

Petrophysical and rock-mechanical characterization of the excavation-disturbed zone in tachyhydrite-bearing carnallitic salt rocks

T. Popp, K. Salzer & M. Wiedemann

Institute for Rock Mechanics GmbH (IfG), Leipzig, Germany

T. Wilsnack

Consulting for Mining, Water and Waste Disposal Engineering (IBeWa), Freiberg, Germany

H.-D. Voigt

Freiberg University of Mining and Technology, Institute of Drilling Engineering and Fluid Mining, Germany

ABSTRACT: Drift sealing systems requiring long-term stability are important components in technical barrier concepts for hazardous-material disposal sites in salt formations. In contrast to rock salt, special problems for sealing systems in potash formations arise because of the ease of dissolving minerals such as carnallite and tachyhydrite-kieserite mineral. Therefore, besides the geo-chemical and technical aspects (e.g. development of an appropriate dam building material) the main emphasis of current investigations is to understand the excavation-disturbed zone (EDZ) because of its importance as a potential “short circuit” pathway around the sealing structure. Results of numerous geophysical in-situ investigations (e.g. permeability and electrical-resistance measurements) in the abandoned potash mine Teutschenthal (D) are presented in this paper. These investigations identified local geological and hydraulic problem areas which may affect the sealing efficiency of the dam building. Additionally rock-mechanical laboratory tests on the carnallitic host rock prove to be a prerequisite for characterizing near-field properties in potash mines.