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NUCLEAR ENERGY AGENCY
RADIOACTIVE WASTE MANAGEMENT COMMITTEE

KNOWLEDGE CONSOLIDATION AND TRANSFER:

The Vision and Expectations of the RWMC

The RWMC has adopted knowledge consolidation and transfer as one of the pillars of the Committee's modus operandi and work programme. This is seen as a natural enhancement of the RWMC role of advancing the state-of-the-art by leveraging and building on accumulated knowledge and experience. The present report describes the Committee's vision as set forth in its deliberations at RWMC-40 and RWMC-41. Intention is to update this document soon after RWMC-42.

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FOREWORD

The RWMC has adopted knowledge consolidation and transfer as one of the pillars of the Committee's modus operandi and work programme. This is seen as a natural enhancement of the RWMC role of advancing the state-of-the-art by leveraging and building on accumulated knowledge and experience. Added focus on knowledge consolidation and transfer can help all national programmes fulfil their mission as they move through different phases of stepwise development and implementation. In considering evolution, not revolution, on this topic the RWMC undertook to consider possible strategies for advancing knowledge consolidation and transfer at its meetings in 2007 and 2008.

First and foremost, the RWMC is a "learning organization". Through the RWMC, members seek to improve themselves as responsive actors in the governance of radioactive waste management and decommissioning. Delegates attend in order to benefit from in-depth pragmatic exchanges with both peers and beyond the membership. They then consolidate their learning. The RWMC takes as a responsibility to mature its lessons in discussion and cooperation with those concerned and then make its learning available to others.

There are several prongs in the knowledge consolidation and transfer strategy. Members' personal involvement is helping shape an active approach to radioactive waste management and decommissioning. Learning is systematically published, in open access on the internet. The RWMC and its working parties have an excellent publication record disseminating the proceedings from numerous topical sessions and workshops. Seeking to make the lessons learnt even more accessible, the RWMC has chosen to produce brochures and flyers. The latter represent a new way to pass on the messages that the RWMC can deliver with confidence.

The present report describes the Committee's vision and serves as the Committee's strategic reference for knowledge consolidation and transfer.

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1. INTRODUCTION

Knowledge consolidation and transfer (KCT) is an important area of the RWMC programme work and modus operandi as identified and refined at the RWMC meetings of 2007 and 2008, respectively. The area is being developed, some aspects of KCT having already received important attention, including the provision of flyers and brochures that capture the essence of lessons recently learnt, the organisation of workshops and topical sessions with multi-stakeholder representation, as well as workshops and meetings that afford a better understanding of the host country programmes, and initiatives to transfer lessons from the field of materials management to other nuclear areas.

This document sets out the vision of the RWMC in the field of KCT as it has emerged in its deliberations. Knowledge consolidation and transfer is defined in Section 2. There are many opportunities to enhance KCT by the Committee and two main areas for application have been identified. The first area (Section 3) emphasises action to improve support to national programmes through timely transfer of current and emerging knowledge. This area refers very much to current RWMC activities and aims at the rationalisation of their delivery by the RWMC, its working parties, and the Secretariat. Actions in this area are affecting and will affect importantly the modus operandi of the Committee. Specific actions have been agreed upon already in this area. The second, more strategic area (Section 4) addresses inter-generational transfer of knowledge. Sharing of information from one generation to the next is integral to radioactive waste management in order to support lengthy decision-making processes and long operational and post-operational lifetimes. This is a policy area that needs to address unprecedented time-horizons, spanning decades to potentially thousands of years. Actions in this area will be discussed further at RWMC-42 in March 2009.

2. KNOWLEDGE CONSOLIDATION AND TRANSFER

Radioactive waste management demands the accumulation of a broad base of *multi-disciplinary knowledge*, addressing complex technical and social considerations in order to support advanced radioactive waste management, including the social licence to proceed. Information is required by *many parties* -- policy makers, regulators, implementers, and a growing external community of stakeholders. These parties constitute an important component of the RWMC membership and of the audience with which the RWMC builds its dialogues.

The Committee has decided to adopt knowledge consolidation and transfer as one of the pillars of the Committee's modus operandi and work programme, and to make it a unifying feature of the Committee's activities. This is seen as a natural enhancement of the RWMC approach so far: building on accumulated knowledge and experience while advancing the state of the art.

The Committee interprets “knowledge consolidation and transfer” as different to “knowledge management” (KM). KCT is a means to improve the delivery of the information and knowledge that is produced by the Committee across specialist boundaries and across generations; KM is more focused on maintaining and forming a competence base in the nuclear industry and is more human-resources oriented for contemporaneous needs. Relevant to KM is the work of the IAEA. Synergies amongst the two approaches exist and should be exploited.

