

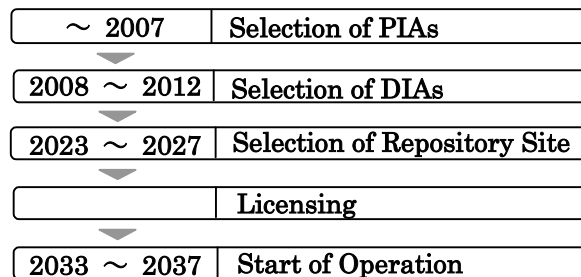
## COMMUNICATION ACTIVITIES FOR NUMO'S SITE SELECTION PROCESS

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### Introduction

A siting program for geological disposal of high-level radioactive waste (HLW) in Japan has just started and is moving into a new stage of communication with the public. Figure 1 shows the overall schedule for the HLW disposal program according to Japan's national policy. A final repository site will be selected via a stepwise process, as stipulated in the Specified Radioactive Waste Final Disposal Act promulgated in June 2000. Based on the Act, the site selection process of the Nuclear Waste Management Organization of Japan (NUMO, established in October 2000) will be carried out in the three steps [1,2] shown in Figure 2: selection of Preliminary Investigation Areas (PIAs), selection of Detailed Investigation Areas (DIAs) and selection of the Repository Site.

Figure 1. **Planned schedule for HLW disposal**

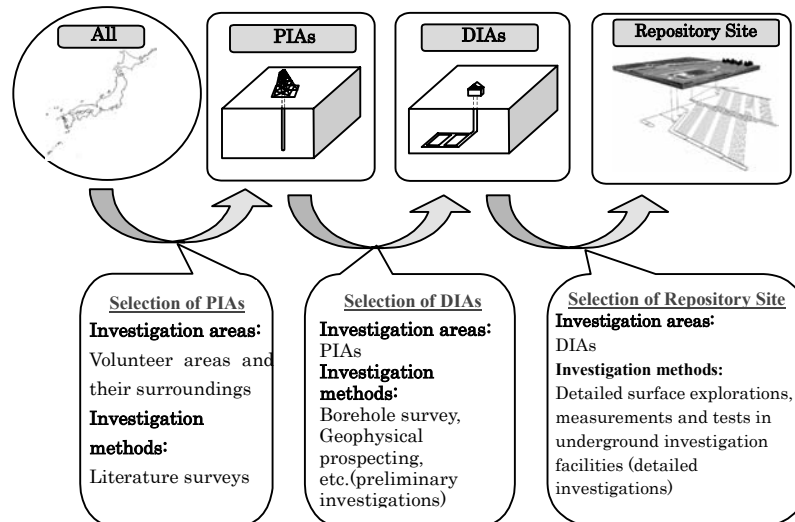


The Act also defines NUMO's responsibilities in terms of implementing the HLW disposal program in an open and transparent manner. NUMO fully understands the importance of public participation in its activities and is aiming to promote public involvement in the process of site selection based on a fundamental policy, which consists of "adopting a stepwise approach", "respecting the initiative of municipalities" and "ensuring transparency in information disclosure".

This policy is clearly reflected in the adoption of an open solicitation approach for volunteer municipalities for Preliminary Investigation Areas (PIAs). NUMO made the official announcement of the start of its open solicitation program on 19 December 2002.

This paper outlines how NUMO's activities are currently carried out with a view to encouraging municipalities to volunteer as PIAs and how public awareness of the safety of the HLW disposal is evaluated at this stage.

Figure 2. Three stages of the site selection process



### NUMO's selection activities for PIAs

For the purpose of soliciting volunteer municipalities, NUMO has already distributed information packages to all 3,239 municipalities in Japan. The package contains four separate documents: "Instructions for Application", "Repository Concepts", "Siting Factors" and "Outreach Scheme". The document also specifies the selection procedure for PIAs as follows.

