

NUCLEAR ENERGY AGENCY
RADIOACTIVE WASTE MANAGEMENT COMMITTEE

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**REVERSIBILITY AND RETRIEVABILITY IN GEOLOGIC DISPOSAL OF RADIOACTIVE WASTE –
TAKING FURTHER THE RWMC WORK IN RELATION TO STEPWISE DECISION MAKING****A Proposal to the RWMC**

National programmes would benefit from a shared and broad-based understanding at the international level of the reversibility and retrievability concepts and of the related opportunities and limitations. Such understanding could be used as a reference for those national programmes that are involved in siting and licensing repositories with strong local interactions. It could also help the elaboration of more robust waste management strategies for national programmes that are in their preliminary stage. The proposed work would make it possible for all to benefit from the recent progress in societal, scientific and engineering knowledge. Because of the vast experience associated with the advanced national programmes the RWMC represents and the breadth of its related high-level initiatives, the Committee is uniquely placed to develop state-of-the-art guidance on reversibility and retrievability concepts in relation to stepwise decision making. A work programme is proposed.

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REVERSIBILITY AND RETRIEVABILITY IN GEOLOGIC DISPOSAL OF RADIOACTIVE WASTE – TAKING FURTHER THE RWMC WORK IN RELATION TO STEPWISE DECISION MAKING

A Proposal to the RWMC

Background

In 2001 the NEA Radioactive Waste Management Committee issued the document entitled, “Reversibility and Retrievability in Geologic Disposal of Radioactive Waste”. This document was prepared on behalf of the RWMC by a group of experts nominated by its various waste management organisations. While in progress, this document was discussed in plenary meetings and in a topical session by the whole committee. The document provided a clear distinction between the concepts of retrievability and reversibility, and showed how reversibility could underpin a flexible approach to decision making.

In 2004 the NEA Forum on Stakeholder Confidence prepared the report titled “Stepwise Approach to Decision Making for Long-term Radioactive Waste Management”. This report was also discussed at length by the RWMC and emphasizes the evolution towards more dialogue in decision making. The observation is made that “Consideration is increasingly being given to the better understanding of concepts such as ‘stepwise decisions making’ and ‘adaptive staging’ in which the public, and especially the most affected local public, are meaningfully involved in the planning process.” Principles and relevant issues are presented in the document, and the concept of “reversibility of decisions” is addressed specifically.

Reversibility and retrievability (R&R) appears, more and more, to be a significant issue in an increasing number of countries, and recent reflections on decision making as well as progress in the various national programmes over the last few years (see box) suggest that it would be appropriate at this time to revise the 2001 document.

In Canada, the NWMO’s 2002-2005 study (Nuclear Waste Management Organization: “Choosing a Way Forward”) recommends an “Adaptive Phased Management” approach of geological disposal, providing in particular for phased and adaptive decision-making, continuous monitoring, retrievability over time and Citizen engagement.

In Switzerland, the 2003 Nuclear Energy Act and 2004 relating Ordinance provide that the eventual closure of the repository is preceded by an observation phase. Retrievability must be ensured until closure of the repository.

In their 2006 final recommendations for the long-term management of the UK's radioactive waste, the Committee on Radioactive Waste Management (CoRWM) discusses various designs providing for retrievability, reversibility or recoverability. They note that “there are already several different repository concepts designed to allow for monitoring and possible retrieval before final closure and it is likely that thinking in this area will develop further.”

In France, the 2006 Radwaste Act defines the process to be carried out when permitting a reversible repository for high level and long lived waste. The Act plans for a new parliamentary debate, sometime around 2016, in order to define by law the reversibility conditions to be associated with the licensing and implementation of the repository. Reversibility will be a key issue in future dialogue with the public and the stakeholders.

Proposal

National programmes would benefit from a shared and broad-based understanding at the international level of the reversibility and retrievability concepts and of the related opportunities and limitations. Such understanding could be used as a reference for those national programmes that are involved in siting and licensing repositories with strong local interactions. It could also help the elaboration of more robust waste management strategies for national programmes that are in their preliminary stage. The proposed work would make it possible for all to benefit from the recent progress in societal, scientific and engineering knowledge.

Because of the vast experience associated with the advanced national programmes the RWMC represents and the breadth of its related high-level initiatives, the Committee is uniquely placed to develop state-of-the-art guidance on reversibility and retrievability concepts in relation to stepwise decision making.

Suggested organisation

The proposed work would result in the updating of the 2001 NEA Radioactive Waste Management Committee document “Reversibility and Retrievability in Geologic Disposal of Radioactive Waste” and possibly the development of additional supporting documents.

