Editorial

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This is the Part II of the themed issue focusing on High-level spent nuclear fuel disposal. This part is dedicated to experiment, technology and program management.

Thermal, hydraulic, mechanical, chemical and biological (THMCB) processes will be ongoing in nuclear waste disposal facilities for hundreds of thousands of years. These processes (THMCB) are fully coupled, which is a significant challenge for testing and modelling. In order to be able to perform relevant investigations, it is necessary to design laboratory tests for measuring model parameters or studying certain issues in mock-up tests controlling all processes involved (e.g. heat transport by convection due to vapour movement when thermal conductivity is measured), carry out 'in situ' tests monitoring the evolution of temperatures, saturation processes, movement of clay components and swelling pressure development, and perform post-mortem analyses on engineered barrier system components after dismantling of tests.

Gharbieh *et al.* (2020) present a description of bentonite block compaction technologies. This contribution is focused on the study of the homogeneity (water content and density) reached with the isostatic compaction method. Tensile strength requirements for block manipulation during compaction and emplacement is also discussed.

Huttunen-Saarivirta *et al.* (2020) studied the surface interactions of copper in the expected disposal environment using laboratory tests. Copper specimens were incubated with ammonia-oxidizing bacteria for different time periods in order to measure biofilm formation and its effects on copper corrosion.

Pintado *et al.* (2020) describe the instrumentation and show the first results of an 'in situ' test performed in Äspö Hard Rock Laboratory in Sweden. The scope of this test is to assess the KBS-3H alternative, a high-level spent nuclear fuel repository design where spent-fuel canisters will be emplaced in long horizontal drifts (Posiva and SKB, 2017).

The management and leadership of high-level spent nuclear fuel disposal in Japan is analyzed by Takeuchi *et al.* (2020). The authorities and implementing organizations play very important roles in gaining acceptance from stakeholders for the construction of repositories. This contribution explains the efforts performed in Japan.

Villar *et al.* (2020) present measurements of the dry density and water content in the bentonite barrier of the FEBEX 'in situ' test after dismantling. This test was carried out over 18 years and these results are of interest for assessing saturation and swelling process development under thermal gradients. The results show axisymmetric water content and dry density distributions with some differences along the drift axis due to the presence of heaters and the concrete plug.

Part II complements Part I by adding to the development of the constitutive models and implementation of these models in the computer codes presented in Part I, the performance of laboratory and 'in situ' tests necessary for models parametrization and validation, the development of technologies for nuclear waste disposal construction and the program management necessary for achieving the acceptance of public opinion and granting the construction and operational licenses from the authorities.

Finally, the Guest Editor would like to acknowledge the authors for their contributions, which will serve to increase knowledge and allow for better response to the challenges posed by nuclear waste disposal.

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