GREENLAND
MINERALS AND ENERGY LTD

Company Announcement, September 24th, 2015

# Kvanefjeld Refinery Pilot Plant Yields Excellent Initial Results

- **First phase of refinery pilot plant successfully completed at Outotec's research laboratories in Finland**
- **Pilot plant operated continuously for approximately 250 hours, utilising mineral concentrate generated by the concentrator pilot plant conducted in May, 2015**
- **High rare earth extractions of approximately 95% achieved, comfortably exceeding Feasibility Study design assumptions of 77%, uranium extractions of approximately 85% achieved in line with Feasibility Study assumptions**
- **Design parameters for thickening, reagent selection and filtration firmed up**
- **Outputs from refinery pilot plant will feed into optimisation studies to further strengthen project economics**
- **Next steps include conditioning of residues that contain rare earths, re-leach with mild hydrochloric acid, impurity removal, and generation of a hi-purity product**
- **Kvanefjeld refinery pilot plant conducted in conjunction with, and partly funded by the EURARE program, which aims to increase rare earth raw materials supply to Europe**

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Greenland Minerals and Energy Limited ('GMEL' or 'the Company') has continued to advance and de-risk the process route for the Kvanefjeld Project. Following on from the successful concentrator pilot plant operations in Finland in May 2015, the refinery pilot plant operation is currently underway and will continue into October, 2015.

The first phase of the refinery pilot plant has been completed at Outotec Pori Research Laboratories, Finland, with excellent results. The Pori Research Laboratories are part of the wider group of Outotec, the global metallurgical technology and equipment supplier.

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## Kvanefjeld Refinery Pilot Plant - Phase 1

In collaboration with Outotec and EURARE, the Company has successfully completed the first phase of piloting the refinery process. The work was partly funded by the EURARE program, and aimed to produce a high-purity rare earth concentrate free of uranium and thorium, for separation test work that will be the next stage of the EURARE program.

Outotec Pori Research Laboratories have extensive experience with atmospheric leaching having invented and developed the HydroCopper® process. This process consists of a counter current leach of copper sulphide concentrates to directly produce LME quality copper products. The experience and equipment in developing this process was applied to the Kvanefjeld refining process.

Overall approximately 250 kg of rare earth and uranium mineral concentrate was treated over a period of 250 hours. This stage of the refinery pilot plant operated from 31st of August until Friday the 11th of September.

This initial refinery pilot stage has met and exceeded present endpoint objectives, with rare earth extractions of 95% being notably higher than feasibility study design criteria (77% extraction). Uranium extraction measured approximately 85%, broadly in line with Feasibility Study assumptions. High plant availabilities were also observed. Samples were taken during operation to confirm the design parameters for thickening, reagent selection and filtration.

## Further Refinery Pilot Plant Operations

The subsequent phases of the refinery piloting program are scheduled to continue through September and into October 2015. Phase 2 consists of metathesis, which conditions the residues produced from phase 1 with caustic to allow easy re-leaching. Phase 3 consists of a mild hydrochloric acid re-leach, impurity removal and rare earth intermediate product precipitation. The rare earth product will be a mixture of all 15 rare earths which is provided for further processing as part of the EURARE program.

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"The EURARE project has received funding from the European Community's Seventh Framework Programme ([FP7/2007-2013]) under grant agreement n°309373. This publication reflects only the author's view, exempting the Community from any liability". Project web site: www.eurare.eu"

