

Borehole Disposal of Radioactive Waste in Israel - Characterization program and borehole

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The IAEC is assessing intermediate depth disposal of radioactive waste at the Yamin Plain (YP), in the northeastern Negev, Israel. The YP holds the Israeli national radioactive waste disposal site. Specifically, the suitability of the Ghareb Fm., of the Mount Scopus Group, residing within the vadose zone in the western YP, is being evaluated.

A comprehensive site characterization program has been underway since 2017. The program includes an in-depth literature review of the geophysics, geology, hydrology and geochemistry of the area. Rock samples from previously drilled boreholes and quarries have been studied.

When preliminary studies proven satisfactory, two seismic lines, parallel and perpendicular to the syncline axis, were run in order to understand the detailed subsurface structure of the target zone and to assist in locating a characterization borehole (BH) that was then drilled at the intersection of the two lines.

Four geological formations were drilled, to a total depth of 321.5m. The Hazeva fm. was drilled using a drill bit, whereas the Mount Scopus Group section was cored. One third of the cores were dipped in wax immediately after sampling, wrapped in plastic and aluminium foils and cemented in PVC tubs, in order to prevent drying, preserve the porewater fluid and keep structural integrity.

After drilling in-site analysis were performed including the following logs: Gamma ray, Electric resistivity, Density and Caliper. Additionally, Optical televiewer (BHTV) imaging was conducted. Hydrological, single and double packer Lugeon tests were conducted at four depths in the borehole.

Core samples from the borehole were allocated to a wide range of ex-situ analysis methods including, geomechanical and petrophysical characterization; mineralogical, geochemical and sorption behaviours of the rocks; porewater extraction and compositions; fracture filling dating; heat and irradiation effects on the rock and in-depth study on the organic component of the rocks.

The full program was coordinated and discussed with the regulator in order to provide the data needed for the performance assessment of this disposal area. The overall accumulated data will assist in the determination of feasibility of the Ghareb fm. to serve for borehole disposal of SNF at the YP.