In addition to international learning, increased focus on KCT can better help all programmes fulfil their mission as they move through different phases of stepwise development and implementation. Opportunities ought thus to be pursued to evolve KCT in all aspects of radioactive waste management undertaken by the committee. This is evolution, not revolution, and the RWMC continues to agree that, for purposes of KCT activities, the ultimate target audiences should remain the RWMC members and their respective governments. It is the prerogative of the RWMC members and their respective governments to reach out and address their national audiences.

Two main areas have been identified for further developing KCT: the area of support of national programmes in order to be able to get better advantage of current and emerging learning, and the area of intergenerational transfer of knowledge. For both these areas KCT is ultimately more effective if there is visibility of the effort. Hence, there ought also to be attention to increasing visibility of the RWMC work and products.

3. SUPPORT FOR NATIONAL PROGRAMMES THROUGH TIMELY TRANSFER OF CURRENT AND EMERGING KNOWLEDGE

This area refers very much to current RWMC activities and aims at the rationalisation of their delivery by the RWMC, its working parties, and the Secretariat. Actions in this area are expected to affect importantly the modus operandi of the Committee.

3.1 Areas of opportunity for developing KCT

There is agreement within the Committee that, opportunities are to be sought and exploited for:

- Facilitating international KCT by ongoing exchange of country-specific information and experiences.
- Optimizing communication tools, adopting formats most suitable for reports to support member country planning.
- Maintaining repositories of information and expert knowledge that can be readily accessed to guide operations - explicit documentation of information through databases, manuals and planning materials.
- Synthesizing, analyzing, extracting learning so it is readily accessible; enabling information to be drawn on in other situations. (e.g. analysing, synthesizing and documenting strengths of methodologies and assessment approaches).

- Transferring accumulated knowledge to new project areas (e.g. lessons from nuclear safety operations might be transferred to radioactive waste management and vice-versa; transfer learning from decommissioning to planning around new nuclear operations)
- Encouraging richness of international dialogue, exchange and collaboration in information sharing to support members in present stages of radioactive waste management programs.
- Engaging and communicating effectively with range of target audiences.

3.2 Relevant actions and initiatives

The RWMC has established a series of initiatives/actions to address this area. Tangible near- and medium-term activities that will sustain focus and momentum on RWMC evolution in this area are summarised in Table 1 under 7 themes¹. Some of these initiatives are strategic in character and affect the modus operandi of the Committee; others are very specific and include time scales for implementation.

There should be report on, and review of, these initiatives at each RWMC and Working Party meeting. A mechanism for evaluation of progress should be developed in parallel with the implementation of the new KCT strategies.

Table 1: KCT actions to support national programmes through timely transfer of current and emerging knowledge²

<p>Stocktaking and visibility through RWMC and Working Parties' programmes of work</p> <ul style="list-style-type: none">• <i>Working Parties to update their Programmes of Work to explicitly include the dimension of knowledge consolidation and transfer, and report regularly on progress in this area at RWMC meetings</i>• <i>RWMC to release more frequent stocktaking reports in key area, perhaps every three to five years, to highlight key developments and lessons learnt.</i>• <i>RWMC to confirm its support to update its stocktaking in the form of its 10-Year Review. Namely, a report on progress in the last decade (an update of the 1999 document), potentially targeting completion for 2011.</i> <p>Stocktaking and visibility through international events</p> <ul style="list-style-type: none">• <i>NEA/RWMC to plan more frequent stocktaking conferences with a view to releasing a report highlighting key developments and lessons learnt.</i>- <i>RWMC to confirm its support of the conference series on geologic disposal,</i>

¹ These are reviewed in depth in document NEA/RWM(2008)4

² Some of these activities and goals have been implemented already, e.g., at RWMC-41 in 2008.

including the next conference scheduled for Japan, in 2011, and plan to issue a collective statement or status report shortly thereafter.

