



ENVIMINE – developing environmental and geodynamical safety related to mine closure in the Barents region

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A project of mining environmental research in the Barents region was carried out in 2012-2014, in cooperation between Geological Survey of Finland, Mining Institute of Kola Science Centre, Russian Academy of Sciences, Russia, and Luleå University of Technology, Sweden. The study areas were the active chrome mine of Kemi in Northern Finland, and the closed mines of Umbozero in Murmansk region, Northwestern Russia, and Laver in Northern Sweden. Umbozero mine, producing rare earth metals, was in operation 1984-2004. Laver mine with iron sulphide ore, producing copper, was in operation 1936-1946.

The objectives of the project were to develop a methodology for environmentally safe mine closure by cross border cooperation, and to produce information of the mining environment for target groups. The aim was also to find out solutions for minimizing environmental impacts and to develop multilateral relations between Finnish, Russian and Swedish organizations, responsible for environmental management. The studies were carried out by sampling and analyzing of groundwater and surface water, surficial deposits and organic sediments of streams in the mine sites and reference areas. Composition of deposits in the tailings was carried out by means of geophysical measurements (GPR, XRF). Research data of Kemi mine indicate diminished emissions, especially after open pit mining was finished in 2006. The results in Laver, Sweden, indicate that the oxidation rate in the tailings has decreased over time, which may be due to the increased distance over which oxygen needs to diffuse to reach unoxidised sulphide grains in the tailings. Problems in Umbozero are seismic instability, high pH values of waters (max. 10.4), fluorine and aluminum concentrations in the mine site, due to the rock type. Concentrations were decreasing downstream, also heavy metal concentrations were low. Results of the project are the basis for updated database of environmental condition of the study areas and for assessment of environmental impacts. Database will be used for developing recommendations for providing environmental and geodynamical safety of Umbozero. The project was partly funded by the European Union.