

The site selection procedure for a high-level radioactive waste repository in Germany: Future application of electromagnetic methods for exploration activities

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SUMMARY

According to the 'Repository Site Selection Act' (a German federal law called Standortauswahlgesetz – StandAG), the BGE, Germany's federal company for radioactive waste disposal, has been assigned to implement the site selection procedure for a German high-level radioactive waste repository in a deep geological formation with best possible safety conditions for a period of at least one million years. The site selection procedure is an iterative process consisting of three phases with increasing level of investigation while the considered area becomes smaller in the process. Starting with an empty, so-called white map of Germany, the BGE completed Step 1 of Phase I in September 2020 with the submission of the sub-areas interim report, which identified 90 individual sub-areas with favorable geological conditions for safe disposal of radioactive waste. According to the site selection act, the host rocks claystone, rock salt and crystalline rock are considered. In the current Step 2 of Phase I, regions for upcoming surface exploration will be identified. Surface exploration will take place in Phase II, including geophysical surveys, geological mapping, hydrogeological investigations, borehole drilling and tests. Surface exploration programs will be developed based on comparison of existing data and the demand for additional information to assess the disposal system.

Electromagnetic (EM) surveys can provide information of the subsurface rock properties relevant to the safety of a high-level radioactive waste repository. Due to the large variety of possible geological settings (different host rocks, depths, cap rock geology, etc.) it is necessary to consider various methods and their combinations for the surface exploration. In addition, surface conditions might influence the selection of methods, e.g. airborne EM in areas that are difficult to access. The BGE is involved in research regarding application of novel sensors, analysis and inversion tools for EM methods and combination of EM and other geophysical methods.

Keywords: Radioactive waste disposal; Site selection; Surface exploration
