use only

This announcement is approved for release by the board of ABx Group Limited.

Go to the ABx [Investor Hub](#) to watch a video of this announcement and ask any questions of management.

### For further information please contact:

Dr Mark Cooksey

MD & CEO

ABx Group

+61 447 201 536

[mcooksey@abxgroup.com.au](mailto:mcooksey@abxgroup.com.au)

[www.abxgroup.com.au](http://www.abxgroup.com.au)

### Media

Chapter One Advisors

David Tasker / Alex Baker

+61 433 112 936 / +61 432 801 745

[dtasker@chapteroneadvisors.com.au](mailto:dtasker@chapteroneadvisors.com.au) /

[abaker@chapteroneadvisors.com.au](mailto:abaker@chapteroneadvisors.com.au)

### About ABx Group Limited

ABx Group Limited (ABx) is a uniquely positioned Australian company delivering materials for a cleaner future.

The three priority projects are:

- **Heavy rare earths:** Supplying light and heavy rare earths from Tasmania into Western supply chains
  - Maiden mixed rare earth carbonate produced
  - Processing Options Analysis conducted in partnership with external experts
- **Clean fluorine chemical production:** Producing industrial chemicals from aluminium smelter by-product (ALCORE)
  - Continuous pilot plant under construction in Bell Bay, Tasmania
- **Near-term bauxite production:** Mining bauxite resources for the aluminium, cement and fertiliser industries
  - Agreements executed with Good Importing International for bauxite projects in Queensland and New South Wales, and \$2.7 million initial payment has been received
  - Approvals well advanced for DL130 bauxite project in northern Tasmania

ABx endorses best practices on agricultural land and strives to leave land and environment better than we find it. We only operate where welcomed.

### **Disclaimer Regarding Forward Looking Statements**

This ASX announcement (Announcement) contains various forward-looking statements. All statements other than statements of historical fact are forward-looking statements. Forward-looking statements are inherently subject to uncertainties in that they may be affected by a variety of known and unknown risks, variables and factors which could cause actual values or results, performance, or achievements to differ materially from the expectations described in such forward-looking statements.

ABx does not give any assurance that the anticipated results, performance, or achievements expressed or implied in those forward-looking statements will be achieved.

