

Current Status of the Program for Geological Disposal of HLW in Japan

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History of HLW Management Policies in Japan

- ◆ 1976: Government initiated R&D programs on geological disposal of high level radioactive waste (HLW) separated from spent fuel during reprocessing.
- ◆ 2000: Upon receipt of a R&D report that concluded the feasibility of geological disposal of HLW in Japan, **the Act on Specified Radioactive Waste Final Disposal** was enacted.
- ◆ The Ministry of Economy, Trade and Industry (METI) authorized the establishment of
 - **Nuclear Waste Management Organization of Japan (NUMO)**
 - Plan and implement geological disposal of HLW
 - Plan and promote R&D activities for geological disposal in cooperation with R&D institutions
 - **Final Disposal Fund**

Activities of NUMO in the First Ten Years

- ◆ In accordance with **the Act**, NUMO adopted a stepwise process for deciding the site for repository, which consists of literature survey, preliminary investigation and detailed investigation and in which the opinions of the concerned local communities should be respected at each step.
- ◆ Since its launch, NUMO hold seminars and symposiums on a nationwide scale to inform the public on the importance and safety of geological disposal of HLW in cooperation with METI.
- ◆ In 2002 NUMO announced to all municipalities in Japan the open solicitation for accepting the literature survey.

Activity of NUMO in the First Ten Years (2)

- ◆ In 2007 **Toyo town in Kochi prefecture** officially expressed its intention to accept the literature survey. However, a strong opposition campaign spread in the municipality of which population was about 3000, and an ensuing mayoral election resulted in the defeat of the incumbent who promoted the project. The town subsequently withdrew its submission.
- ◆ After this event, METI started to explore the way to induce municipalities to consider the acceptance of literature survey but could not come to concrete conclusions before the occurrence of Great East Japan Earthquake and a major nuclear accident at Fukushima Daiichi nuclear power station in March 2011.

Recommendation of Science Council (SCJ)

1. Pursue social consensus on the nuclear energy policy before talking about the selection of the site for geological disposal of HLW;
2. Recognize the limitation of scientific and technological capability and secure scientific autonomy for scientific deliberation;
3. Rebuild a policy framework centered on temporary storage and total volume control of the waste;
4. Pursue socially acceptable procedures by formulating policies on fair burden-sharing;
5. Pursue multi-step procedures to build consensus among the public by establishing venues for discussion and
6. Recognize the need for long-term tenacious efforts to solve the problems.

AEC's Recommendations

1. Clarify the amount and nature of HLW in association with nuclear energy and fuel cycle policies to be pursued in the post-Fukushima accident era, noting that one repository under planning will be sufficient for several decades of nuclear power generation;
2. Review the safety of geological disposal of HLW in Japan based on the latest knowledge of science and technology and geology in particular, and share the result with the public as well as learned societies;
3. Make it clear that its efforts to realize final disposal of HLW be promoted step-by step, assuring reversibility and retrievability so that the course of action can be modified based on the result of consensus and risk assessments to be emerged in the future;
4. Take initiative in sharing these information and exchanging opinions with the public through regular meeting with citizens and municipalities.

Basic Energy Plan in April 2014

- Nuclear power should continue to be used as a key base-load power source and the nuclear fuel cycle program should be promoted so as to make an effective use of resources and reduce the volume and hazard level of HLW to be disposed of in geologic repositories.
- Geological disposal of HLW and used fuel if necessary, is the issue that the current generation who has benefitted from nuclear power generation should address, regardless of the future program of nuclear power generation in Japan. It should not be postponed by the extended storage of HLW;
- Considering the majority of the public now have a feeling of antipathy to nuclear power, nuclear community should sincerely communicate with the public about their resolve of never betraying the nation's right to be safe from nuclear accidents by making full use of lessons learned from the accident at Fukushima.

Basic Energy Plan in April 2014 (2)

- ◆ The stepwise approach should be pursued to select a site for geological repository, incessantly consulting with the public, while securing reversibility of the process and retrievability of waste and placing the first priority on the safety at any time.
- ◆ A venue for deliberation with the public should be established, where a diverse range of residents in the municipalities that are interested in the disposal project can participate, overcoming the feeling of antipathy.
- ◆ The Government should encourage municipalities to accept the investigation of candidate sites, explaining that the Government would cooperate with them to explore the way for sustainable development of the municipalities from the view point of equity of benefit, respecting the intent of the municipalities to accept the geological investigation for the benefit of the nation.