**Material Flow During EURARE Demonstration Work Package for Kvanefjeld Ore**

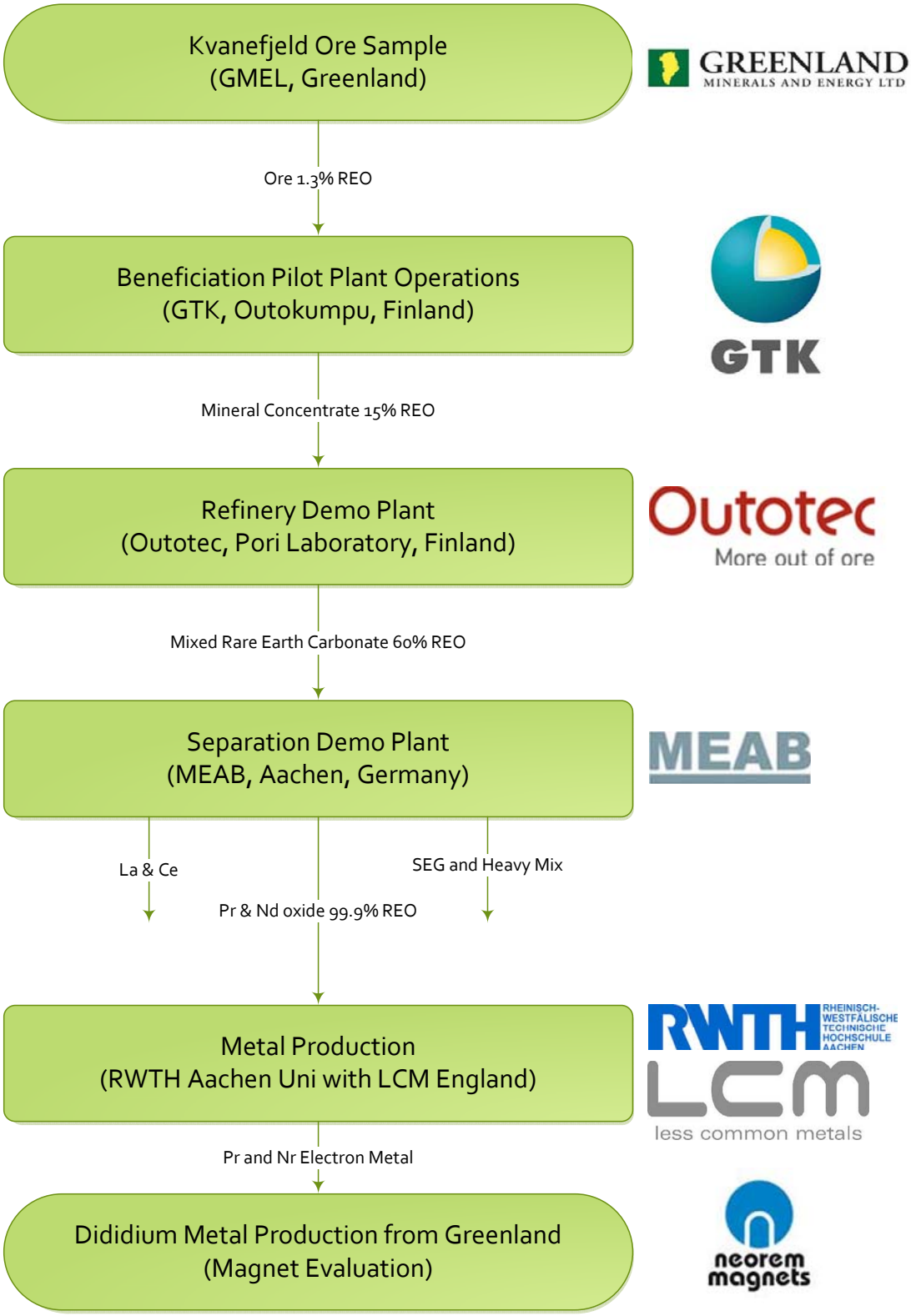


Figure 1: Flow of Kvanefjeld Raw Materials through the EURARE program

**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 Kvanefjeld multi-element deposit (rare earth elements, uranium, zinc), that stands to be the world's premier specialty metals project. A pre-feasibility study was finalised in 2012, and a comprehensive feasibility study was completed in May, 2015. The studies demonstrate the potential for a large-scale, long-life, cost-competitive, multi-element mining operation. Through 2015, GMEL is focussed on completing a mining license application in order to commence project permitting, in parallel to advancing commercial discussions with development partners. 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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## *Competent Person Statement – Mineral Resources and Ore Reserves*

*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 and Energy 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 and Energy Ltd and Mr Scott McEwing of SRK Consulting (Australasia) Pty Ltd.*

*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 12th, 2015. The ore reserve estimate was released in a Company Announcement on June 3rd, 2015. There have been no material changes to the resource estimate, or ore reserve since the release of these announcement.