1. When a volunteer municipality applies for site investigations, NUMO will conduct a regional literature study, based on records of geological history, to determine seismic and volcanic activity and uplift and erosion in and around the area where the volunteer municipality is located. This study will be conducted in collaboration with experts who have specific knowledge and expertise regarding these phenomena in the area concerned. The evaluation of each area will be conducted in compliance with siting factors prepared and published in advance by NUMO.
2. All the evaluation results will be documented and then submitted to the governors and mayors of the relevant municipalities. NUMO will also disclose the evaluation reports for perusal by relevant prefectures.
3. Comments on NUMO's reports will be taken into consideration. The revised reports will then be submitted to the governors and mayors of the municipalities, together with lists of comments and NUMO's responses.
4. In accordance with the Final Disposal Act, NUMO will select candidate PIAs based on regional literature surveys and will request approval of the PIAs by the government.

5. The government will publicize the decision process relating to authorization of PIAs in the final disposal plan. In compliance with the Act, the government will have to ask for comments from the governors and mayors of relevant municipalities. The government will consider these comments in approving the selection of the PIAs.

### **NUMO's public relations activities**

NUMO believes that the initial, and critical, milestone in the process is the first approach of a volunteer municipality. Therefore, in order to increase public awareness of HLW disposal and to encourage active discussion on the siting of the repository, leading to a first application by a municipality, NUMO has been carrying out the following public relations activities: promotion activities aimed at prefectural offices, public forums/"conversaciones" co-hosted by local media and information campaigns.

#### ***1. Approach to municipalities/prefectures***

In 2001, NUMO directly visited all 47 prefectural offices in Japan to inform them of its assignments in the national HLW disposal program. After publishing a brochure on NUMO's siting procedure in November 2001, NUMO revisited all the prefectural offices and mailed brochures to all 3,239 municipalities. NUMO officially announced the start of open solicitation for PIAs in December 2002 and revisited the same prefectural offices again. A set of documents called the "Information Package" was also sent to all the municipalities. This package is composed of four separate documents: "Instructions for Application", "Siting Factors for the Selection of Preliminary Investigation Areas", "Repository Concepts" and "Outreach Scheme".

#### ***2. Public forums and conversaciones***

NUMO organized public forums at 31 different locations out of 47 prefectures in 2001 and 2002. The number of participants was estimated to be approximately 5,000. Local media at each location jointly hosted the forums and made the discussions the subject of an article in their newspapers.

In 2003, NUMO started holding conversaciones; these were scheduled at 30 different locations with local opinion leaders, the aim being to talk about the HLW disposal issue. The co-hosting local media contributed to discussions and reported the outcome as feature articles.

#### ***3. Information campaigns***

In order to increase public awareness of the HLW disposal program, NUMO has been conducting attention-catching information campaigns on TV, in leading newspapers/magazines and so on. So far, NUMO's program has been advertised in newspapers/magazines corresponding to more than 80% of Japan's total readership.

A poster campaign was also launched at major train stations. NUMO is currently planning to develop an interactive website for public dialogue.

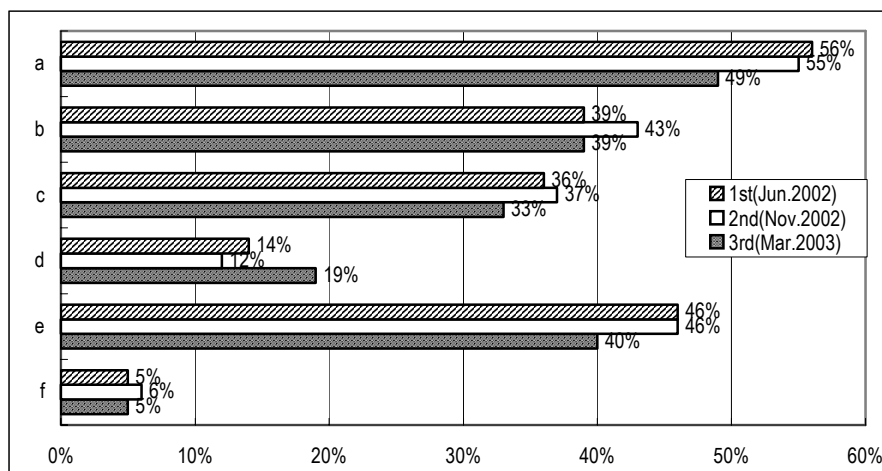
**Public interests and views on safety issues**

NUMO’s activities in terms of responding to questions from the public and providing adequate information are prerequisites to removing communication barriers and initiating open debate with the public. In this respect, it is important to examine what technical information the general public is interested in, particularly regarding safety-related issues relevant to NUMO. Therefore, some aspects were investigated in order to determine public viewpoints.