- *Efforts by working parties especially, to organize periodic stocktaking conferences on specific topics, such as the one held in 2007 on the Safety Cases for disposal or the one held in 2004 on decommissioning.*
- *At a minimum all stocktaking conference proceedings should include a summary of lessons learnt that could be made available separately and free of charge.*
- *RWMC and its Working Parties to provide more attention to create opportunity to receive an overview of the national scene when official meetings and workshops are held in member countries.*

Visibility through enlarged participation in RWMC and its working parties' events

- *RWMC and its Working Parties' programmes of work and activities to be designed to seek multiple perspectives, inviting input from a broad base of individuals, organizations and sectors, to enrich the thinking, the dialogue and analysis led by RWMC and to increase awareness of NEA activities and reports.*

Knowledge transfer and visibility through publications

- *Management of previous publications:*
 - *Secretariat to devise a plan for categorizing and making available the intellectual and technical legacy of RWMC, making accessible the past RWMC research, reports, publications.*
 - *Committee members to identify to the Secretariat those RWMC and its Working Parties documents that they feel are key and should be made more broadly accessible or summarized.*
 - *Secretariat to consider means of enhancing accessibility or disseminating summaries for key documents identified by Members.*
- *Structure of new publications:*
 - *RWMC and Working Parties to structure reports so as to enhance communication of key messages, taking into account intended audiences and dissemination.*
 - *Working Parties to consider increasing the emphasis on capturing peer-reviewed literature and documenting and communicating results of their work to wider audiences.*
 - *Expert groups should be encouraged to find appropriate approaches to enhance visibility of their products.*
- *Dissemination of publications:*
 - *Secretariat to identify opportunities to increase awareness of new publications in*

concert with member country delegations.

- *Communicating key messages:*
 - *RWMC and Working Parties to assume as a priority the production of flyers (brochures) as opportunities to profile identity, key findings or major reports. The FSC flyers and their hierarchy to be used as guideline in planning for other groups' flyers.*
 - *RWMC to develop identity flyer to provide greater visibility on the purpose of RWMC, its principles and programme focus.*
- *Archiving and access:*
 - *Secretariat to introduce administrative streamlining in management and archiving of RWMC publications for easy access in future.*

International transfer of knowledge through Peer Reviews

- *RWMC to explore the possible range of new topics of interest to Members for future peer reviews.*
- *Working Parties to give consideration to potential new areas of focus for future peer reviews (see also Appendix A); report ideas back to RWMC.*

Provision of country information

- *RWMC members to continue providing country-specific information in formats currently in place for country reports, updates and profiles. These formats to be assessed over time, and improved.*
- *RWMC and Working Parties are encouraged to make use of the information for their work and to make it better known.*
- *The RWMC should institutionalize the discussion of trends in waste management based on updates by country delegations provided in advance of the meetings and in full session.*

Visibility through the NEA web page

- *Secretariat to bring forward proposal for more innovative use of the NEA website to support broader dissemination of information and reports.*

4. INTER-GENERATIONAL TRANSFER OF KNOWLEDGE: LEARNING FROM THE PAST, PLANNING FOR THE FUTURE

Of particular importance to radioactive waste management is the *inter-generational* transfer of knowledge. This is a policy area which addresses unprecedented time-horizons, through implementation spanning decades, operation over potentially hundreds of years, and post operation over potentially thousands of years.

Integration of technical, scientific and social information for decision making should continue over long periods of time, which gives rise to significant challenges for ensuring transfer of information and institutional memory. Sharing of information from one generation to the next is integral to radioactive waste management in order to support lengthy decision-making processes and long operational lifetimes and initiatives to consolidate, communicate, and transfer knowledge assume great significance in the context of radioactive waste management.

The continued and growing importance of subjects such as reversibility and retrievability, stepwise decision making, flexibility and adaptability, transfer of responsibilities between institutional actors, institutional controls, surveillance, monitoring and confidence building all depend for their success on the transfer of information to future generations, especially in the short term, but increasingly on longer and longer time scales. Preservation of information and memory can thus be seen as an intergenerational, cross-cutting theme that interacts with many other areas of work during the staged approach to disposal. The important role of record-keeping for information and memory preservation is already evident in the area of decommissioning and lessons can be learned from it. Similar issues and needs arise for long-term stewardship projects and for extended storage of a variety of wastes.

4.1 Areas of opportunity for developing KCT

There is agreement within the Committee that, opportunities are to be sought and exploited for:

- Contributing to the availability of robust information required to support decision-making processes spanning long time periods by systematically organizing and maintaining the information foundation from the past.
- Anticipating needs of future decision-makers producing and archiving today's research reports in a way that lends itself to knowledge transfer. Archiving and maintaining information, analysis and research.
- Assisting member countries in organizing their programmes to capture and retain institutional knowledge as programmes move ahead - retaining documentation on how decisions were reached, and on the associated bases for these decisions.
- Pursuing issues related to inter-generational transfer of knowledge, such as record-keeping to help support safety cases by meeting future requirements of regulators, implementers, policy makers, affected communities.
- Building and sustaining a capability for inquiry, assessment through sustained R&D and investment in resilient networks of experts. Managing tacit knowledge embodied through investment in human resources and skills training.

