



Gesellschaft für Anlagen-
und Reaktorsicherheit
(GRS) mbH

Gas Migration in the Opalinus Clay as a Function of the Gas Injection Pressure

HG-C Project

Final Report

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Preface

Beside salt and granite, clay formations are investigated as potential host rocks for disposing radioactive waste. In Switzerland in the canton Jura close to the city of St. Ursanne, an underground laboratory was built in the vicinity of the security gallery of a motorway tunnel. Since 1995, a consortium of 12 international organisations is running this laboratory for investigating the suitability of the Opalinus clay formation with regard to disposal of radioactive waste.

When disposing radioactive waste in clay formations gases like hydrogen, hydrocarbons, or carbon dioxide will be generated and released as a result of corrosion of the metallic components of the waste or the containers and by thermal or microbial degradation of organic components within the waste, the backfill or the surrounding clay. These gases are of importance for the long-term safety as they may pressurise sealed areas and be transport medium for volatile radionuclides. In order to quantify the gas migration and the gas pressure evolution it is of importance to know the relevant gas transport mechanisms. Previous tests in the Mt. Terri underground laboratory indicated that gases do migrate into the surrounding clay already at low pressure.

The aim of the HG-C project was to investigate the gas migration into the Opalinus clay in the undisturbed rock outside the excavation damaged zone as a function of the gas injection pressure and to determine the relevant petro-physical parameters of gas advection and gas diffusion.

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