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## Development of Technology for Directional Drilling - Results of Drilling and Survey in the Borehole -

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During high-level waste (HLW) disposal site selection, borehole measurement and logging to investigate the hydro-geological and geo-mechanical conditions of the host rocks is a very important way to examine the potential of the disposal candidates. In Japan, attention is being given to Neogene soft sedimentary rock as the host rock for HLW disposal. In particular, the soft sedimentary rock in coastal areas is thought to be one of the best candidates, because there is little driving force from underground water.

Directional drilling is supposed to be efficient under limited topographic and geological conditions, and the Central Research Institute of Electric Power Industry (CRIEPI) has been conducting a project on directional drilling and logging/measurement technologies since 2000.

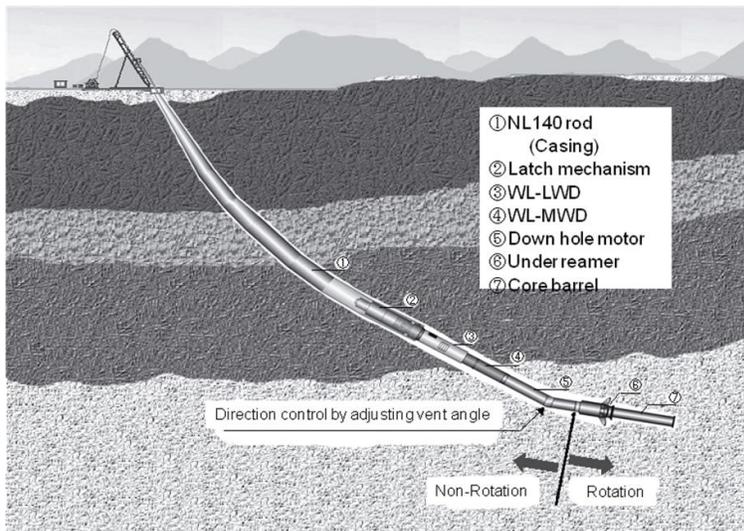


Figure 1: Conceptual Design of Directional Drilling System

After conducting a seismic reflection survey for the Omagari fault [3] distribution at the Kami-Horonobe area in the town of Horonobe, a drilling site was selected, and a borehole trace was planned to perpendicularly intersect the fault zone in 2005. Considering the planned trace, a 1000-m-long borehole was drilled to a depth of 450 m. From 750 m to the end (1000 m), the borehole was horizontal. The total core recovery was 99.8%, even though it was drilled in the fault zone. The geological, hydrological, geo-mechanical, geophysical, and geochemical data were collected using borehole logging/measurement/survey and core logging/measurement/analysis, and the Omagari fault was characterized.

After conducting all the work in the borehole, a steel pipe was inserted into the borehole to case the wall. Open hole sections for long-term monitoring were constructed considering the hydro-geological

Basic directional drilling system was developed [1] and the system was applied to the Neogene normal sedimentary rock [2] at the Hokushin area of the Horonobe town in Hokkaido. The borehole was 700 m long and the applicability of the system was confirmed until 2004.

After conducting a seismic reflection survey for the Omagari fault [3] distribution at the Kami-Horonobe area in the town of Horonobe, a drilling site was selected, and a borehole trace was planned to perpendicularly

conditions throughout the hole. Then, the monitoring system was inserted and set up to obtain the initial conditions of the groundwater pressure and water chemistry in 2014.

**(needs some findings or conclusions)**

*References:*

- [1] Kiho K et al. (2011) 16<sup>th</sup> Pacific Basin Nuclear Conference, P16P1395
- [2] Fukasawa H (1985) Jour. Geol. Soc. Japan, 91, 12, 833-849
- [3] Ishii E et al. (2006) Jour. Geol. Soc. Japan, 112, 5, 301-314

