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### **Injection measures to stabilize the excavation damaged zone in claystone**

The Konrad repository is the first repository in Germany that has been licensed according to nuclear law. It is located in Salzgitter (Lower Saxony). The licensing process lasted for about 20 years. Permission for the construction and operation of the repository was granted in 2007, and the former iron ore mine is currently being converted into a repository. Up to 303,000 m<sup>3</sup> of radioactive waste with negligible heat generation will be disposed off here.

The iron ore layers are located 800 – 1300 m below ground surface and do not reach the surface. Furthermore, they are part of a system of rim synclines that form diapiric salt structures surrounding the iron ore layers. A 400-m-thick clay cover protects the iron ore mine against ground water. Thus, the mine is extraordinarily dry. Fortunately, the formation was only slightly excavated because the mining period was short. This means that the site conditions for the disposal of low-level radioactive waste are good.

To access the mine, the clay cover has been penetrated by two shafts, shaft Konrad 1 and shaft Konrad 2. Presently, the claystone passage of shaft Konrad 2 is further excavated as it is intended for the future waste package transport. Parts of the shaft landing station are situated in claystone as well. Typically, the shaft and the shaft landing station are stabilized by a ground support system consisting of rock bolting and shotcrete measures.

If the ground support turns out to be not sufficient, local injection measures are planned as a preventive measure to stabilize the excavation damaged zone in the claystone. Although this preventive measure has not been necessary yet, the effectiveness of the injection measures has already been extensively tested in the laboratory and in situ.

This contribution will focus on the experience gained while testing injection measures in claystone. This includes the selection of the grouting material and technical equipment as well as the procedure to prepare the specimens for laboratory testing. Finally, results of in-situ injection tests are provided, which show the conditions and limits of injection measures to solidify claystone.