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Drilling and survey technology for controlled drilling - Outline of drilling and survey system and its application -

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In Japan, the soft sedimentary rock of the Neogene tertiary is being focused as a host rock for High Level Waste (HLW) disposal. Especially, the soft sedimentary rock at the coastal area is thought to be one of the best candidates, since there is little driving force of the underground water. The measurement and logging of the bore hole in order to investigate the hydro-geological and geo-mechanical conditions of the host rock is a very important way to examine the potential of the disposal candidates.

Since 2000, CRIEPI (Central Research Institute of Electric Power Industry) has been conducting the project on controlled drilling and the logging/measurement technologies in its boreholes. Based on the results of phase 1(2000-2004), CRIEPI has been developing the drilling and logging/ measurement technologies for fault zone. The drilling technology such as drilling for fault zone, horizontal drilling, long hole drilling, coring and locality detection was developed and these applicability was confirmed while drilling. The permeability/water-sampling/imaging tool was revised to apply wider borehole and longer measuring section. The WL-LWD was improved to be tougher in the hole. The borehole pressure meter and stress measurement tools were unified. Each tools necessary for the monitoring system is manufactured. The applicability of these tools and systems were verified in the borehole.

After conducting surveys for the Omagari fault distributing at the Kami-horonobe area at Horonobe town in Hokkaido, the drilling site and borehole trace was decided in 2005. Considering the planned trace, the bore hole was drilled to the 900m long and its core recovery was 99.8% as of FY. 2009. Using borehole logging /measurement/survey, the geological, hydrological, geo-mechanical, geophysical and geochemical data were collected and the Omagari fault was characterized.

This study was done under contracts awarded from METI (Ministry of Economy, Trade and Industry) and in-situ drilling and survey was conducted as a collaboration work with the Horonobe Underground Research Center of JAEA (Japan Atomic Energy Agency).

Keywords: Geological disposal, Controlled drilling, Measurement while drilling, Hydraulic test