

Abstract of Contribution 148**ID: 148****Abstract***Topics:* 2.4 Finnish Mine Water Issues, 2.5 Mine Closure, 5.7 Prediction, 9.1 Finland*Keywords:* lysimeter, static tests, waste rock utilization**Assessment of the Effects of Mine Closure Activities to Waste Rock Drainage Quality at the Hitura Ni-Cu mine, Finland****Teemu Karlsson, Päivi Kauppila**

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After mining operations, mineral waste material dumps and ground workings are left behind that may cause detrimental effects on the environment, if closure is not done appropriately. Thorough planning and field investigations are a crucial part of the selection of suitable closure methods. Desired closure objectives may not be achieved due to wrong closure activities, or the environmental implications may even get worse as a result of undesired mobilization of potentially harmful elements. Besides proper closure, the utilization of mine waste material is an essential part of eco-efficient mining. The effects of closure activities and possibilities for waste rock utilization were assessed at the Hitura Ni-Cu mine, which is currently facing these topics.

There are two different waste rock piles at the Hitura mine; a serpentinite pile and a mica schist pile, both containing material deposited during 1970–1993. In this study, the current environmental effects on surface waters of both waste rock piles were investigated through field measurements and water quality analyses, and the rock materials were thoroughly characterized chemically and mineralogically. The characterization methods included various laboratory tests, e.g. different leaching methods to assess mobility of potentially harmful elements. In addition, field scale filled in lysimeters were applied to investigate longer term leaching of the waste rocks in natural conditions, and the usability of serpentinite in covering the mica schist pile.

According to the field investigations, the current environmental effects on the surface water quality of the Hitura waste rock piles are relatively small. Although the mica schist pile is producing low quality drainage, it does not cause considerable effects on the surrounding water system. The waste rock materials of both piles contain high concentrations of potentially harmful elements, e.g. Ni and Cu. In serpentinite the metals are mainly in immobile form, e.g. Ni is present in the silicate minerals. On the contrary, the metals in the weathered mica schist appear to be highly mobile, i.e. in the easily weatherable sulfide minerals, and the lysimeters filled with mica schist produce metal rich, acidic seepage water. No negative effects were observed in using the serpentinite as cover material.

Based on the results, disturbance of the weathered mica schist waste rock pile, e.g. by shaping the slopes, is likely to result in substantial mobilization of potentially harmful elements. On the other hand, serpentinite, which contains metals in more stable form, could be used in landscaping the mica schist pile.

Bibliography

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