

# Mining Waste Management Methods (KaiHaMe)



Päivi M. Kauppila<sup>1</sup>, Teemu Karlsson<sup>1</sup>, Tero Korhonen<sup>2</sup>, Marja Lehtonen<sup>3</sup>, Antti Taskinen<sup>2</sup>, Anna Tornivaara<sup>1</sup> and Neea Heino<sup>2</sup>

<sup>1</sup> Geological Survey of Finland, P.O. BOX 1237, FI-70211 Kuopio, Finland, <sup>2</sup> GTK Mintec, Tutkijankatu 1, FI-83500 Outokumpu, Finland, <sup>3</sup> Geological Survey of Finland, P.O. BOX 96, FI-02151 Espoo, Finland  
E-mail: [paivi.kauppila@gtk.fi](mailto:paivi.kauppila@gtk.fi)

- WP1 Operational model for optimization of mining wastes
- WP2 Long term stability of mining wastes and prediction of seepage water quality
- WP3 Increased utilization and raw material potential through processing of mining wastes
- WP4 Dissemination and communications

Figure 1. Work packages of the KaiHaMe project.



Figure 2. Management of mining waste is one of the major challenges of sustainable mining. Photo © P. Kauppila, GTK



Figure 3. Filled in lysimeters to study leaching behaviour of waste rocks in varying conditions. Photo © T. Karlsson, GTK.

- Improved operational preconditions for sustainable mining
- Increased material ecoefficiency and decreased use of other natural resources
- Improved management of mining wastes
- Decreased negative impacts of mining waste disposal

Figure 4. Benefits of the KaiHaMe project.

## Introduction

Management of mining wastes is one of the primary challenges of sustainable mining. Only a small part of excavated metal ores can usually be utilized and the rest of the material is disposed as a mineral waste. The uncontrolled drainage from waste disposal sites may deteriorate downstream water bodies and cause harm to aquatic biota and human health.

The KaiHaMe project develops tools for the utilization and management of mining wastes and for the prediction of their discharge quality.

## Objectives

- Decrease negative impacts of mining waste disposal and promote sustainable mining by enhancing material ecoefficiency throughout the life-cycle of mining operations
- Increase raw material value of excavated ores
- Decrease amount of disposed hazardous wastes
- Enhance prediction of long-term impacts of wastes

## Approaches

- Develop an operational model for the optimal use of wastes to enhance material ecoefficiency (WP1). The model will combine raw material aspects and environmental characterization of wastes
- Review data on modelling tools applied in the prediction of waste effluent quality and make a suggestion of suitable methods (WP2)
- Study how to optimize the use and environmental properties of wastes through beneficiation (WP3). Beneficiation tests will be carried out on As containing tailings to decrease their As content. Filled-in-lysimeters will be used to evaluate leaching properties of generated tailings and their use in waste cover structures
- Seek new options for the use of non-inert waste rocks at mine sites (WP3). Filled-in-lysimeter tests are used to test weathering behaviour of non-inert waste rocks and applicability of waste rocks in structures where oxygen ingress is limited (Figure 3)
- Disseminate generated knowledge through workshops, publications and Wiki (WP4)

The project started in April 2015 and will continue until the end of 2017. The project is funded by the ERDF, GTK, FQM Kevitsa Mining Oy, Kemira Oyj and Endomines Oy.

