

Current Status of R&D Activities at the Mizunami Underground Research Laboratory in Japan

HIROMITSU SAEGUSA, KUNIO OTA, SHINJI TAKEUCHI and KAORU KOIDE Mizunami Underground Research Laboratory, Japan Nuclear Cycle Development Institute

The Mizunami Underground Research Laboratory (MIU) is now under construction by the Japan Nuclear Cycle Development Institute, in the Cretaceous Toki granite in the Tono area, central Japan. The MIU is a purpose-built generic underground research laboratory that provides a foundation for multidisciplinary studies to build a firm scientific and technical basis for geological disposal of nuclear wastes. The main goals of the MIU Project are to establish techniques for investigation, analysis, and assessment of the deep geological environment and to develop a range of engineering techniques for deep underground application. The conceptual design of MIU consists of two circular 1,000 m shafts, and horizontal research galleries at depth of 500 m and 1,000 m. The MIU Project has three overlapping phases: Surface-based Investigation (Phase I), Construction (Phase II) and Operation (Phase III), with duration of 20 years. The project began in 1996. Surface-based investigations are ongoing at the MIU Site. The main aims of the investigations are to develop conceptual models of the geological environment and to enhance the understanding of the undisturbed deep geological environment before excavation of the shafts and research galleries. Field investigations began with fault mapping at and around the MIU Site, following a literature survey. Work continued with reflection seismic and vertical seismic profile surveys. In addition, a large program of borehole investigations were carried out in several boreholes ranging from 99 to 1,300 m deep, in order to extensively characterize the subsurface geological environment. In addition, cross-hole tomography and cross-hole hydraulic tests using these deep boreholes were carried out. The results of the field-based investigations are synthesized in conceptual models of the geological environment. The main items for further investigation can be specified through evaluation of model uncertainties. The deep geological environment is thus progressively understood.

Excavation of the shafts commenced in July 2003, and the shafts reached a depth of 50 m in September 2004. A range of geoscientific investigations is also being carried out during shaft construction. The shaft construction is planned for completion in 2010.

More information on the MIU Project is available on http://www.jnc.go.jp/