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**NUCLEAR ENERGY AGENCY
RADIOACTIVE WASTE MANAGEMENT COMMITTEE**

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R&R project status report following the Toronto meeting of October 2008

Reversibility & Retrievability Project


8-10 October, 2008

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REVERSIBILITY AND RETRIEVABILITY PROJECT


Draft Status Report following the
R&R Project meeting
Toronto, Canada
8-10 October, 2008

C. Pescatore, with the assistance of the Core Group

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Project Overview

- R&R project agreed at RWMC-40 (March 2007)
 - Foundation document: NEA/RWM(2007)7
 - Main goal: to raise awareness of the issues around R&R
 - Particular focus on policy and regulatory issues
- Proposed timeline: new NEA document(s) in 2011, preceded by a conference in France in late 2010

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Topical Session at RWMC-41 (March 2008)

- Presentations from *Canada, France, Germany, Sweden and USA* on responses to draft guidelines/questionnaire
- Discussion focused on drivers, scope, communications and decision making
- RWMC agreement to start a Project, with method of funding and structure, and to proceed with a revised questionnaire.
- 1st Working Group meeting Fall 2008 in Toronto to prepare for a report at RWMC-42 in 2009

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Questionnaire and Guidelines

- Revised questionnaire was distributed to RWMC members on 23 May 2008
- Responses received from 13 countries:
 - Austria, Belgium, Canada, Czech Republic, Finland, France, Germany, Hungary, Japan, Korea, Switzerland, the UK and the USA.
- Response expected from Spain.

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Toronto meeting

- Participation from 10 countries, IGSC and FSC
- Organized in a way to give everyone an active role
- Sessions organized around the questionnaire
- Each session discussed the questionnaire responses, with a view
 - (a) to start work on the first progress report
 - (b) to decide on main issues and directions of work

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Toronto meeting: R&R “Scale”

- A proposal was presented by Andra to continue work on an R&R “Scale” within the project
- It was agreed to pursue the question within the framework of the R&R project

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Session – Historical Development (1)

- A variety of historical paths are evident in the responses
- Programmes that have not yet reached the stage of in-depth public debate on geological disposal have not yet encountered R&R questions (e.g., Belgium, Japan, Czech R.,....)
- Programmes in which reversibility and/or retrievability are legal, worked-out requirements one way (USA, Switzerland) or another (Sweden, Finland) do not regard them as major implementation issues
- Some programmes that are still undergoing public debate are wrestling with R&R issues (e.g. France, Canada)

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Session – Historical Development (2)

- In countries where retrievability or reversibility is a policy requirement, this has typically arisen through political will and/or societal dialogue.
- Access to resources and performance confirmation are economic and technical motivations. Societal motivations include lack of familiarity and discomfort with absence of active control, accessibility and reparability.
- Issues involving the meaning of safety, ethical questions, financing and transfer of information to future generations are typically also involved.



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Session – Terminology

- “*Retrievability*” is fairly widely used, generally as defined in NEA-3140
- Often applied only pre-closure, sometimes post-closure
- “*Reversibility*” is less widely used, sometimes with reference to decision making
- Other terms such as flexibility and adaptability are also used for decision making
- Agreement not to lump R&R together indiscriminately. They are distinct ideas. Need to agree to definition for the project purposes.


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Session – Terminology

- Guidance from Project's questionnaire:
 - *Reversibility*, refers to the ability to reverse decisions or processes;
 - *Retrievability*, refers the ability to retrieve entire waste packages;
 - *Recoverability*, refers the ability to recover emplaced materials.

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Session – Policy

- No compromises on safety, both long- and short-term
- To the extent that design and implementation are modular, adaptable and step-by-step, reversibility is good engineering practice
- Retrievability adds to the complexity of the repository design.
- Retrievability requirements are harder to implement as add-ons to pre-existing designs
- There are varied views on whether retrievability should be incorporated into design even when it is not a requirement

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Session – Stakeholder Communications

- It is important to avoid raising false expectations through imprecise communications; this is difficult.
- Different understandings of terminology between the technical and non-technical communities leads to confusion.
- Terms need to be simple and easy to understand.
- Stepwise decision making, allowing for reversibility and adaptability, is a means to increase familiarity and trust. It is also a means to optimize the system from both a technical and societal viewpoint.