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# Developing the world's premier specialty metals project

www.ggg.gl | **Kvanefjeld Refinery Pilot Plant Stage 1, September 2015**

# About Outotec Research Laboratories

## Highly Skilled and Experienced in Atmospheric Leaching

- Located in Pori, Finland
- Part of Outotec Global Metallurgy
- Highly skilled and experienced in atmospheric leaching
- Developed the ‘HYDROCOPPER®’ process
- Excellent hydrometallurgical expertise
- State-of-the-art facilities

# Outotec Research Laboratories

## Sustainable Use of Earth's Natural Resources

# The Refinery Pilot Plant Operation

## 250 Kilograms of Concentrate Treated

- **1st Kvanefjeld Refinery Pilot Plant Performed**
  - Previously completed 100 hour continuous leach tests
- **Concentrate from 26 tonne flotation pilot plant in May 2015**
- **Fully integrated two stage leach**
- **Part of the EURARE Program**
  - The EURARE program aims to encourage the sustainable supply of EU rare earth raw materials

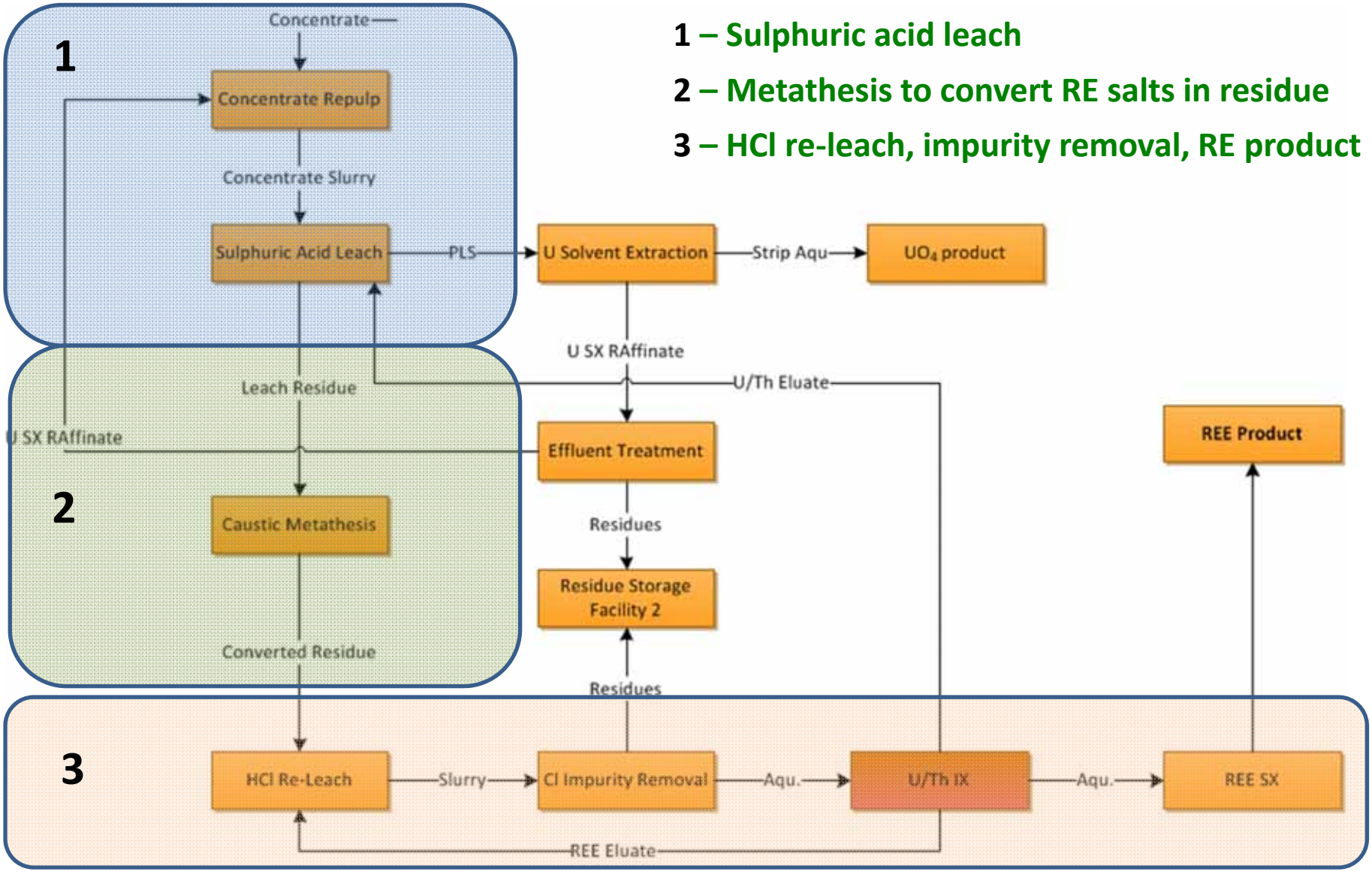
# Pilot Plant Flowsheet

## Three Phases to the Refinery Process

1 – Sulphuric acid leach

2 – Metathesis to convert RE salts in residue

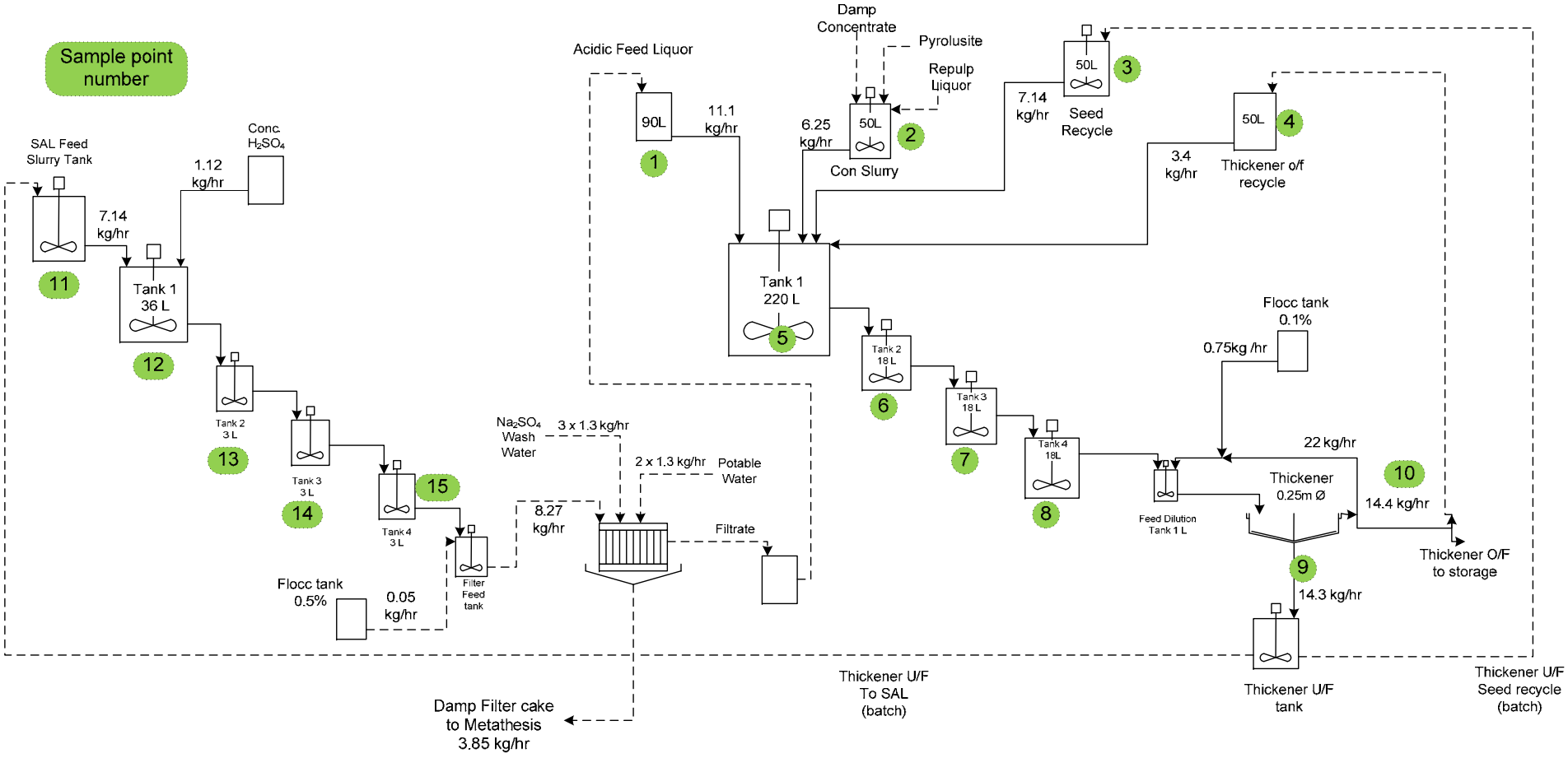
3 – HCl re-leach, impurity removal, RE product