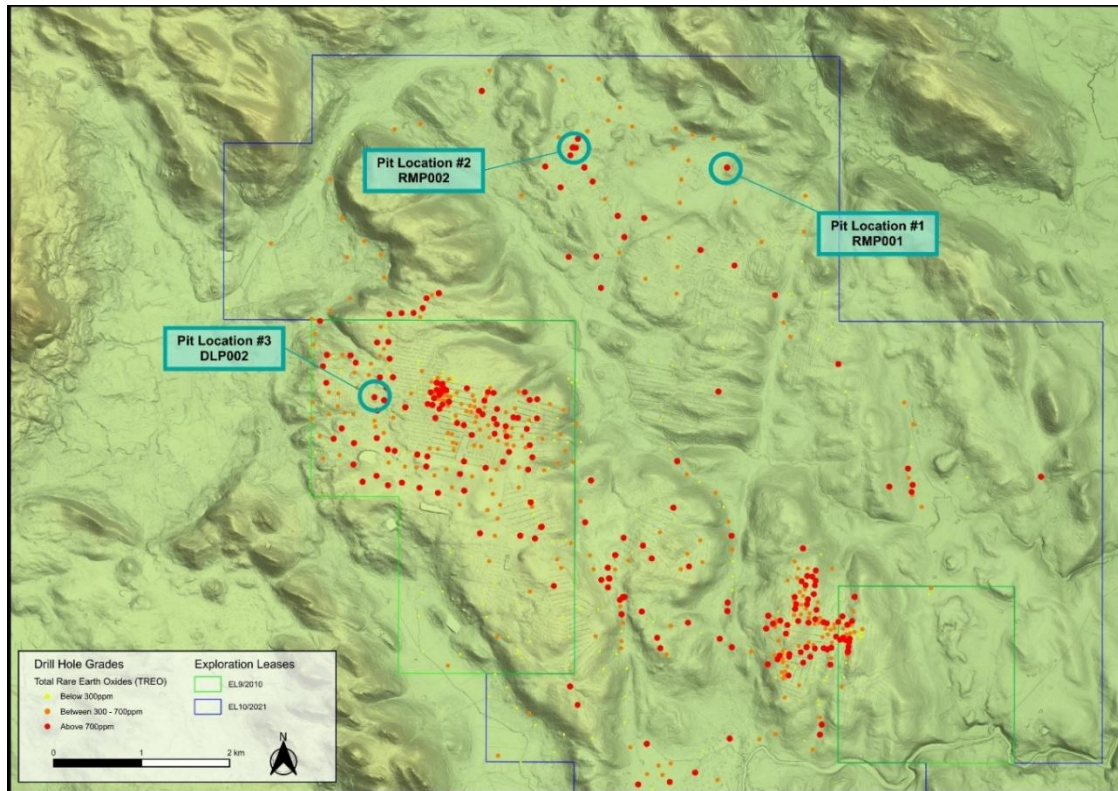
### **Competent Persons Statement**

The information in this report that relate to Exploration Information and Mineral Resources are based on information compiled by Ian Levy who is a member of The Australasian Institute of Mining and Metallurgy and the Australian Institute of Geoscientists. Mr Levy is a qualified geologist and a director of ABx Group Limited.

Mr Levy has sufficient experience, which is relevant to the style of mineralisation and type of deposit under consideration and to the activity, which he is undertaking to qualify as a Competent Person as defined in the 2012 Edition of the Australasian Code for Reporting of exploration Results, Mineral Resources and Ore Reserves. Mr Levy has consented in writing to the inclusion in this report of the Exploration Information in the form and context in which it appears.

For personal use only

## APPENDIX



**Figure 4: Trial pit locations at Deep Leads**

**Table 2: Leaching conditions to define ionic rare earths**

Parameter	Definition
Leachate	Salt, e.g. ammonium sulfate, magnesium sulfate
pH	4 or above
Temperature	Room
Pressure	Ambient
Leach Time	30 minutes maximum

**Table 3: Summary of processing conditions used to produce MRECs**

	ABX <sup>1</sup>	MEI <sup>2</sup>	VMM <sup>3</sup>	BCM <sup>4</sup>
pH	4.5	4.0	4.5	4.5
Temperature	Ambient	Ambient	Ambient	Ambient
Leachate <sup>5</sup>	AMSUL	AMSUL	AMSUL	MAGSUL
Concentration	0.3M	0.5M	0.3M	0.3M
Duration	30 min	30 min	30 min	30 min
Leachability (MagREO <sup>6</sup> )	64% <sup>6</sup>	74%	78%	68%
Precipitant <sup>7</sup>	ABC	ABC	ABC	MgO, MBC <sup>8</sup>
REE recovery on IR	>98%	>98%	>98%	N.R.

<sup>1</sup> ABx ASX Announcement, 6 November 2025

<sup>2</sup> Meteoric Resources ASX Announcement, 29 Feb 2024

<sup>3</sup> Viridis Mining & Minerals ASX Announcement, 12 Dec 2024 (Southern Complex)

For personal use only

<sup>4</sup> Brazilian Critical Minerals ASX Announcement, 11 Nov 2024

<sup>5</sup> AMSUL = ammonium sulfate, MAGSUL = magnesium sulfate

<sup>6</sup> MagREO = Pr<sub>6</sub>O<sub>11</sub> + Nd<sub>2</sub>O<sub>3</sub> + Tb<sub>4</sub>O<sub>7</sub> + Dy<sub>2</sub>O<sub>3</sub>

<sup>7</sup> ABC = ammonium bicarbonate

<sup>8</sup> Magnesium oxide (MgO) was used for impurity removal and magnesium bicarbonate (MBC, Mg(HCO<sub>3</sub>)<sub>2</sub>) was used for MREC precipitation

