Object description

The Asse II mine is located near Remlingen in the district of Wolfenbüttel in Lower Saxony. The mine is one of formerly three facilities that were built on the Asse mountain range for salt extraction.

From 1967 to 1978, about 47,000 cubic meters of low- and intermediate-level radioactive waste were emplaced on behalf of the Federal Government. Since 2009, the mine has been operated in accordance with the nuclear law as well. The legal mandate is to decommission the facility immediately. This is to be done after the radioactive waste has been retrieved.

In the course of the past decades (until the end of 2009), rock salt crushed rock of various origins was introduced into the excavated sections of the mine to stabilize the mine.

Under the dead weight of the salt crushed rock and the simultaneously effective rock pressure, settlement and compaction occurred. Over the decades, both have led to an inhomogeneous structure, which has also been influenced by varying moisture distribution and cracking.

The working area was located at a depth of approx. -573 mNN with temperatures of 38-40 °C.

Scope of work

In an elaborate injection test, different injection methods were tested to significantly reduce the permeability of the salt backfill to solution migration. A positive side effect of the injection is the increase of the compressive strength of the salt crust. Both particle-supported (magnesia binder) and particle-free (acrylate gels) injection materials were used. The injection was carried out using double hose packers and sleeve pipes in about half of the 52 planned boreholes with a length of 26m each. To evaluate the advantages and disadvantages of different injection methods, rock injections were added. The fixation of the sleeve pipes in the borehole, as well as the division of the annulus gap into several sections, was done by textile packers.

Particularities

During the test injections, a hybrid slurry consisting of magnesium binder and acrylate gel was tested to optimize the properties of the material in terms of flow behavior and strength. The accurate addition of the acrylate gel and the adaptation of the mix to the situation of each borehole is performed by a special control system during the injection process.

1. Control system for automated hybrid injections
2. Injection unit
3. Hybrid material (magnesium binder + acrylate gel)