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Session – Stepwise Decision Making

- There are clear links between reversibility of processes and stepwise decision making, although the two concepts are not identical
- Few if any countries have detailed processes in place for either
- It is not possible to predict the path of a stepwise or adaptive process too far in advance, so it is reasonable not to have processes that are highly detailed – but the principles to be applied should be clear from the outset
- A need was expressed to review the FSC work on stepwise decision making, and follow-up on it especially as it relates to reversibility


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Session – Regulatory Implementation

- Very few countries have regulatory requirements related to R&R other than requirements to verify compliance with legal obligations *re* R&R
- Designs must meet safety requirements regardless of retrievability
- The relationship between retrievability and operational safety has not yet been investigated.
 - May R&R requirements contribute to operational safety? May operational safety not include requirements that favour R&R?

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Session – Monitoring

- There are differences between monitoring for purposes of performance confirmation for designers vs. post-closure monitoring to detect problems
- Technical and non-technical communities have differing views and expectations
- It is unlikely that a repository would be left unmonitored as long as regulators exist
- More research and development on monitoring is likely to be necessary to support continued controls.
- The type and intensity of monitoring will also depend on the repository design.

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Session – Practical Issues

- There are differences in host geology – in some host rocks, keeping a repository open beyond a period of several decades may not be feasible. It is not clear, however, whether this statement is supported by engineering studies
- Financial issues
 - there is general agreement that current generations should finance design, with or without design features to promote retrievability or reversibility
 - financing for actual retrieval (Who? Why? How?) is an open question



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Session: R&R “Scale”

- The concept needs to be tailored to its purpose and audience
- A simpler, more-easily understood scale, with fewer steps, is more likely to be useful
- Main attributes of interest appear to be, in the order:
 - stages in repository development;
 - stages in the approach to passive safety
 - ease of retrieval;


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Session: The Way Forward (1)

- A major outcome of this meeting is to be a report to the RWMC in March on the findings of the working group and plans for future work
- Report is now being written based on the responses to the questionnaire and discussions both during and after the October meeting
- Recommendations to the RWMC and other groups are desirable.

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Session: The Way Forward (2)

- Next WG meeting tentatively planned for 2-4 June 2009 in Paris
- Topics to be discussed could include:
 - terminology
 - decision-making processes
 - the role of monitoring
 - limitations on retrievability or reversibility
 - the relationship between retrievability or reversibility and operational safety (nuclear and non-nuclear)
- This meeting would also begin planning for the proposed conference in late 2010

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Session: The Way Forward (3)

- Three tasks before the next WG meeting:
 - R&R scale proposal (task group: France, Belgium, UK)
 - review of NEA-3140 vis-à-vis questionnaire responses (all WG members)
 - possibly a review of the role of R&R in advanced programmes (e.g. Sweden, Finland where R&R appear to be less important now than in the past)



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Session: The Way Forward (4)

- **The schedule of the various tasks is as follows:**
 - Draft report to be sent to IGSC and FSC Core Groups by mid-January
 - Revised draft to be distributed to RWMC members by mid-February
 - Task group on scale to complete its work by mid-April
 - WG member reviews of NEA-3140 to be done between mid-February and mid-April
 - Other tasks in preparation for June meeting to be started after mid-February

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Forseable Interactions

- Interaction with FSC on decision-making processes will be helpful
- Interaction with IGSC is likely to increase at a later stage, when the scale proposal is more developed and as technical issues are raised in other discussions
- Broader audiences (e.g. stakeholder representatives, ethicists, policy specialists) will need to be involved in later phases

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