WASCIOUS
Water conscious mining

Wascious aims at developing a technology concept for water conscious mining, where innovative water and tailings treatment technologies provide good-quality water for recycling and discharge and enable safe utilisation or disposal of tailings. The project consortium represents forerunners within academic, research and industry bodies that will create a professional network and further brand our region as a top mining destination. The project is funded by NordMin and participating partners.

It is becoming very important for the mining industry to both during the active life of the mine but also post closure reduce impact of its water use and any discharge of potentially polluted water to the environment. Recycling of water calls for treatment systems preventing accumulation of certain compounds, which otherwise potentially could have a negative effect on the process and result in a reduced yield or quality. Furthermore the climatic conditions in Nordic region call for solutions suitable for big flows and very cold water.

Overall water management and stream control requires a new approach. The traditional practice is to mix all water streams, though having different characteristics, for a single water treatment process. By instead applying customized treatment methods, higher recycling rates could be reached and it would open for potential metal recovery from waste streams.

The specific aims of the project are:

- To map current treatment technologies for water and tailings management and to identify future challenges.
- To evaluate innovative technological solutions and to develop new know-how for mine water and tailings treatment.
- To conduct process modelling using a detailed water balance model (with rough operational costs) for a feasibility study of technology alternatives.
- To propose a treatment concept and a plan for further development of the concept (including R&D proposals) for water conscious mining including recycling of process waters, safe (potentially dry) disposal of tailings and ideas for treatment solutions for discharged waters.
- To perform experimental work in lab and pilot scale to verify proposed concepts.
- To establish a future Nordic research platform: a R&D network related to environmental issues in mining for the Nordic region, enabling exchange of ideas and collaboration in future project calls, and facilitating ideas for future projects.

Objectives

This project aims to develop a technology concept for innovative water and tailings management using technologies customized for the mining industry in the Nordic region and in other areas with similar climate. The target is to provide good-quality water suitable for recycling or discharge and also to enable safe utilisation and disposal of tailings.
Outcome

- Reports on state-of-the-art technologies, practical experiences from process development and test runs, tools for modelling of water recycling, as well as concepts and key technologies for low water footprint mines.
- A summary report of the outcome from all activities will be prepared. The report will be practically oriented and will provide guidance on available processes and examples of achieved results. The Water Impact Index (WIIX) will be used for comparing the treatment alternatives.
- 2 PhD theses are linked to the project.

Dissemination

- Continuous project presentation will be available at NordMin web-page
- Project reports
- Academic publications related to the PhD theses
- Participation in NordMin events
- Presentations at national and international seminars
- Input data to Mining Waste BAT Reference document (coordinated by IPTS/JRC)

Consortium

Research organisations

- VTT Technical Research Centre of Finland
- Lappeenranta University of Technology, Finland
- Luleå University of Technology, Sweden
- SINTEF Stiftelsen, Norway
- Norwegian University of Science and Technology, Norway
- ÍSOR Iceland Geosurvey, Iceland

Solutions providers:

- VEOLIA Water Technologies, Denmark
- Outotec Oyj, Finland
- ÁF-Consult Ltd, Finland

Participating mines and end-users:

- FQM Kevitsa Mining Oy, Finland
- Dragon Mining Ltd, Finland
- LKAB Luossavaara-Kiirunavaara AB, Sweden
- FinnMin - Finnish Association of Extractive Resources Industry
- SveMin - Swedish Association of Mines, Mineral and Metal Producers

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The project will continue until September 2016. It is coordinated by VTT, Finland.