**1. Public perception of HLW-related issues**

In order to estimate public perception and the impact of NUMO’s advertisements relating to the HLW disposal program, public surveys based on telephone interviews were carried out three times subsequent to public acceptance campaigns in the media (newspapers, magazines, posters and TV). The results obtained are shown in Figure 3. The survey shows that around 50-55% of respondents have heard of HLW. Their knowledge levels and concerns about HLW, shown in answers “b” and “c”, are considered to be fairly high. Unfortunately, regarding any enhancement of public awareness, it seems that no remarkable change occurred as a result of the information campaigns. Only public recognition of NUMO is clearly increasing, although it still remains in the lower percentages.

Figure 3. **Results of public survey by telephone interview on NUMO’s PA activities**  
 (Area: all 47 Prefectures, Coverage: 2,000 men and women between age 20 and 60)



**【 HLW awareness 】**  
 a. “have seen or heard of”  
 b. “fair knowledge”  
 c. “fairly interested or more”  
**【 NUMO recognition 】**  
 d. “know or heard of”  
**【 HLW disposal 】**  
 e. “somehow necessary or more”  
 f. “fairly informed or better”

The interesting result is found in answer “e”. Around 40-46% recognized that HLW disposal was somehow necessary or more, even though many people answered that they had doubts about the safe disposal of HLW. They also expressed a lack of satisfaction with the information provided by NUMO. This indicates that NUMO has to study more closely what the public would like to know about the HLW disposal program, particularly with respect to safety. NUMO will continue to survey these parameters periodically and will make adjustments to respond to the public voice.

## **2. *Public interest in the HLW program***

Based on information including nuclear energy issues and various open discussions about HLW disposal in Japan, group interviews were conducted with members of the public, focusing on university students, housewives, engineers, businessmen, schoolteachers, municipal government staff and senior citizens (over 60 years old) [3]. The following aspects emerged clearly as general characteristics:

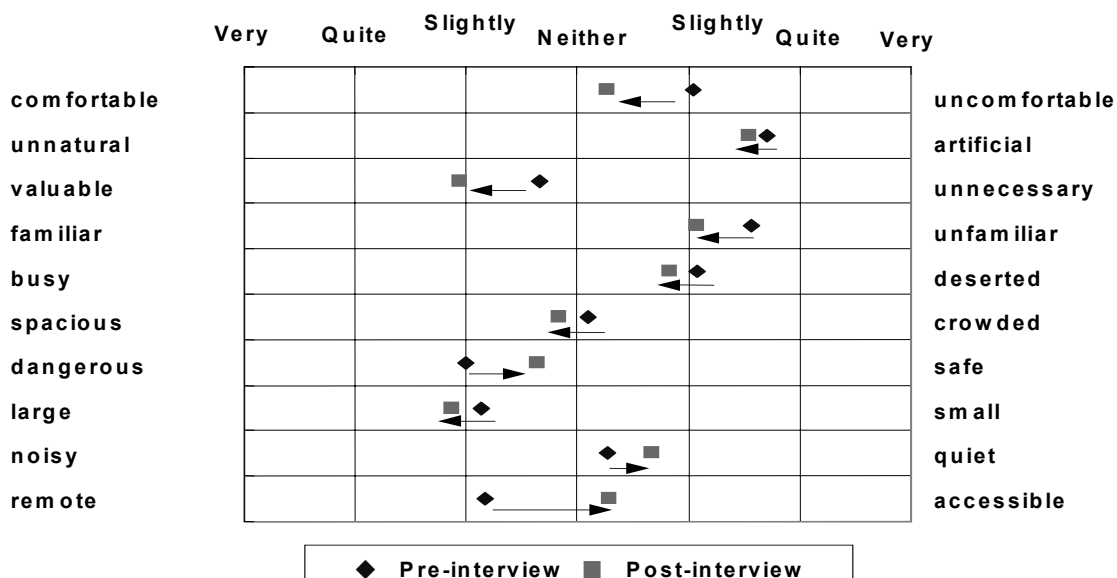
- a) The term, high-level waste has some level of recognition, but most people have no concrete image of what HLW actually is.
- b) Many people would like to know how issues associated with HLW disposal were recognized socially at the beginning of development of the nuclear power program.
- c) Instead of being concerned about the long-term safety of HLW disposal, people tend to worry more about risks in the more immediate future, for example associated with activities such as the operation of reprocessing plants and transportation of HLW.
- d) Some people expect major future developments in science and technology, so that they do not recognize geological disposal as being a “favorable” strategy at present.
- e) The NIMBY syndrome clearly exists in the case of the HLW repository siting.