**Table 4: Normalised<sup>1</sup> composition of peer MRECs (wt%)**

	Oxide	ABX	MEI	VMM	BCM	Chinese Standard <sup>2</sup>
REO	La <sub>2</sub> O <sub>3</sub>	17.56	55.59	47.57	33.49	-
	CeO <sub>2</sub>	5.59	1.35	0.55	8.59	-
	Pr <sub>6</sub> O <sub>11</sub>	4.96	8.30	8.56	6.85	-
	Nd <sub>2</sub> O <sub>3</sub>	21.75	21.23	27.52	28.08	-
	Sm <sub>2</sub> O <sub>3</sub>	4.53	2.32	3.04	4.44	-
	Eu <sub>2</sub> O <sub>3</sub>	1.44	0.58	0.72	0.48	-
	Gd <sub>2</sub> O <sub>3</sub>	4.88	1.45	1.92	2.80	-
	<b>Tb<sub>4</sub>O<sub>7</sub></b>	<b>0.66</b>	<b>0.19</b>	<b>0.22</b>	<b>0.29</b>	-
	<b>Dy<sub>2</sub>O<sub>3</sub></b>	<b>3.87</b>	<b>0.77</b>	<b>1.10</b>	<b>1.35</b>	-
	Ho <sub>2</sub> O <sub>3</sub>	0.83	0.10	0.19	0.19	-
	Er <sub>2</sub> O <sub>3</sub>	2.23	0.29	0.43	0.68	-
	Tm <sub>2</sub> O <sub>3</sub>	0.30	0.01	0.05	0.10	-
	Yb <sub>2</sub> O <sub>3</sub>	1.56	0.10	0.28	0.58	-
	Lu <sub>2</sub> O <sub>3</sub>	0.24	0.01	0.04	0.10	-
	Y <sub>2</sub> O <sub>3</sub>	26.11	4.34	6.58	8.40	-
	TREO	96.53	96.63	98.77	96.51	93.4
	NdPr <sup>3</sup>	26.71	29.53	36.09	34.97	-
	DyTb <sup>3</sup>	4.54	0.97	1.31	1.64	-
Impurities	Al <sub>2</sub> O <sub>3</sub>	0.43	0.61	0.56	0.91	1.5
	CaO	0.50	0.93	0.15	0.09	-
	Fe <sub>2</sub> O <sub>3</sub>	0.20	0.19	<0.02	0.10	-
	MgO	<0.03	N.R.	<0.03	0.91	-
	SiO <sub>2</sub>	0.64	0.24	0.12	<0.35	1.5
	U <sub>3</sub> O <sub>8</sub>	0.0053	0.0096	0.0043	0.021	-
	ThO <sub>2</sub>	<0.002	0.00007	<0.00002	<0.002	-
	Total <sup>4</sup>	3.47	3.37	1.23	3.49	-

<sup>1</sup> MREC is normalised to MREO by calculating the expected product composition after calcination to a moisture-free and hydration-free mixed oxide state, i.e. containing only REO and impurity oxides

<sup>2</sup> Chinese Standard has been normalised to remove 1.5% loss on ignition

<sup>3</sup> NdPr = Pr<sub>6</sub>O<sub>11</sub> + Nd<sub>2</sub>O<sub>3</sub>, DyTb = Tb<sub>4</sub>O<sub>7</sub> + Dy<sub>2</sub>O<sub>3</sub>

<sup>4</sup> Includes other impurities not individually listed

For personal use only

**Table 5: Rare earth oxide prices (USD/kg)**

REO	SMM <sup>1</sup>	Benchmark Mineral Intelligence <sup>2</sup>	
		(DDP China)	(CIF EU)
La <sub>2</sub> O <sub>3</sub>	\$0.63	-	-
CeO <sub>2</sub>	\$1.63	-	-
Pr <sub>6</sub> O <sub>11</sub>	\$80.63	-	-
Nd <sub>2</sub> O <sub>3</sub>	\$80.28	-	-
Sm <sub>2</sub> O <sub>3</sub>	\$2.32	\$2.12	-
Eu <sub>2</sub> O <sub>3</sub>	\$23.24	-	-
Gd <sub>2</sub> O <sub>3</sub>	\$22.39	-	-
Tb <sub>4</sub> O <sub>7</sub>	\$918.95	\$927.08	\$3,500
Dy <sub>2</sub> O <sub>3</sub>	\$208.44	\$218.55	\$975
Ho <sub>2</sub> O <sub>3</sub>	\$69.57	-	-
Er <sub>2</sub> O <sub>3</sub>	\$49.01	-	-
Tm <sub>2</sub> O <sub>3</sub>	\$115.29 <sup>3</sup>	-	-
Yb <sub>2</sub> O <sub>3</sub>	\$14.08	-	-
Lu <sub>2</sub> O <sub>3</sub>	\$725.30	-	-
Y <sub>2</sub> O <sub>3</sub>	\$6.48	-	-

