Development of Technology for Controlled Drilling and Measurement in the Borehole

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In Japan, the soft sedimentary rock of the Neogene tertiary is being focused as a host rock for the High Level Radioactive Waste (HLW) disposal. The underground water flow in the soft sedimentary rock at the offshore region is thought to be slow, since there is no driving force of the underground water.

The measurement and logging in the borehole in order to check the hydro-geological and geo-mechanical conditions of the host rock is a very important way to evaluate underground geological environment. The CRIEPI (Central Research Institute of Electric Power Industry) has been conducting the project about the controlled drilling technology and the measurement and logging technologies in its borehole. We defined the key technologies of the project are as follows;

(1) Drilling technology to vent the hole as we intend.
(2) Locality detection technology of the drill bit (MWD).
(3) Core sampling technology to obtain the undisturbed rock core.
(4) Logging, measuring and monitoring technology during/after drilling.
(5) Hydraulic long-term monitoring technology after drilling.

In 2000, as the beginning year of the project, we made the conceptual design of the drilling and measuring systems, and made key tools concerning each technology on an experimental basis. We have been developing sub tools and constructing drilling and measuring systems since 2000, and applying these systems to the Horonobe site recent 4 years.

We will briefly report the outline of the controlled drilling and measuring system and the results of drilling and measurement that were carried out at the Horonobe site, Hokkaido, Japan.