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Borehole Disposal of Radioactive Waste in Israel

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Israel is assessing borehole disposal of radioactive waste. With limited geological options for disposal, intermediate-depth borehole disposal is being considered in the arid Yamin Plain region of the northeastern Negev desert at depths of several hundred meters below ground surface in the vadose zone. Unlike deep borehole disposal of several kilometers, which relies on emplacement below the depth of recirculating groundwater, the safety case for intermediate-depth borehole disposal relies more on the aridity of the vadose zone, the robustness of the engineered barriers (e.g., canister, seals, backfill materials) in the disposal borehole.

To study the suitability of the Yamin Plain region for borehole disposal a small-diameter characterization borehole is planned, to retrieve core samples and to better understand the vadose zone geo-mechanical and hydrogeochemical properties and percolation flux. Moreover, a wide range of laboratory geochemical, hydrological, and mechanical studies as well as a new seismic survey are being carried out. The information from the characterization borehole as well as the supplementary laboratory and seismic studies will inform the safety case, and together with performance assessment analyses will help to identify key areas of uncertainty and guide future research and development activities aimed at demonstrating the feasibility of the intermediate-depth borehole disposal concept in Israel.