

GEOLOGICAL DISPOSAL FACILITIES - Chairperson F. Besnus (France)

This session comprised five topical presentations and a report of the contributed papers, followed by a panel discussion.

A volunteering approach to siting has been adopted in the Japanese high level radioactive waste disposal programme; communities are being invited to volunteer as potential hosts for the repository. A flexible approach is being used to define the repository concepts; they will be tailored to the characteristics of volunteer sites. The main research and development challenges for repository design and development will therefore be identified and resolved as the repository concepts become clear over the next decades.

Siting was also the subject of the presentation of EDRAM, the International Association for Environmentally Safe Disposal of Radioactive Materials. This is an association of radioactive waste management organizations from many of the countries most involved in large scale radioactive waste disposal. It provides a forum to promote the exchange of knowledge, experience and information among its members. In the presentation, the conditions for success, the constraining factors and the future challenges were discussed. The use of a volunteering approach involving stakeholders is now seen as the way forward. It was noted that, since the siting process can take several decades, the need for stable political decisions over such time periods is important.

Experiences from two national programmes were described:

- The US DOE gained considerable experience in creating and communicating the case for the safety of the potential Yucca Mountain repository culminating in approval in 2002 by the President and Congress. The experience that supported the successful site recommendation process involved a three-tiered approach. First, a highly technical case was made for regulatory compliance. Second, a broader case for safety was made in an Environmental Impact Statement. And third, plain language brochures were made available to the public in hard copy and on the Internet, to explain the DOE's action and its legal and scientific bases.
- The French 2005 Clay File is a document that contains an assessment of the feasibility of a disposal system in a specific clay formation. The presentation described the preparation and the content of the material that the French national organization responsible for radioactive waste management (ANDRA) submitted to its supervisory ministries in June 2005. The File will be the subject of an international peer review in November 2005. It addresses, in particular, the management of uncertainties, the geological survey and review, and reversibility.

A presentation from Finland set out an approach for demonstrating the safety of a geological repository based on the experience gained from the successful Finnish project. It emphasized that absolute proof of the long-term safety of geological disposal is not possible and, instead, a judgement is required which should be based on the concepts of reasonable assurance and multiple lines of evidence.

Similar issues were dealt with in the contributed papers summarized by the rapporteur. They addressed: progress in disposal programmes, regulatory issues, and knowledge and 'know-how' preservation. For the latter, timescales of centuries have to be taken into account. Two goals are assigned to knowledge preservation: (1) the efficient use of information in ongoing programmes to support decisions; (2) the transfer of information to future generations to enable them to take informed decisions

The panel discussion focused on the following topics: siting and site requirements, safety assessment approaches, and innovative technologies and demonstration programmes.

Regarding siting, the purely scientific approach is no longer considered to be appropriate. The volunteering approach with stakeholder involvement is becoming the reference. Siting should be a step-by-step process with clearly identified rules. It should involve communication with the public and the regulator must also be involved. The trend is to select a 'suitable' site rather than the 'best one', recognizing that there is room for flexibility in combining engineered systems and site characteristics to achieve safety. Thus, there is no reason for defining more precise requirements for siting internationally than those already existing. However, this should not prevent international initiatives on providing guidelines regarding favorable site features that would facilitate safety demonstration.

Probabilistic and deterministic approaches are both useful and are not mutually exclusive. The deterministic approach can treat uncertainty in a bounding conservative way, while the probabilistic approach can treat parameter uncertainty in an explicit way. They provide complementary tools for the interpretation and presentation of the results of calculations. Whatever method is used, there is, in the end, the need to explain and clearly justify the relevance of the assumptions made.

In the context of radioactive waste disposal, the regulation of long-term radiation protection has been identified as a complex issue that could benefit from further international guidance. The relevance of protection criteria (doses, risks, fluxes,...) and their interpretation in the very long term remains open to discussion. Considerable differences can be observed between national regulations in the setting of timeframes for safety consideration and the associated protection criteria. These differences are difficult to explain and to justify and may add to a

lack of trust among stakeholders in the capacity of the disposal system to protect people and the environment in the long term.

Demonstration programmes in underground facilities were identified as indispensable tools for assessing design performance. It was noted that this topic has not been the subject of a detailed international exchange of information.