A Group of Expert in Geology Established by the Government

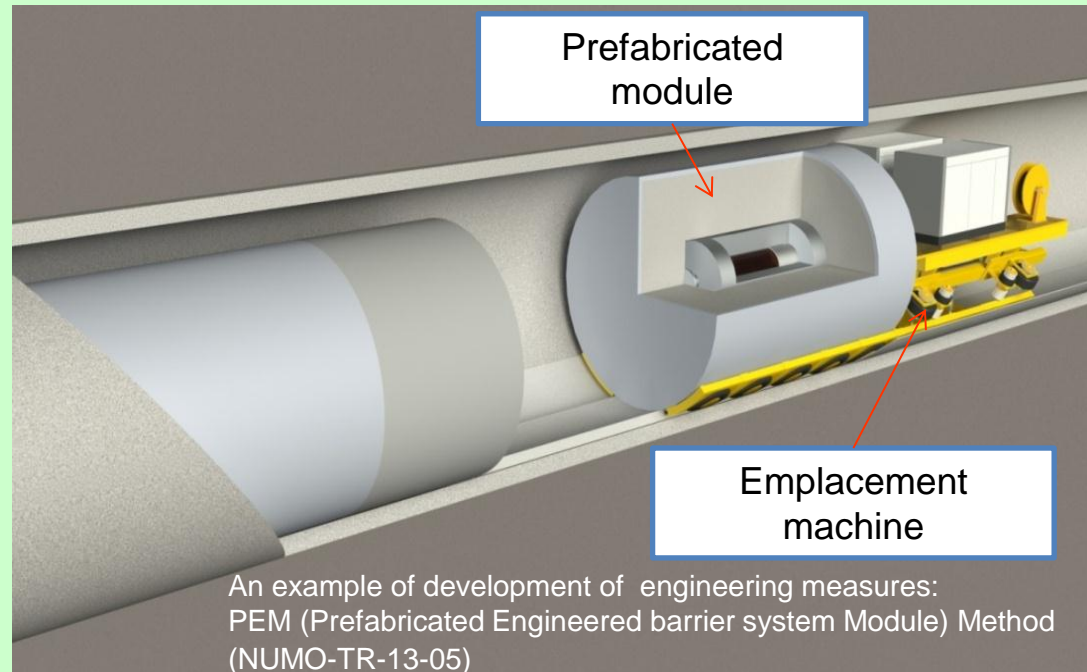
- ❖ Reviewed geological environment desirable for the location of geological repository from the viewpoint of thermal, mechanical, hydrological and chemical characteristics, taking into consideration of knowledge in geology accumulated by NUMO and other research organizations since 2000.
- ❖ Concluded that
 - A. Areas having preferable geological environment would be widely distributed in Japan;
 - B. Some type of natural events should be avoided in the site determination process due to their impact on the physical isolation and confinement functions of the geological disposal system;
 - C. Research on various earth science phenomena related these impacts should be promoted continuously .

NUMO Recently

- Has been active in the public outreach activities, holding seminar and symposium on the importance and safety of geological disposal on a nationwide scale and utilizing such tools as Geo Mirai PR vehicle, an 8-ton truck carrying models and panels describing information about geological disposal.
- Has been active in the systematic promotion of technology R&D in cooperation with various research organizations, including JAEA which operates underground research laboratories at Horonobe and Mizunami;
 - Awarding R&D contracts to companies with relevant expertise.
 - Participating in the various international collaborative activities promoted by the IAEA and the NEA, and
 - Promoting R&Ds in cooperation with overseas GD implementers and research institutes.

NUMO's Current R&D Activities

1. Science and engineering for the investigation and evaluation of the geological environment
2. Development of engineering measures
3. Post-closure safety assessment methodology
4. Safety assurance during project implementation
5. Waste form and inventory
6. Development of monitoring technology
7. Confidence building of the safety of geological disposal



NUMO Recently

- Decided to;
 - Innovate its organizational structure with a view to pursue joint understanding on the importance of site surveys for geologic repositories with plural municipalities in parallel, in line with the government policy and actions, in addition to nationwide activities to bring about an environment in which the public pays respect to municipalities that are interested in siting the repository;
 - Compile in 2015, as a unique implementer of geologic disposal, a generic deep geologic disposal safety case report that should present essential information about the safety of geological disposal in Japan.

Summary

- **No municipalities have successfully volunteered for site survey yet**, though NUMO has committed to mutual understanding with the public on the necessity and safety of geological disposal of HLW.
- **Government decided to improve the process by showing suitable areas for the repositories** with a view to encouraging municipalities to consider the acceptance of the survey and explaining that Government would cooperate with them to explore the way for their sustainable development, respecting their intent to contribute to the nation.
- **NUMO will follow the safety-oriented, stepwise procedure for the realization of geological repositories**, communicating in transparent, impartial, authentic and open manner with stakeholders, keeping its knowledge and skills in relevant fields up-to-date through careful planning and discussion with experts at home and abroad.

Thank you for your kind attention!