# Pilot Plant Flowsheet Phase 1

## Counter Current Atmospheric Leach with Two Products

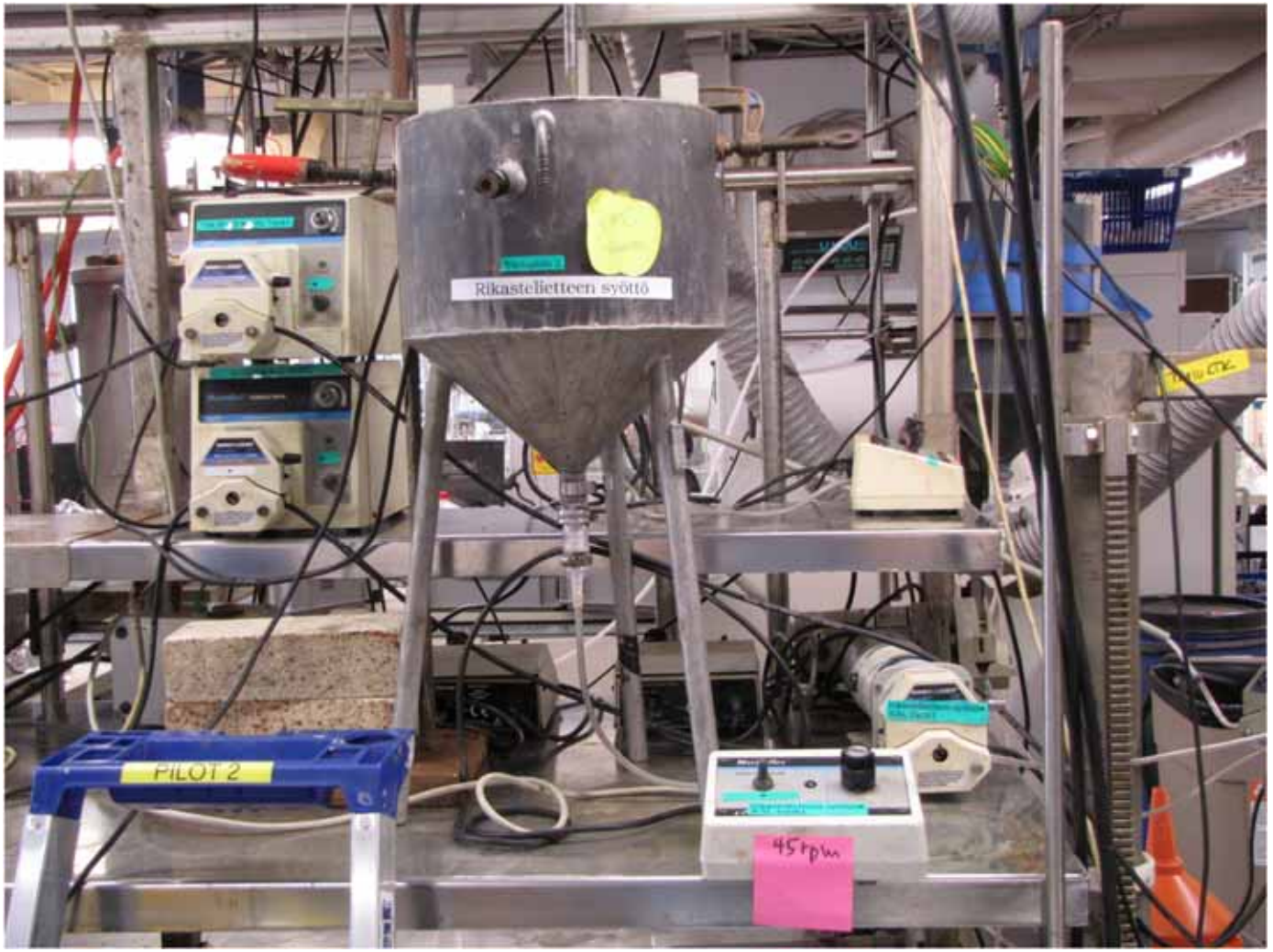
### Two Stage Counter Current Leach Circuit




Outotec's **'HYDROCOPPER®'** process utilises counter current atmospheric leach technology

