

Company Announcement, 9 July 2020

## **Kvanefjeld Project:**

### **By-Products to Deliver Economic and Environmental Benefits**

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**Greenland Minerals Ltd** ('GML' or 'the Company') is pleased to provide an overview of the economic and environmental implications of the production of by-products from the Company's 100% owned Kvanefjeld rare earth project ('Kvanefjeld' or 'the Project'). When developed, Kvanefjeld will be one of the world's largest producers of rare earths (REs), producing in excess of 30,000 tpa of rare earth oxide (equivalent) in an intermediate product. The intermediate product will contain very significant quantities of the critical magnet rare earths **neodymium, praseodymium, terbium and dysprosium**.

Kvanefjeld will also recover a series of by-products during production of the RE intermediate product. The Project will produce commercially significant quantities of uranium oxide, zinc concentrate, and fluorspar. At current prices, rare earths are forecast to contribute over 90% of Project revenues. The incremental cost of by-product recovery is low and the by-product revenue generated contributes to lower the production cost of rare earths. Importantly, the recovery of by-products has the effect of removing environmentally adverse elements from the Project's tailings streams thereby reducing the Project's overall environmental impact.

#### **Uranium**

The Kvanefjeld deposit contains a large low-grade uranium resource, of which a significant proportion is hosted within the main RE minerals. To produce a high-purity intermediate RE product it is necessary to remove the uranium via a uranium recovery circuit. The uranium will be recovered as uranium peroxide (UO<sub>4</sub>) and will meet the specifications set by uranium conversion facilities.

The annual cost of removing approximately 475 tpa of uranium is around US\$5M. Uranium sales is estimated to be US\$45Mpa, which represents a significant gross margin contributor.

Uranium production reduces the environmental impact of the Project and would also contribute to the reduction of global greenhouse gas emissions through power generation. Recovering uranium also reduces the volume of uranium disposed of in tailings and residual radioactivity in the Project area.

#### **Zinc**

Zinc occurs throughout the Kvanefjeld deposit at a grade of approximately 0.23%. The zinc is recovered in a flotation concentrate at the first stage in the RE production process. The removal of zinc prior to RE flotation, reduces the chemical treatment stages in the refinery circuit.

The zinc concentrate will contain ~50% zinc which is comparable to other zinc concentrates traded internationally. The Project will produce ~6,000tpa of zinc concentrate to generate approximately US\$6Mpa (1% of revenue) after allowing for treatment charges.

The removal and sale of zinc reduces the environmental impact of the Project by reducing the amount of zinc sulphide in tailings.

### **Fluorspar**

The Kvanefjeld deposit contains the water soluble mineral villiaumite which is the source of fluoride in the Project area. In the upper levels of the deposit much of the villiaumite has been dissolved by groundwater, and as a result, the levels of fluoride in groundwater are naturally elevated.

Remaining fluoride is dissolved from ore in the RE flotation circuit, where it plays an important role in the RE flotation process, as a depressant of non-RE bearing (waste) minerals. The flotation process water is recycled to produce the optimum concentration of fluoride to facilitate RE flotation performance. Fluorspar is precipitated from a bleed stream from this water cycle process and is thickened, filtered, and washed. The presence of fluorine brings a cost saving, as otherwise an alternate depressant would be required in the flotation process.

Kvanefjeld will produce metallurgical grade fluorspar (Metspar) which is used in the production of steel, cement and ceramics. The Project will produce 12,500tpa of high grade Metspar. Fluorspar will add approximately US\$4Mpa of revenue.

Fluorspar production reduces the amount of fluoride to be managed within the Project area. The management of residual fluorine is addressed in the EIA, currently under review.

### **Economic Implications**

Annually, by products will generate US\$60M in revenue for the Project, reducing the cost of producing REs by approximately US\$1.90/kg of RE, or 40% of the cost of producing a RE intermediate product in Greenland. This ensures Kvanefjeld will be one of the lowest-cost, globally significant producers of rare earths.

**-ENDS-**

Authorised by:  
Dr John Mair  
Managing Director

## ABOUT GREENLAND MINERALS LTD.

Greenland Minerals 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 Kvanefjeld Rare Earth Project. A pre-feasibility study was finalised in 2012, and a comprehensive feasibility study was completed in 2015 and updated following pilot plant operations in 2016. The studies demonstrated the unique and highly advantageous strengths of the Kvanefjeld Project and outlined the potential for Kvanefjeld to be developed as a long-life, low cost, and large-scale producer of rare earth elements; key enablers to the electrification of transport systems.

GML is working closely with major shareholder and strategic partner Shenghe Resources Holding Co Ltd to develop Kvanefjeld as a cornerstone of future rare earth supply. An exploitation (mining) license application for the initial development strategy was reviewed by the Greenland Government through 2016 -19 and was updated in 2019 following addition supporting studies.

In 2017-18, GML undertook technical work programs with Shenghe Resources Holding Co Ltd that improved the metallurgical performance and simplified the development strategy and infrastructure footprint in Greenland, with optimised Feasibility Study outcomes announced in mid-2019. This defined a significantly enhanced project cost-structure and a direct alignment with downstream processing. In addition, the Company continues its focus on working closely with Greenland's regulatory bodies on the processing of the mining license application and maintaining regular stakeholder updates.

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Greenland Minerals 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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### **Competent Person Statement – Mineral Resources Ore Reserves and Metallurgy**

*The information in this report that relates to Mineral Resources is based on information compiled by Mr Robin Simpson, a Competent Person who is a Member of the Australian Institute of Geoscientists. Mr Simpson is employed by SRK Consulting (UK) Ltd ("SRK") and was engaged by Greenland Minerals Ltd on the basis of SRK's normal professional daily rates. SRK has no beneficial interest in the outcome of the technical assessment being capable of affecting its independence. Mr Simpson has sufficient experience that is relevant to the style of mineralisation and type of deposit under consideration and to the activity being undertaken to qualify as a Competent Person as defined in the 2012 Edition of the 'Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves'. Robin Simpson consents to the inclusion in the report of the matters based on his information in the form and context in which it appears.*

*The information in the statement that relates to the Ore Reserves Estimate is based on work completed or accepted by Mr Damien Krebs of Greenland Minerals Ltd and Mr Scott McEwing of SRK Consulting (Australasia) Pty Ltd. The information in this report that relates to metallurgy is based on information compiled by Damien Krebs.*

*Damien Krebs is a Member of The Australasian Institute of Mining and Metallurgy and has sufficient experience that is relevant to the type of metallurgy and scale of project under consideration, and to the activity he is undertaking, to qualify as Competent Persons in terms of The Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves (JORC Code, 2012 edition). The Competent Persons consent to the inclusion of such information in this report in the form and context in which it appears.*

*Scott McEwing is a Fellow and Chartered Professional of The Australasian Institute of Mining and Metallurgy and has sufficient experience that is relevant to the style of mineralisation and type of deposit under consideration, and to the activity he is undertaking, to qualify as Competent Persons in terms of The Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves (JORC Code, 2012 edition). The Competent Persons consent to the inclusion of such information in this report in the form and context in which it appears.*

The mineral resource estimate for the Kvanefjeld Project was updated and released in a Company Announcement on February 12<sup>th</sup>, 2015. The ore reserve estimate was released in a Company Announcement on June 3<sup>rd</sup>, 2015. There have been no material changes to the resource estimate, or ore reserve since the release of these announcements.