



Demonstrating the possibility of safe operation in the first phase of the site selection procedure in Germany

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Abstract. The Federal Company for radioactive waste disposal (BGE) is responsible for the search for a site with the best possible safety for the disposal of high-level radioactive waste in Germany. The site selection procedure is regulated in a law that was adopted by the German Federal Parliament (Repository Site Selection Act – StandAG, 2017, last updated 2020 (StandAG)) and aims to be a participatory, transparent, learning, and self-questioning process based on scientific expertise. The first step of the first phase of the site selection procedure was completed in September 2020 and resulted in the identification of sub-areas that give reason for expecting favourable geological conditions for the long-term storage of nuclear waste in the sub-surface. These sub-areas cover approximately 54 % of Germany and are located in three different host rocks: rock salt–halite, claystone, and crystalline rock. The challenge for the next step is to find suitable siting regions within the previously determined sub-areas that are then considered further in the next phase of the site selection procedure (Hoyer et al., 2021).

The preliminary representative safety analyses in Phase I, Step 2 of the site selection procedure require according to Section 7 (6) No. 4 EndlSiUntV that “the basic possibility of safe operation shall be demonstrated, but a complete operational safety analysis does not need to be performed”. The method is described in BGE (2022a, b) and can be summarized as follows.

The demonstration of the basic possibility of safe operation is carried out within the framework of the representative safety analyses for the individual aspects of operational safety in different degrees of detail. The non-radiological aspects of operational safety, which are, for example, derived from occupational health and safety, mining law and fire protection, a site-independent consideration of the regulatory basis and the derivation of corresponding actions, are considered requirements for and are taken into account by the preliminary repository design according to Sect. 6 (4) EndlSiUntV.

To demonstrate the basic possibility of safe operation for the operational safety aspects “radiation protection” and “release of radioactive substances” in the investigation areas to be considered, a general catalogue is compiled that summarizes possible events and actions to fulfill the requirements for operational safety. This general catalogue is independent of location and coverage of all host rocks and repository concepts.

From this general catalogue, possible specific events are identified for each individual investigation area, and the necessary actions are derived. In addition to the demonstration of the basic possibility of safe operation, the robustness of operational safety within the investigation area is evaluated in a second step.

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