# Concentrate Storage

## Process Piloted in Three Phases



# Weak Acid Leach Tank 1

## Large Tank Used to Assess Scale and Seeding

# Weak Acid Leach Circuit

## Continuously Stirred Tank Reactors

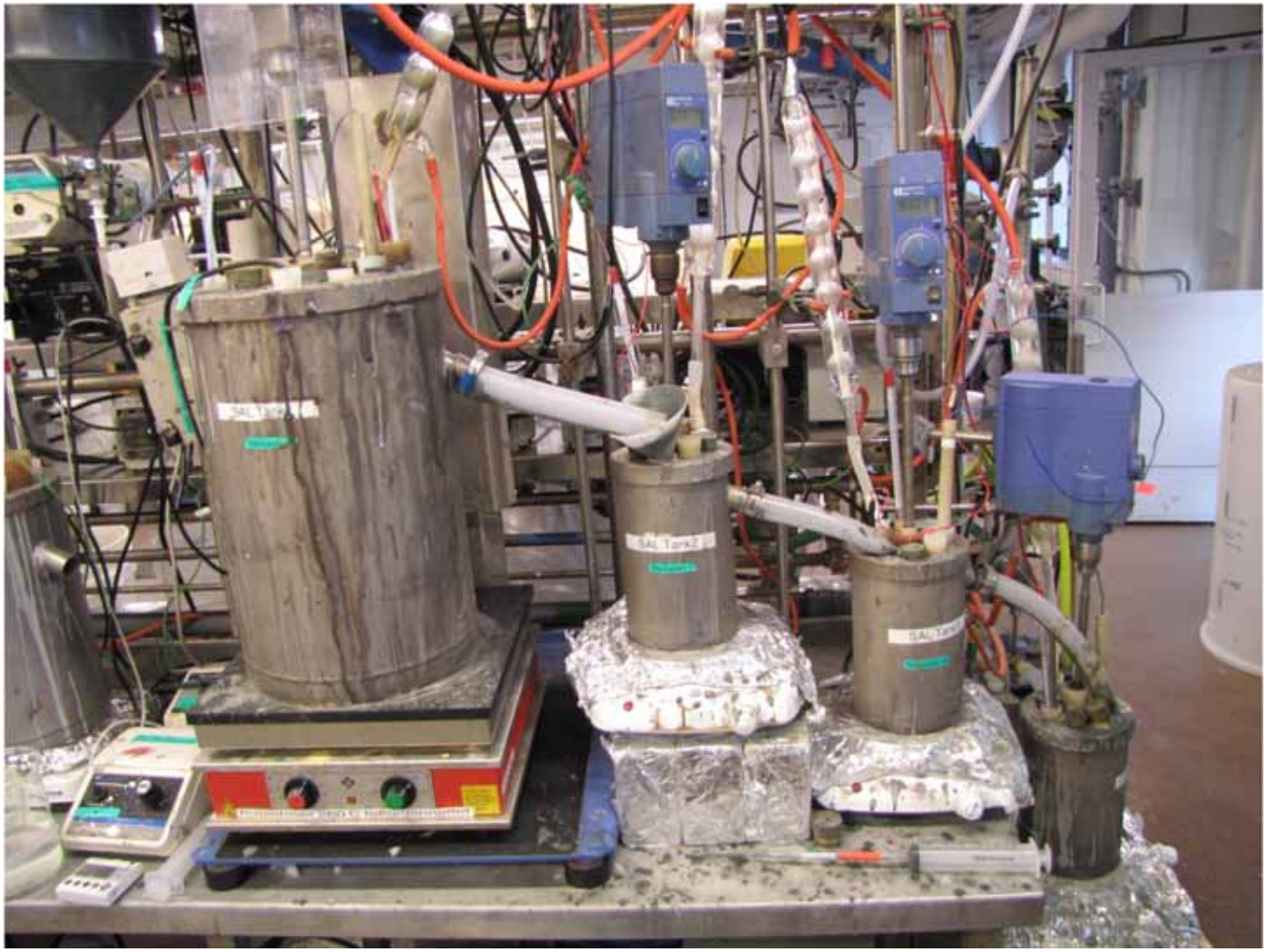
Outotec

# Weak Acid Leach Thickener

## Clear Overflows Produced, Suitable for Downstream Processing

# Strong Acid Leach Circuit

## Ensures High Extractions of Rare Earth Elements and Uranium



# Strong Acid Leach Filtration

## Good Filtration Observed for Strong Acid Leach Discharge

# Strong Acid Leach Filter Cake

## Rare Earths in Filter Cake Ready for Next Phase … Metathesis

# Weak Acid Leach Thickener Over Flow

## Uranium Solution Ready for Solvent Extraction

# Pilot Plant Facilities

## Great Facilities and Long 250 Hours of Operation

- Computer controlled circuit
- Operated from Monday 31st August till Friday 11th of September, 2015

