



Company Announcement, Tuesday 1<sup>st</sup> October, 2013

## High Quality Rare Earth Product Confirms Efficiency and Effectiveness of Kvanefjeld Process Route

Greenland Minerals and Energy Ltd ("GMEL" or "the Company") has continued to advance the refinery circuit for the Kvanefjeld project, located in southern Greenland. An effective hydrometallurgical process route has been developed for the treatment of the rare earth and uranium-rich mineral concentrates generated via froth flotation. The refinery utilises simple equipment and elegant chemistry, with scaled-up test work now having produced a high purity rare earth intermediate product. A recent full flowsheet laboratory test run on the Kvanefjeld mineral concentrate has produced 1.1 kg of a high-purity mixed rare earth carbonate.

The mixed rare earth intermediate product is a chemical precipitate formed by the addition of sodium carbonate to a purified rare earth chloride stream. This produces a mixed rare earth carbonate intermediate product. It is low in impurities and contains 94% rare earth oxide (REO) after calcination. The rare earth carbonate product has a favourable REO distribution with 14.75% of the contained rare earths being the more valuable heavy RE elements (see Table 1).

Low levels of calcium (1.26%), aluminium (0.12%) and silica (0.5%) were the most significant impurities. Very low levels of uranium (11 ppm), lead (1.4 ppm) and thorium (2.5 ppm) were measured in the sample which reveals how well these radionuclides were controlled by the impurity removal processes.

The successful production of a significant quantity of rare earth carbonate displays the effectiveness of the Kvanefjeld refining process in producing a high quality product. All process steps in the refining process have now been tested at bench scale or small continuous scale. The process engineering for the refinery is well advanced with key process design documents completed. The non-refractory nature of the Kvanefjeld ore minerals allows for simple, atmospheric acid leach circuits, without the complex high-temperature acid back or caustic cracking processes that are required in many RE operations.

With the process to produce a high-quality RE intermediate product now well established, the Company is working on the evaluation of processes to isolate cerium and lanthanum from the 'critical' rare earths (Pr, Nd, Eu, Dy, Tb, Y). The demand outlook for critical rare earths is strong, with ongoing supply concerns and strong pricing forecasts. The de-coupling of the critical rare earths from the bulk light rare earths in cerium and lanthanum provides greater marketing flexibility and value recognition.



**Table 1.** Distribution of rare earth elements in the intermediate rare earth carbonate produced from Greenland's Kvanefjeld project. The product contains a favourable distribution of the important heavy REO's (Eu – Y).

Element	% REO Distribution	14.75% HREO Distribution
La	27.19%	
Ce	37.15%	
Pr	4.57%	
Nd	13.42%	
Sm	2.92%	
Eu	0.20%	
Gd	1.76%	
Tb	0.31%	
Dy	1.36%	
Ho	0.23%	
Er	0.60%	
Tm	0.07%	
Yb	0.30%	
Lu	0.02%	
Y	9.89%	

Yours faithfully,



Roderick McIlree

Managing Director

Greenland Minerals and Energy Ltd

## **ABOUT GREENLAND MINERALS AND ENERGY LTD.**

Greenland Minerals and Energy Ltd (ASX – GGG) is an exploration and development company focused on developing high-quality mineral projects in Greenland. The Company's flagship project is the 100% owned Kvanefjeld multi-element deposit (Rare Earth Elements, Uranium, Zinc), that is rapidly emerging as a premier specialty metals project. A comprehensive pre-feasibility study has demonstrated the potential for a large-scale, cost-competitive, multi-element mining operation. For further information on Greenland Minerals and Energy visit <http://www.ggg.gl> or contact:

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Greenland Minerals and Energy Ltd will continue to advance the Kvanefjeld project in a manner that is in accord with both Greenlandic Government and local community expectations, and looks forward to being part of continued stakeholder discussions on the social and economic benefits associated with the development of the Kvanefjeld Project.

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*The information in this report that relates to exploration targets, exploration results, geological interpretations, appropriateness of cut-off grades, and reasonable expectation of potential viability of quoted rare earth element, uranium, and zinc resources is based on information compiled by Mr Jeremy Whybrow. Mr Whybrow is a director of the Company and a Member of the Australasian Institute of Mining and Metallurgy (AusIMM). Mr Whybrow has sufficient experience 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 by the 2004 edition of the "Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves". Mr Whybrow consents to the reporting of this information in the form and context in which it appears.*

*The geological model and geostatistical estimation for the Kvanefjeld and Zone 2 deposits were prepared by Robin Simpson of SRK Consulting. Mr Simpson is a Member of the Australian Institute of Geoscientists (AIG), and has sufficient experience 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 by the 2004 edition of the "Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves". Mr Simpson consents to the reporting of information relating to the geological model and geostatistical estimation in the form and context in which it appears.*