<sup>1</sup> 26 November 2025. Ex-works including 13% VAT

<sup>2</sup> 27 November 2025

<sup>3</sup> Ginger International Trade & Investment, 27 November 2025 (SMM price not available)

**Table 6: MREO basket prices, calculated from MREO compositions in Table 4 and SMM REO prices in Table 5 (USD/kg)**

REO	ABX	MEI	VMM	BCM
La <sub>2</sub> O <sub>3</sub>	\$0.11	\$0.35	\$0.30	\$0.21
CeO <sub>2</sub>	\$0.09	\$0.02	\$0.01	\$0.14
Pr <sub>6</sub> O <sub>11</sub>	\$4.00	\$6.69	\$6.91	\$5.53
Nd <sub>2</sub> O <sub>3</sub>	\$17.46	\$17.05	\$22.09	\$22.57
Sm <sub>2</sub> O <sub>3</sub>	\$0.11	\$0.05	\$0.07	\$0.10
Eu <sub>2</sub> O <sub>3</sub>	\$0.33	\$0.13	\$0.17	\$0.11
Gd <sub>2</sub> O <sub>3</sub>	\$1.09	\$0.32	\$0.43	\$0.63
Tb <sub>4</sub> O <sub>7</sub>	\$6.08	\$1.77	\$2.00	\$2.66
Dy <sub>2</sub> O <sub>3</sub>	\$8.07	\$1.61	\$2.29	\$2.82
Ho <sub>2</sub> O <sub>3</sub>	\$0.58	\$0.07	\$0.13	\$0.13
Er <sub>2</sub> O <sub>3</sub>	\$1.09	\$0.14	\$0.21	\$0.33
Tm <sub>2</sub> O <sub>3</sub>	\$0.35	\$0.01	\$0.06	\$0.11
Yb <sub>2</sub> O <sub>3</sub>	\$0.22	\$0.01	\$0.04	\$0.08
Lu <sub>2</sub> O <sub>3</sub>	\$1.77	\$1.07	\$0.29	\$0.70
Y <sub>2</sub> O <sub>3</sub>	\$1.69	\$0.28	\$0.43	\$0.54
<b>TREO</b>	<b>\$43.06</b>	<b>\$28.59</b>	<b>\$35.41</b>	<b>\$36.68</b>
NdPr <sup>1</sup>	\$21.46	\$23.74	\$29.00	\$28.10
DyTb <sup>2</sup>	\$14.16	\$3.38	\$4.28	\$5.48
Other REO <sup>3</sup>	\$7.44	\$1.47	\$2.13	\$3.10

<sup>1</sup>Sum of the basket values of Nd<sub>2</sub>O<sub>3</sub> and Pr<sub>6</sub>O<sub>11</sub>

<sup>2</sup>Sum of the basket values of Dy<sub>2</sub>O<sub>3</sub> and Tb<sub>4</sub>O<sub>7</sub>

<sup>3</sup>Sum of the basket values of La<sub>2</sub>O<sub>3</sub>, CeO<sub>2</sub>, Sm<sub>2</sub>O<sub>3</sub>, Eu<sub>2</sub>O<sub>3</sub>, Gd<sub>2</sub>O<sub>3</sub>, Ho<sub>2</sub>O<sub>3</sub>, Er<sub>2</sub>O<sub>3</sub>, Tm<sub>2</sub>O<sub>3</sub>, Yb<sub>2</sub>O<sub>3</sub>, Lu<sub>2</sub>O<sub>3</sub>, and Y<sub>2</sub>O<sub>3</sub>