The interviews also suggested that information on the risks associated with geological disposal and technical explanations, which cannot be comprehended easily by lay people, would possibly be understood better as a result of introductory lectures and discussions. Figure 4 shows changes in people’s feelings about HLW disposal after being provided with detailed information on the HLW disposal program.

The overall result of the survey of impressions given before and after the group interviews showed a rather positive trend. All the groups made progress on questions regarding safety, feelings of security, usefulness, familiarity and so forth. For instance, a feeling of being “slightly uncomfortable” before group interviews became “neither uncomfortable nor comfortable”. Further changes included: “quite unfamiliar” (before interviews) to “slightly unfamiliar” (after interviews); “slightly dangerous” (before) to “neither dangerous nor safe” (after); an impression of “slightly remote” (before) changed to “very slightly accessible” (after).

The results demonstrate that providing relevant information is a very useful way to mitigate major concerns regarding HLW disposal. The input is also useful for scrutinizing factors relating to safety issues that are considered to be important for building public acceptance of the HLW program.

Figure 4. Results of pre- and post-interview questionnaires



3. Key technical issues for communication

Based on investigations of information events related to HLW facilities in Japan and abroad, the content of discussions and the communication methods used were analyzed and characterized from the viewpoint of stakeholder interests. Based on the results obtained, three key issues for better communication with stakeholders were identified: “technical issues”, “procedural issues” and “communication issues”, shown in Table 1.

Table 1. Three key issues for better communication

Technical issues	Method for quantifying uncertainty Experimental methods and verification Theoretical approach, etc.
Procedural issues	Procedural fairness: consistency, non-prejudice, reversibility, representativeness, ethics
Communication issues	Public involvement Risk information

The group interviews also suggested various effective strategies for pursuing communication with the general public. Some technical questions raised by the group interviews are identified. As part of this study, further analysis was carried out to understand in depth the participants’ comments from group interviews.

In the previous 13 group interviews, the participants requested disclosure of information from diverse technical viewpoints. Table 2 summarizes the potential technical issues based on these requests.

Table 2. Potential technical issues based on communication with participants

Potential Technical Issues	Perceived Effects
<b>A. Safety Engineering</b>	
- Decentralized siting	- Reducing inventory per site
- Development of much safer engineered barriers with low-cost materials	- Cost effectiveness and improvement of intrinsic safety
<b>B. Fail-Safe Engineering</b>	
- Increase in disposal depth	- Low flow rate of groundwater
- Adopting quake-proof engineering	- Improvement of quake-proof performance
<b>C. Institutional Control</b>	
- Long-term maintenance of repository records	- Reducing risk of human intrusion
<b>D. Monitoring &amp; Retrievability</b>	
- Development of remote monitoring and auto-restoration system	- Swift response to unexpected perturbations and accidents
<b>E. Risk-Reduction Measures by Siting</b>	
- Selection of a site with small uplift and low erosion rate	- Avoid risk of repository exposure
<b>F. Assessment of Post-Closure Safety</b>	
- Integrated assessment including key topics such as assessment period, etc.	- Active consideration of uncertainties
- Consideration of pre-excluded phenomena such as influence of micro-organisms and bacteria	- Advancement of assessment (aiming at complete assessment)
<b>G. Pre-Closure Safety</b>	
- Risk assessment during repository operation	- Development of risk-reduction measures during repository operation
<b>H. Social Expectations &amp; Trust in Future Science and Technology</b>	
- Consideration of partitioning/transmutation	- Flexibility for adopting new technology
<b>I. Miscellaneous</b>	
- Disclosing prerequisites for theoretical calculations and policy of assumptions	- Enhancing social trust and preventing misinterpretation
- Scenario simulation using simulation models	- Improvement in practicality of scenario analysis
- Interpretation of safety based on demonstration and evidence	- Enhancing social trust and practicality