The project would be carried out by an international group of experts currently working for various organisations involved in scientific and technical development, siting and implementation, as well as regulation of geological repositories. The group would include scientific and technical experts as well as others experienced in dialogue with the local public and with other stakeholders. The broad competence and experience of this group should make it possible to appropriately consider both the technical approaches and the social underpinnings and sensitivities.

Once nominated by the RWMC organisations, this international group of experts would be expected to conduct its work between 2007 and 2010. There would be intermediate reports to the Committee, as well as a topical session organised in 2010.

Thereafter, under the auspices of the NEA/RWMC, an international conference on reversibility and retrievability could be organized, e.g. by mid-2011. The conference would address the major issues identified by the international group of experts and the RWMC topical session. The conference programme would include presentations highlighting the main conclusions (draft) reached by the Committee and its supporting experts. The conference would be open, with participation from society at large. The main points made at the conference will be summarised and documented as part of the proceedings

The final, updated document, “Reversibility and Retrievability in Geologic Disposal of Radioactive Waste”, would take into account the conference conclusions and recommendations. The document would be published by the NEA early in 2012 at the latest.

Example work themes

The proposed work would review once again the definitions of R&R. One objective would be to make these concepts as clear as possible for the public and for the stakeholders. These definitions could be concretely supported by design examples.

The flexibility in the application of these concepts would be analyzed with regard to the type of waste, to the type of host rock, and to any other identified parameters. Provision should be made to ensure the compatibility of these concepts with various national situations. This can be supported by a review of the

current approaches to reversibility or retrievability in participating countries, taking into account public or stakeholder expectations, legal or regulatory framework, safety requirements, repository designs, considered timeframe, and other considerations.

The implementation, construction, operation and closure of a repository are based on a decision making process. A number of recent publications call for a staged approach to this process. The proposed work would analyze this staged decision making process in relation to the R&R concepts. Accordingly, it would first identify the various steps/stages in the decision making process that should be considered. The integration of the R&R concepts into these steps would be discussed. The work would explore the conditions necessary for decision making, the related responsibilities (implementer, regulator, others) and the potential for dialogue with stakeholders or with the public.

An important part of the proposed work would be dedicated to a discussion of the limitations of the R&R concepts. Technical limits can relate to the type of waste or type of host rock, to safety requirements with regard to operational or post closure situations, to the long term behaviour of the materials used, etc. Examples of other limitations that could be addressed are a potential preference, by some stakeholders, for experience based observations rather than for predictive approaches; perceptions of long timescales by the public and the possibility, or not, of having practical demonstrations..

The observation and surveillance (monitoring) of a repository and its environment can support the decision making process. The proposed work would discuss the opportunities provided by monitoring with regard to the R&R concepts. Those decision making stages that could be impacted by monitoring data will be identified, as well as the type of data that should be relevant for decision making. A summary of the current state of the art in the field of monitoring would be provided, taking into account current international and national research and development programmes .

Finally the work might identify the cost issues related to reversibility and to the stepwise approach.

Resources and synergies

The NEA work is reputed for the high level conceptualization it can offer based on the input from specialists from the most advanced radioactive waste management programmes and including the expertise of policy makers, R&D specialists, regulators, and implementers. Many of them participate in international programmes, e.g., under the aegis of the European Commission and the IAEA, on focused aspects of the reversibility/retrievability issue. It is expected that the working group that will scope the programme of work will identify these international inputs and synergies¹.

In contacts with the RWMC and the NEA, several RWMC member organisations adhering to EDRAM – the International Association for Environmentally Safe Disposal of Radioactive Materials consisting of waste management agencies– have indicated their strong interest and support² for a high-level initiative that would result in the updating of the 2001 NEA Radioactive Waste Management Committee document.

¹ In particular, one input will be IAEA's TECDOC under preparation (2003-2007) on the potential technological impact of retrievability on the design, construction, operation, closure and post-closure monitoring requirements of a geologic repository for long lived and high level radioactive waste and/or spent nuclear fuel.

² Expressions of interest – to be confirmed in due course – have come from Ontario Hydro (Canada), Andra (France), SKB (Sweden), Nagra (Switzerland), and Nirex (UK).

Andra is prepared to host and help kick-off the working group and, in due course, to organize the proposed international conference. At that time, the conference participants would also have the opportunity to visit Andra's underground research laboratory in Meuse/Haute-Marne and the adjacent technological demonstration facility to be built there in the near future. It is expected that additional sponsorships and co-organizers would be acquired in the course of the project.

The first meeting of the group should take place in advance of the RWMC meeting of March 2008.