



HRL ÄSPÖ - TWO-PHASE FLOW EXPERIMENT - GAS AND WATER FLOW IN FRACTURED CRYSTALLINE ROCK

Abstract

Gas generated from radioactive waste may influence the hydraulic and mechanical properties of the man-made barriers and the immediate surroundings of the repository. Prediction of alteration in fractured crystalline rock is difficult. There is a lack of experimental data, and calibrated models are not yet available. Because of the general importance of this matter the Federal Ministry for Education, Science, Research and Technology (BMBF) decided to conduct a two-phase flow study at HRL ÄSPÖ within the scope of the co-operation agreement with SKB.

Within the presentation an overview of field experiments and modelling studies scheduled until end of '99 are given. Conceptual models for one- and two-phase flow, methodologies and with respect to numerical calculations necessary parameter set-ups are discussed.

Common objective of in-situ experiments is to calibrate flow models to improve the reliability of predictions for gas migration through fractured rock mass. Hence, in a defined dipole flow field in niche 2/715 at HRL Äspö effective hydraulic parameters are evaluated. Numerical modelling of non-isothermal, two-phase, two-component processes is feasible only for two-dimensional representation of a porous medium. To overcome this restriction, a computer program will be developed to model three-dimensional, fractured, porous media.

Rational aspects of two-phase flow studies are for the designing of geotechnical barriers and for the long-term safety analysis of potential radionuclide transport in a future repository required for the licensing process.

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