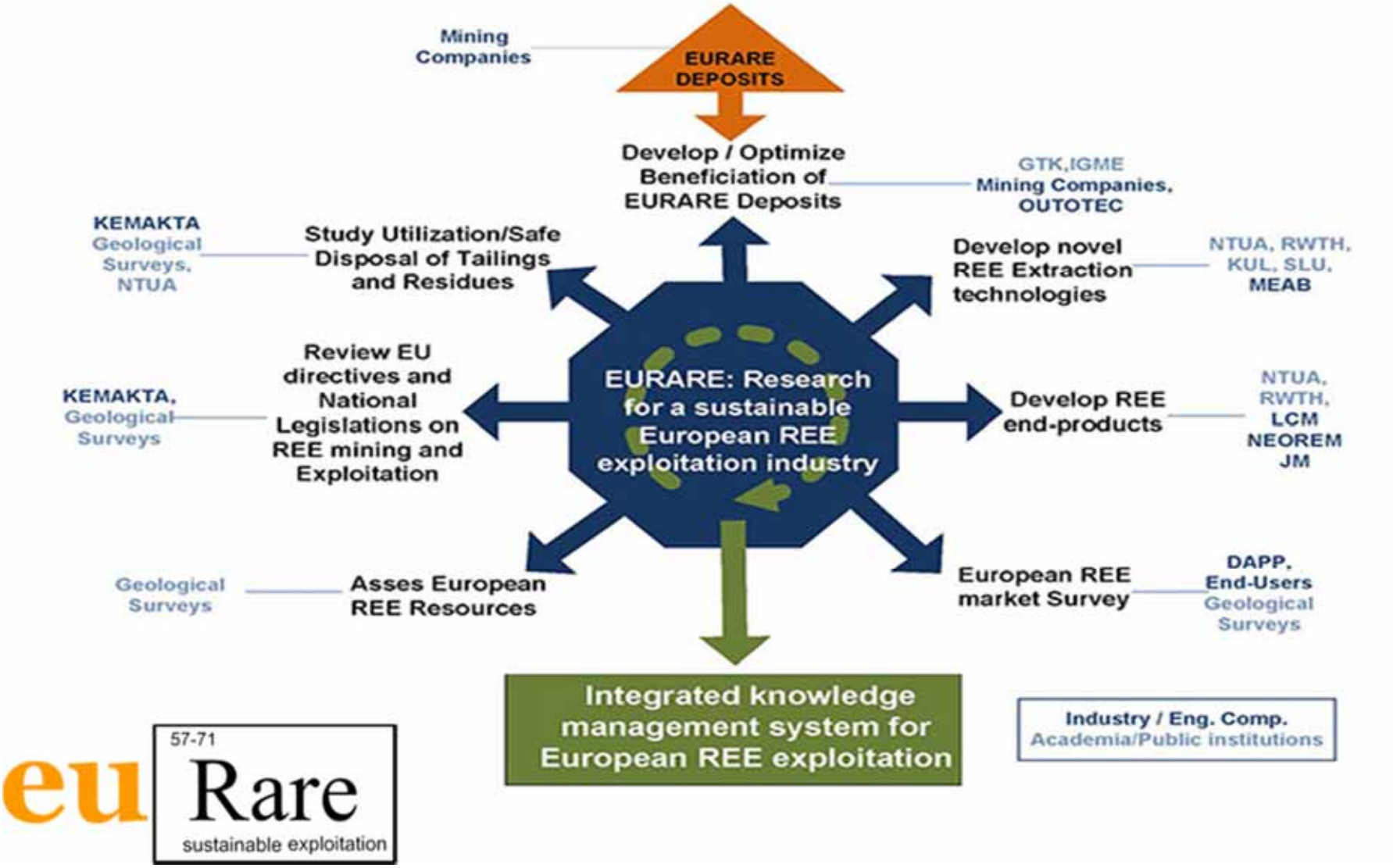
# Overall Performance

## Kvanefjeld Flotation Now Well Tested

- **High availability with only 4 hours of downtime**
- **Rare earth leach extraction of approximately 95%**
  - Exceeding Feasibility Design of 77%
- **Uranium leach extractions of approximately 85%**
- **Good circuit operability**
- **Silica control in circuit effective with no gelling**
- **Filtration and thickening working very effectively**

# About the EURARE Program

## GMEL is one of the participating Mining Companies

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