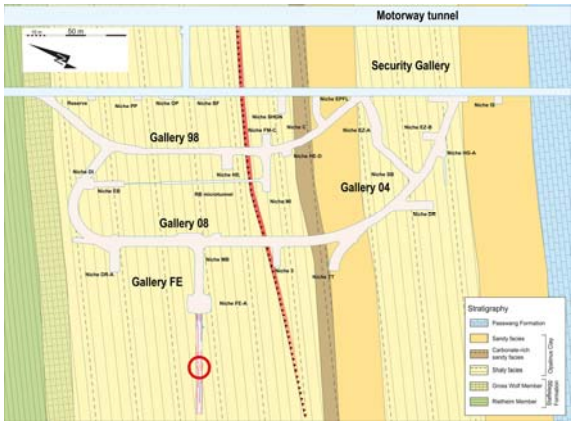
Guide

Mont Terri
Rock laboratory

6 Hydrogen in Opalinus Clay



Objective: To understand how hydrogen gas travels in Opalinus Clay, to measure the relevant properties and to evaluate the characteristic parameters.

Key issues: Hydrogen is a gas which has to be handled with care (risk of explosion in the presence of oxygen). In a future deep disposal facility, however, hydrogen will be a significant factor in the event that steel is used and the storage canisters corrode in the saturation phase. There is no risk of an explosion, since no oxygen will be present in the deep storage facility.

Procedure: Drill boreholes under sterile conditions (argon drilling gas, disinfected tools).
Install a fluid circulation system. Introduce argon into the borehole, which removes gases from the formation and can be measured at the surface with a mass spectrometer.
Add hydrogen to the mud circulation (approx. 10% hydrogen, 90% other gases).

Results: So far the following gases naturally occurring in Opalinus Clay have been measured: methane, carbon dioxide (to be expected), alkanes and nitrogen (unexpected). All gases are present in very low concentrations and, in normal circumstances, are dissolved in pore water.
No results yet for hydrogen (first after mid 2011).

Start: 2008
End: 2015
Project Partners: ANDRA, NAGRA, NWMO
Cost: CHF 1.4 million