These, in other words, can be identified as “technical issues or challenges”. Table 2 shows not only issues based on most recent requests, but also items that have been raised repeatedly since earlier interviews. These issues were pulled together within an approximately two-hour interview session and are considered to be priority topics for NUMO’s future communication efforts. These issues are also thought to include key questions that may need establishment of specific measures.

Clarifying these general technical issues and responding to the public's demands would not, however, be the level of support that would generate a feeling of security and confidence. It is nevertheless important to remember that they are in fact prerequisites to ensuring a smooth initiation of communication with the general public.

When local municipalities apply as PIAs, NUMO will initiate close communication with the affected public, taking public concerns such as the above-mentioned technical issues into consideration.

## **Conclusion**

The main mission of nuclear waste management is to maintain the environmentally friendly nature of Japan's nuclear energy program by implementing safe disposal of HLW. NUMO's responsibility is to develop the HLW disposal program with particular emphasis on ensuring safety at all stages. However, NUMO's "safety-first principle" is not yet fully understood by society for three reasons: 1) radioactivity cannot be detected by our senses; 2) members of society have no direct experience of a HLW repository; 3) few understand that the risks associated with HLW decrease with time as radioactivity decays away.

This paper has summarized some recent studies of public perception of HLW-related issues in Japan. Many of the experiences, such as public forums and conversations and public surveys (including group interviews and telephone interviews) have provided NUMO with a valuable opportunity to learn what the public would really like to know about. NUMO wishes to help resolve these important issues by providing extensive and understandable information about the HLW disposal program.

## **References**

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- [3] Okuyama, S., Takeuchi, M. and Sekine, M.: Establishment of mutual trust in a deep geological disposal project: analysis of public interest in nuclear safety issues, Proceedings of IRPA 11(2004)(submitted).



*Appendix***JAPAN (NUMO)  
DECISION ON THE HLW REPOSITORY**

<b>Decision and decision maker</b>	<b>Relevant stakeholders and SI tools</b>	<b>Impacts on processes (P) and outcomes (O)</b>
Choosing geological disposal and siting process by law (Parliament and government)	Politician (Parliament debate), general public (public comments)	Stepwise siting process (three stages) and stakeholder involvement (governor, mayor, residents (P and O))
Fundamental safety principle (Nuclear safety commission)	Regulator, implementer, general public (public comments)	Regulatory framework is under consideration by the regulator
Siting requirements for Preliminary investigation areas (Nuclear safety commission)	Regulator, implementer, general public (public comments)	
<ul style="list-style-type: none"> <li>➤ Choosing “Open solicitation policy” for siting process</li> <li>➤ Publishing NUMO’s siting factors for Preliminary investigation areas (NUMO)</li> </ul>	<ul style="list-style-type: none"> <li>➤ Mayor (governor, municipality parliament, residents)</li> <li>➤ General public (visiting prefectural offices, brochures, printed documents, public forums, discussions with opinion leaders, media campaign, poster campaign, website, public opinion surveys, focus group discussions)</li> </ul>	<ul style="list-style-type: none"> <li>➤ NUMO’s policy and siting factors were approved by the competent authority (not regulator) (P)</li> <li>➤ Identifying key technical, procedural issues for making the communication strategy (P)</li> </ul>

General impacts on process:

- Requiring transparency on the siting process.
- Safety regulation will be legislated in the future.