- Stock-taking and analysis of learning to date:
 - Mining and synthesizing the lessons of the past: Stocktaking so others can benefit from lessons learned and practitioner experience. Organize and assess trends, and document progress and achievements over time.

4.2 Relevant actions and initiatives

The area of the *inter-generational* transfer of knowledge is presently under development and dedicated actions and initiatives are being identified.

The indications from the R&R project, the results of the 1st RWMC-RF workshop as well as current work interests within the IGSC and the FSC all point towards making this a new major interdisciplinary topic, in the field of long-lived waste disposal, under the RWMC rubric of knowledge consolidation and transfer. The activities of the WPDD also signal the important role that record-keeping and memory preservation play in the area of decommissioning.

The RWMC working groups should continue to offer good platforms for co-operation among specialists in their specific domains. Preservation of information and memory across generations is, however, a cross-cutting theme of raising importance and it would well deserve having its own dedicated framework initiative in order to reach a critical mass for the development of shared viewpoints and positions on the many subjects that form this topic. Because of the vast experience accumulated by the advanced national programmes that the RWMC represents and the breadth of its related high-level initiatives, the *Committee* is uniquely placed internationally to combine resources and help develop state-of-the-art guidance on the long-term preservation of information and memory. This topic will be discussed further at the RWMC-42 meeting in March 2009, where a dedicated initiative is on the table.

5. CONCLUSIONS

Radioactive waste management demands the accumulation of a broad base of multi-disciplinary knowledge, addressing complex technical and social considerations. In order to support advanced radioactive waste management, including the social licence to proceed, information is required by many parties -- policy makers, regulators, implementers, and a growing external community of stakeholders. To ensure knowledge is passed on and retained, initiatives to consolidate, communicate, and transfer knowledge assume great significance in the context of radioactive waste management.

International collaboration and transfer of knowledge is already an established feature of radioactive waste management, as countries recognize the merit of exchanging research and lessons learned, and citizens increasingly demand that the most advanced international understanding and practices be brought to bear by national implementers and regulators and policy makers.

Of particular importance to radioactive waste management is the inter-generational transfer of knowledge. This is a policy area which addresses unprecedented time-horizons, through implementation spanning decades and operations over potentially hundreds of years. The long timeframes of decision-

making and implementation give rise to significant challenges for ensuring institutional memory and transfer of information. Integration of technical, scientific and social information will continue over long periods of time. Sharing of information from one generation to the next becomes integral to radioactive waste management to support lengthy decision-making processes and long operational lifetimes.

The Committee has decided to adopt knowledge consolidation and transfer as one of the pillars of the Committee's modus operandi and work programme, and make it a unifying feature of the Committee's activities. This is seen as a natural enhancement of the RWMC approach so far: building on accumulated knowledge and experience while advancing the state of the art.

There are many opportunities to enhance knowledge consolidation and transfer by the RWMC. Two main areas for application of KCT have been identified. The first area emphasises action to improve support to national programmes through timely transfer of current and emerging knowledge; the second, more strategic area addresses inter-generational transfer of knowledge.

APPENDIX A

Peer Reviews

RWMC should keep exploring the possible range of topics of interest to Members for future peer reviews. Questions to be answered regarding expanding peer reviews services into new areas include:

- Resource availability
 - How to assure quality of reviews
 - is important that NEA remain within areas of competency and resource capability required to undertake quality work
 - Maintaining consistency with original “raison d’être” of NEA peer reviews
 - to assist members in adopting best current international practices typical of advanced nuclear programs, seek to raise quality of work in member countries, share international learning and lessons
 - peer reviews *not* be seen as approving or disproving a national program: recognize that what works well in one country may/may not be appropriate for another country’s socio-political environment.
 - different approach from IAEA reviews.
- Modalities of conducting reviews
 - Reviews of technical areas may be more straightforward in terms of assessing state of the art practices and understanding. In new domains, such as social aspects of implementation driven and shaped by country-specific socio-political environments, what implications might this have for the nature of peer reviews? One size may not fit all. Indeed, flexibility must be given to each peer review team to adapt to the specific request and situation. The review process might invite new or varied means of conducting reviews or tailoring assistance to members as new needs arise, e.g.:
 - Reviews of literature
 - Convening international conferences/ symposia
 - Establishment of international networks of experts in different disciplines to increase member access to third-party specialists in new areas (eg., social science disciplines)