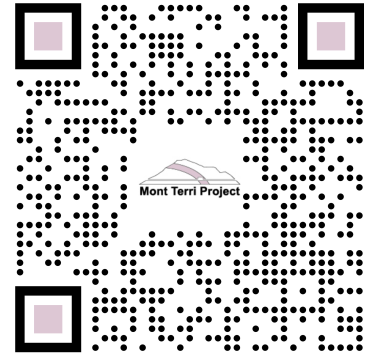


Mont Terri Project Underground Rock Laboratory



Report period: November 6–12, 2023

Assembled and edited by swisstopo, St-Ursanne



Spotlight of the week: DR-C experiment: The objective of the proposed experiment is to study the possible impact of a thermal gradient on the diffusion of different radio-tracers in Opalinus Clay. In current safety assessment of geological disposal of HLW, the impact of thermal gradients generated by the radioactive waste on the diffusion of radionuclides through the host rock is usually disregarded. In this case, the full retention of radionuclides in the containment canister during the entire thermal phase is normally assumed. However, in case of premature failure of the containment canister during the thermal phase, the radionuclides released in the pore water could migrate at higher diffusion rates. Presently, there is a lack of experimental data regarding the effect of temperature on radionuclide diffusion under in situ conditions. For this reason, this scenario should be better studied to increase confidence in the long-term safety of geological disposal for heat-emitting radioactive waste. Indeed, this scenario is especially important if retrievability of the waste is considered. The study of worse scenarios, like the one proposed, could also help public acceptance of nuclear waste disposal .

CD-A (Influence of Humidity on Cyclic and Long-Term Deformations) experiment

- On Monday, November 6, S. Schefer (swisstopo) restarted the DAS from the Twin Niches and reconnected the psychrometric sensors which had lost the connection to the DAS.

CI-D (Diffusion Across 10-Year-Old Concrete/Claystone Interface) experiment

- On Monday, November 6, U. Mäder (RWC) and P. Steiner (swisstopo) prepared the fibreglass stabilisation tubes for BCI-D4, fitted them with spacers and filled them with mortar.
- On Tuesday, November 7, the last core length of BCI-D4 was drilled by A. Eul and S. Braunschweig (Eul GmbH) and recovered early this morning, reaching 6.5 m. Widening the borehole from 350 to 400 mm was a bit tricky and slow.
- On Wednesday, November 8, C. Zwahlen, A. Jenni (RWI UniBern) and P. Steiner (swisstopo) sampled the remains of BCI-D3OC. There are now approximately 60 samples of aqueous extracts, and 50 samples for water-content from Opalinus Clay and OPC concrete. In addition, some very good-quality samples were cut and preserved from the interface Opalinus Clay / concrete for some follow-up dedicated studies.
- On Wednesday, November 8, BCI-D4, the new approach borehole below the test, was completed, reamed flat and cleaned. Then, a large drilling guide was inserted and fixed at the top. This guide allows for drilling 7 stabilization boreholes with 46 mm DM and of 2 m length. The first 3 of these small boreholes were drilled in the afternoon, followed by embedding fiberglass tubes with epoxy resin. The remaining holes will be drilled Monday morning.
- On Wednesday, November 8, L. Martin (Nagra) and M. Heule (PSI) visited the CI-D experiment to discuss next steps and co-ordinate analytical work done at PSI (3-H, 36-CI) with the sample preparation team from Uni Bern.

DR-E (Long-Term Diffusion Experiment in the Main Fault-Zone) experiment

- On Monday, November 6, S. Schefer (swisstopo) reduced the flow in BDR-E2 to 0.5 l/h.

HE-E (In-Situ Heater Test in VE-Micro-Tunnel) experiment

- On Thursday, November 9, A. Eul and S. Braunschweig (Eul GmbH) started the installation for BHE-E4 followed by drilling shotcrete with 250/400 mm (**Figure 1**).
- On Friday, November 10, U. Mäder (RWC), M. Treuthardt (Nagra) and P. Steiner (swisstopo) prepared sampling tools for granular bentonite inside BHE-E4.

IC-A (Corrosion of Iron in Bentonite) experiment

- On Thursday, November 9, M. Frutschi, N. Jakus (EPFL), T. Guillemot, A. Brown (Nagra), Y. Lettry and R. Hafner (Solexperts) removed the steel samples from BCI-A1 for analysis and inserted new material into the borehole (**Figure 2**, **Figure 3**).

MA-A (Modular Platform for Microbial Studies) experiment

- On Friday, November 10, T. Theurillat (swisstopo) replaced the vacuum pump for the glovebox.

SI-B (Seismic Imaging of Structures Below the Mont Terri Tunnel and Rock Laboratory) experiment

- From Tuesday to Saturday, November 7–11, S. Lüth, K. Krüger, A. Jurczyk and A. Bauz (GFZ) installed seismic receivers along the safety gallery and in the borehole BDS-2. Furthermore, they did seismic acquisition using a magnetostrictive seismic vibro source on a profile along the Safety Gallery (**Figure 4**).

SW-A (Large-Scale Sandwich Seal in Opalinus Clay) experiment

- On Thursday, November 9, T. Theurillat (swisstopo) refilled the HPT of shaft 1.

Varia

- On Tuesday, November 7, the power of GA18 was interrupted for 15 minutes due to the seismic measurements in the safety gallery.
- From Wednesday to Thursday, November 8–9, the Steering Meeting (SM-93) took place in Meiringen. The delegates meet three times a year for discussing the actual and future research program, the strategy and financial aspects. The day before the meeting, they enjoyed a visit at the Grimsel test site guided by R. Schneeberger and F. Kober (Nagra) (**Figure 5**).

Visits

Day	Date	Group Name	Group Size	Visitors Guide
Thu	9.11.2023	Zurich International Women's Association	12	R. Nicol (swisstopo)
Fri	10.11.2023	Swisstopo HR-Team	4	R. Nicol (swisstopo)

Figures



Figure 1: HE-E: Installation of the drill rig for HE-E4 inside Ga98 (J. Windisch, swisstopo).



Figure 2: IC-A: The samples are below a packer and well stored (P. Steiner, swisstopo).



Figure 3: IC-A: Removing the samples in a controlled environment inside the glovebox (P. Steiner, swisstopo).



Figure 4: SI-B: Seismic measurements in the Safety Gallery (J. Windisch, swisstopo).



Figure 5: Varia: Part of the Mont Terri Delegates at Grimsel Testsite during Steering Meeting SM-93 (F. Kober, Nagra).