**Table 7 - Summary of sampling information referred to above, in accordance with LR 5.8.1**

<b>Geology and geological interpretation</b>	REE mineralisation occurs in clay layers that overlie a Jurassic age dolerite basement in a district with some residual weathered Tertiary age alkali basalt.
<b>Sampling and sub-sampling techniques</b>	Pit sampling was done at 1 metre intervals using a large excavator with an 8 metre boom. Subsampling of ~180kg was done by fractional shovelling. This sample was dried, crushed to 25mm and ground to minus 5mm. Further subsampling to collect the 100kg samples for ANSTO processing was done by increment division on disk-ground powder in accordance ISO Standard 6140. See Figures 5 & 6 below.
<b>Drilling techniques</b>	Not applicable (N.A.). Bulk pit sampling by excavator
<b>Criteria used for resource classification, drill &amp; data spacing &amp; distribution.</b>	N.A.
<b>Sample analytical method</b>	Assay samples are analysed by standard NATA-approved induction coupled plasma analytical methods for rare earth elements at ALS labs in Brisbane (method ME-MS81). Interlab comparisons were satisfactory.
<b>Estimation methodology, cut off grade, mining, metallurgy &amp; other modifying factors</b>	All N.A.

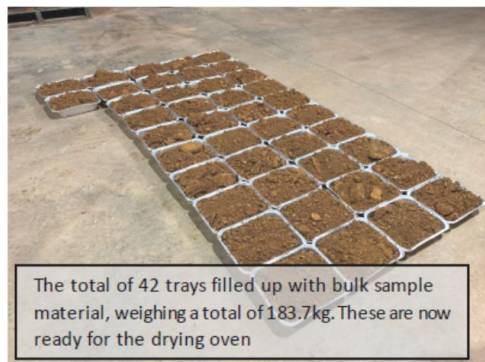
For personal use only



Bulk bag placed onto tarp ready for sampling to commence

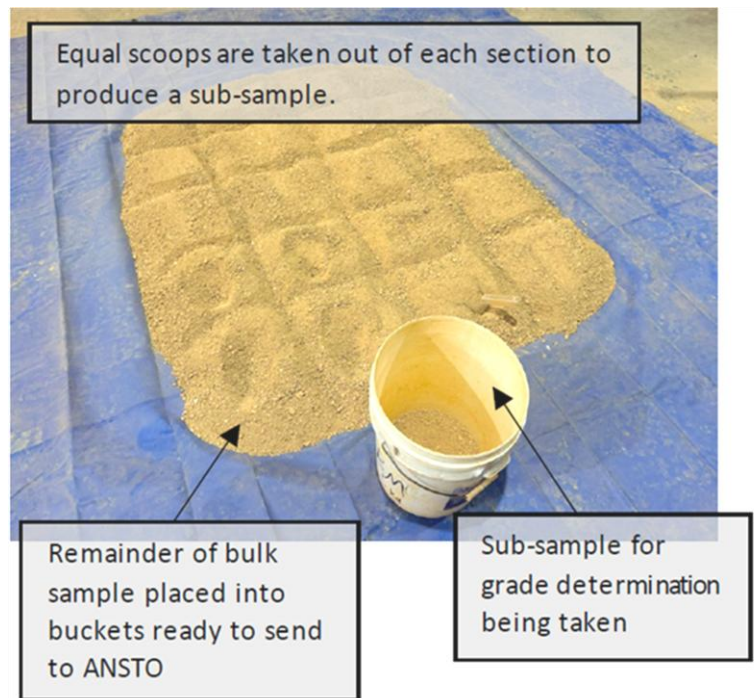


Working around the bulk sample, sub-samples from varying locations taken and placed into heat-proof trays



The total of 42 trays filled up with bulk sample material, weighing a total of 183.7kg. These are now ready for the drying oven

**Figure 5 (left): handling the bulk sample from the pit,** Preparations for drying the 183.7kg bulk sample in 42 trays



**Figure 6 (above): Increment subsampling of the 100kg ANSTO sample crush and ground to less than 5mm.**

Subsampling done in accordance with International Standard ISO 6140 at the ABX Research Laboratory at Western Junction, Launceston, Tasmania.

