

Procedure Consideration of Site Evaluation of Geological Disposal for HLW

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1. Introduction

After presenting the concept of land disposal of US National Academy of Science (NAS), the current concept of geological disposal, methodology, and safety assessment method was established at the end of the 1970s [1].

Finland, Sweden, and France have successfully selected the site, and other sites are being selected including UK, Japan, Switzerland, and Canada. Most of these countries establish procedural legitimacy by stipulating clear legal framework for the site selection process prior to site selection.

In this paper, site evaluation procedure and evaluation methods are analysed based on overseas status and it consider the step-wise conceptual work related to implication derived from the result.

2. Procedure of siting process

2.1 Procedure of siting process of IAEA

The site selection process for securing high-level radioactive waste disposal facilities can be divided into the four stages [2].

During the concept and planning phase, identify potentially important site selection factors, potential sites and possible site selection areas, and define survey objectives and research programs. In the regional mapping step, a literature survey is conducted on the metropolitan area to identify one or two target areas for further investigation.

In the stage of site investigation, a site survey is conducted on the potential site, the safety of the in-depth disposal system to be considered is judged, and a detailed site survey is conducted based on this, and a preferred site for characterizing the detailed site is selected.

2.2 Procedure of siting process in Korea

The "Basic Plan for the Management of High Level Radioactive Waste Management" (hereinafter referred to as the "Basic Plan") announced in 2016 is scheduled to be reviewed in connection with developing a geological disposal system. The master plan outlines the site selection procedures for the three stages.

3. Procedure of site evaluation

The Sweden of many oversea countries is advanced nation related to site evaluation based on step-wise procedure of siting process. So we firstly focus on procedure of site evaluation for geological disposal in Sweden.

According to the siting requirement of Sweden, one is that suitable bedrock must exist on the selected site. The other is that acceptance and confidence must exist on a local level for both the siting work and an establishment of the final repository.

These requirements can be associated with performance and/or individual parameters. It defined unacceptable thresholds for sites. And the siting factor means the data, characteristics and conditions

that can be used in the siting to determine that the requirements are satisfied. Requirement driven siting factors are divided into the four main groups ‘Safety related site characteristics’, ‘Technology for execution’, ‘Societal’ and ‘Environment and land use’. Based on these siting factors, the work of siting of geological disposal is conducted to process in the three stages [4].

The general siting stage is presented regional general siting studies for all countries. The study focused on long-term safety and thereby on bedrock conditions but also included the general surveys of environmental and transport infrastructure.

The feasibility study stage was to determine whether premises existed for further siting studies for a geological disposal. Therefore geological studies were a principal component based on existing knowledge, but no drilling was done.

The site investigation stage has included investigation of the biosphere and geological conditions as well as geophysical survey on potential site. Most of the work during the site investigation stage has been done within four technical main activities: investigation, site modeling, design and safety assessment.

The site investigation phase was carried out in two main steps: initial site investigation (ISI) and complete site investigation (CSI). After the initial stage, a preliminary safety evaluation was made of the site in question, which included comparing the data collected on conditions on the site with pre-established criteria. An essential goal was to evaluate the assessment that had justified the choices of candidate sites, i.e. to ensure that these sites have good prospects of meeting the requirements for a final repository. Another goal was to give feedback to the continued investigations and the work with the repository layout and to identify geoscientific

questions that might require particular attention in the continued work.

4. Conclusion

For siting process, the site selection process should demonstrate evidence of natural containment and isolation characteristics prevailing over the types of radioactive waste under consideration. Based on basic plan, the preliminary investigation stage was conducted the feasibility study and preliminary site investigation for evaluating the identification of potential site. And then, detailed investigation stage is carried out in order to confirm the preliminary design and preliminary safety assessment based on detailed 3D site descriptive modeling.

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