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International Collaboration in the U.S. Disposal Research Program: Advances Made in Testing and Predicting Coupled Processes in Engineered & Natural Barriers

The United States research program for geologic disposal of spent fuel and high-level waste is engaged in broad and active collaborations with several international geologic disposal programs. Such collaboration is a beneficial and cost-effective strategy for knowledge dissemination on different geologic disposal options; it also allows sharing international investment needs such as those for large-scale field experiments in underground research laboratories. To date, the U.S. program has established formal and informal cooperation partnerships with several international initiatives and institutions and has developed a number of collaborative R&D activities. This presentation gives an overview of these R&D activities, with specific focus on activities that improve our current understanding of the coupled thermal-hydrological-mechanical and chemical (THMC) processes occurring in engineered and natural barriers. We start with a brief review of selected international cooperation initiatives and then describe a few specific research projects featuring simulation of THMC processes during the early emplacement phase (e.g., heater tests, gas transport tests). We focus specifically on such studies that use experimental data sets provided by international research cooperation for joint modeling work to increase the confidence in performance-relevant predictions of coupled processes.

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