## JORC Code, 2012 Edition – Table 1

### Section 1 Sampling Techniques and Data

Criteria	JORC Code explanation	Commentary
Sampling techniques	<ul style="list-style-type: none"> <li>Nature and quality of sampling</li> <li>Include reference to measures taken to ensure sample representivity</li> <li>Aspects of the determination of mineralisation that are Material to the Public Report.</li> <li>Industry standard work:</li> </ul>	<ul style="list-style-type: none"> <li>Bulk pit dug by excavator</li> <li>Samples taken at 1 metre intervals by cleaning pit at the metre interval, then taking full 1 metre slice for the samples.</li> <li>Subsampling the metre samples done as per ISO bauxite sampling processes</li> </ul>
Drilling techniques	<ul style="list-style-type: none"> <li>Drill type</li> </ul>	<ul style="list-style-type: none"> <li>Not applicable to bulk pits excavated by excavator with 8 metre boom</li> </ul>
Drill sample recovery	<ul style="list-style-type: none"> <li>Method of recording and assessing core and chip sample recoveries and results assessed.</li> </ul>	<ul style="list-style-type: none"> <li>Not applicable to bulk pits</li> </ul>
Logging	<ul style="list-style-type: none"> <li>Whether samples have been geologically and geotechnically logged to an appropriate level for metallurgical studies.</li> <li>Whether sampling is qualitative or quantitative.</li> <li>Total length &amp; percentage of the relevant intersections logged.</li> </ul>	<ul style="list-style-type: none"> <li>Pits sampled, assayed, logged, photographed &amp; stored to ISO standards. See below</li> <li>All 8 metres was logged and sampled</li> <li>Depth 5m to 6m selected – see below</li> </ul>
Sub-sampling techniques and sample preparation	<ul style="list-style-type: none"> <li>If core, whether cut or sawn, quarter, half or all core.</li> <li>If non-core, sample method, whether sampled wet or dry.</li> <li>Nature, quality &amp; appropriateness of the sample preparation.</li> <li>Quality control procedures adopted for all sub-sampling stages to maximise representivity of samples.</li> <li>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.</li> <li>Whether sample sizes are appropriate to the grain size of the material being sampled.</li> </ul>	<ul style="list-style-type: none"> <li>Depth 5m to 6m selected for the sample to be used to produce a mixed carbonate rare earth carbonate (MREC)</li> <li>100kg samples produced by drying 600kg, comminution, subsampling by increment division in accordance ISO Standard 6140 at ABx Research Lab, Launceston that is a recognised sampling lab for bulk products including shipping of bauxite.</li> <li>Separate subsamples assayed the same</li> </ul>
Quality of assay data and laboratory tests	<ul style="list-style-type: none"> <li>The nature, quality and appropriateness of the assaying and laboratory procedures used and whether the technique is considered partial or total.</li> <li>Geophysical tools, spectrometers, handheld XRF instruments, etc, the parameters used in determining the analysis</li> <li>Nature of quality control procedures adopted.</li> </ul>	<ul style="list-style-type: none"> <li>Assaying done by NATA-registered ALS laboratories, Brisbane</li> <li>N.A. Assays are by ALS which is a major mineral laboratory</li> <li>ALS is industry-standard and publishes its QA/QC protocols and results on its website</li> </ul>
Verification of sampling and assaying	<ul style="list-style-type: none"> <li>The verification of significant intersections by either independent or alternative company personnel.</li> <li>The use of twinned holes.</li> <li>Documentation of primary data, data entry procedures, data verification, data storage (physical and electronic) protocols.</li> <li>Discuss any adjustment to assay data.</li> </ul>	<ul style="list-style-type: none"> <li>Pit sampling supervised by 4 ABx senior staff – see Competent Person &amp; Expert Statement for details.</li> <li>Repeated subsampling assayed the same.</li> <li>Metal assays from ALS converted to oxides as per industry standards for reporting</li> </ul>
Location of data points	<ul style="list-style-type: none"> <li>Accuracy &amp; quality of surveys used to locate drill holes &amp; pits.</li> <li>Specification of the grid system used.</li> <li>Quality and adequacy of topographic control.</li> </ul>	<ul style="list-style-type: none"> <li>Location by GPS</li> <li>Pit DLP002 location: 477720E , 5410126N (WGS 84 56S grid). RL 287.675m by LiDAR.</li> </ul>
Data spacing and distribution	<ul style="list-style-type: none"> <li>Data spacing for reporting of Exploration Results.</li> <li>Whether the data spacing and distribution is sufficient.</li> <li>Whether sample compositing has been applied.</li> </ul>	<ul style="list-style-type: none"> <li>Bulk pit sampling at 1m intervals considered appropriate and sufficient</li> </ul>
Orientation of data in relation to geological structure	<ul style="list-style-type: none"> <li>Whether the orientation of sampling achieves unbiased sampling of possible structures and the extent to which this is known, considering the deposit type.</li> <li>Does the drilling orientation introduce a sampling bias</li> </ul>	<ul style="list-style-type: none"> <li>Vertical bulk pit sampling is appropriate for the horizontal layers of REE mineralisation</li> </ul>
Sample security	<ul style="list-style-type: none"> <li>The measures taken to ensure sample security.</li> </ul>	<ul style="list-style-type: none"> <li>Chain of custody protocols were applied to secure the bulk bag samples.</li> </ul>
Audits or reviews	<ul style="list-style-type: none"> <li>The results of any audits or reviews of sampling techniques and data.</li> </ul>	<ul style="list-style-type: none"> <li>Two bulk samples taken simultaneously assayed the same</li> </ul>

For personal use only

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

Criteria	JORC Code explanation	Commentary
Mineral tenement and land tenure status	<ul style="list-style-type: none"> <li>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.</li> <li>Security of tenure and impediments to obtaining a licence to operate.</li> </ul>	<ul style="list-style-type: none"> <li>EL7/2010 100% owned and unencumbered. Pit located in a pine plantation with approvals from owner and government agencies.</li> </ul>
Exploration by other parties	<ul style="list-style-type: none"> <li>Acknowledgment and appraisal of exploration by other parties.</li> </ul>	<ul style="list-style-type: none"> <li>ABx sole discoverer and first to explore this area.</li> </ul>
Geology	<ul style="list-style-type: none"> <li>Deposit type, geological setting and style of mineralisation.</li> </ul>	<ul style="list-style-type: none"> <li>REE mineralisation occurs in clay layers that overlie a Jurassic age dolerite basement in a district with some residual weathered Tertiary age alkali basalt.</li> </ul>
Drill hole Information	<ul style="list-style-type: none"> <li>Summary of information for understanding exploration results including a tabulation of the following information for all material drill holes:               <ul style="list-style-type: none"> <li>easting and northing of the drill hole collar</li> <li>elevation or RL (Reduced Level – elevation above sea level in metres)</li> <li>dip and azimuth of the hole</li> <li>down hole length and interception depth</li> <li>hole length.</li> </ul> </li> <li>If exclusion of this information is justified, the Competent Person should clearly explain why this is the case.</li> </ul>	<ul style="list-style-type: none"> <li>Pit DLP002 location: 477720E , 5410126N (WGS 84 56S grid). RL 287.675m by LiDAR.</li> </ul>
Data aggregation methods	<ul style="list-style-type: none"> <li>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.</li> <li>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.</li> <li>The assumptions used for any reporting of metal equivalent values should be clearly stated.</li> </ul>	<ul style="list-style-type: none"> <li>No aggregation or any cutting of assays done</li> <li>Metal assays from ALS converted to oxides as per industry standards for reporting</li> </ul>
Relationship between mineralisation widths & intercept lengths	<ul style="list-style-type: none"> <li>These relationships are particularly important.</li> <li>If the geometry of the mineralisation with respect to the drill hole angle is known, its nature should be reported.</li> <li>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').</li> </ul>	<ul style="list-style-type: none"> <li>Vertical bulk pit sampling is appropriate for the horizontal layers of REE mineralisation</li> </ul>
Diagrams	<ul style="list-style-type: none"> <li>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.</li> </ul>	<ul style="list-style-type: none"> <li>See report</li> </ul>
Balanced reporting	<ul style="list-style-type: none"> <li>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.</li> </ul>	<ul style="list-style-type: none"> <li>All data to date is reported in this report</li> </ul>
Other substantive exploration data	<ul style="list-style-type: none"> <li>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.</li> </ul>	<ul style="list-style-type: none"> <li>All data to date is reported in this report</li> </ul>
Further work	<ul style="list-style-type: none"> <li>The nature and scale of planned further work (eg tests for lateral extensions or depth extensions or large-scale step-out drilling).</li> <li>Diagrams clearly highlighting the areas of possible extensions, including the main geological interpretations and future drilling areas, provided this information is not commercially sensitive.</li> </ul>	<ul style="list-style-type: none"> <li>ANSTO labs are engaged to undertake the processing on the 100kg sample to produce a mixed rare earth carbonate (MREC)</li> </ul>