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NUCLEAR ENERGY AGENCY
RADIOACTIVE WASTE MANAGEMENT COMMITTEE

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STRATEGIC AREAS IN RADIOACTIVE WASTE MANAGEMENT

Update of the RWMC Strategic Areas Document of 1999

This report describes the strategic areas in which the RWMC plans to focus its efforts in future years based on the identification of the major challenges currently faced by national programmes. The text of this document is primarily based on text of the original brochure published in 1999, which has been updated to reflect the strategic areas for radioactive waste management identified in the NEA Strategic Plan for the period 2005-2009. Further updating is expected in conjunction with the next revision of the NEA Strategic Plan, anticipated to commence in 2008.

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FOREWORD

The NEA Radioactive Waste Management Committee (RWMC) is a forum of senior operators, regulators, policy makers, and representatives of R&D institutions engaged in the management of radioactive materials and waste. The Committee assists Member countries by promoting safe approaches and practices and providing objective guidance on the solution of problems concerning the management of radioactive waste and the decommissioning of nuclear facilities. The representation of industry, safety authorities, research, and governmental policy bodies, and the wide range of external expertise it is able to muster, make the RWMC a uniquely-placed international forum to address issues concerning the management of radioactive materials and waste.

Since its inception in 1978, the RWMC has addressed both strategic and technical issues in waste management, especially disposal. Consideration of developments in the areas of decommissioning and of stakeholder involvement, and the expansion of activities to address regulatory aspects more substantively, have been prominent developments in the last decade. The RWMC provision of a framework for quality peer reviews of technical studies, the holding of national workshops with prominent country representatives and stakeholders from national programmes, and the continued fostering of technical excellence have served the NEA member countries well.

This report describes the strategic areas in which the RWMC plans to focus its efforts in future years based on the identification of the major challenges currently faced by national programmes. The text of this document is primarily based on text of the original brochure published in 1999, which has been updated to reflect the strategic areas for radioactive waste management identified in the NEA Strategic Plan for the period 2005-2009. Further updating is expected in conjunction with the next revision of the NEA Strategic Plan, anticipated to commence in 2008.

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INTRODUCTION

Radioactive waste and retired facilities used for practices involving radioactive materials exist as a result of past activities associated with commercial nuclear power generation as well as with other industrial, medical and educational practices involving the use of radioactive materials. Just as for other types of hazardous waste and installations, radioactive waste and the decommissioning of nuclear facilities need to be managed in a safe, economical, and environmentally and publicly acceptable manner.

The NEA primary goal in the area of radioactive waste and materials, as defined in the 2005-2009 NEA Strategic Plan is:

> *to assist member countries in the area of management of radioactive waste and materials, focusing on the development of strategies for the safe, sustainable and broadly acceptable management of all types of radioactive waste, in particular long-lived waste, and spent fuel.*

Over the years, the programmes of the RWMC have contributed to establishing a consensus between experts in the participating countries that disposal sites for long-lived waste can be properly identified and characterised, that geological repositories can be designed so that no short-term detriment to populations will result from disposal of waste, and that an acceptable level of safety is provided for times far into the future. There now exists a general consensus that the current generation, which has benefited from the nuclear energy produced during its lifetime, should provide future generations the means safely to manage the waste, including its permanent disposal, whilst retaining adequate flexibility to implement complementary or alternative approaches and techniques. Similarly, the activities of the RWMC have contributed to the progression of decommissioning of retired nuclear facilities towards a mature industrial activity.

Continued assistance is being provided to enable further evolution in radioactive waste management and decommissioning in line with new technical developments. At the same time, challenges to successful implementation of national programmes also arise as regards societal acceptance of the proposed processes and end-points. Stakeholder involvement is widely recognised as being an important component of achieving societal confidence, and the RWMC has established itself as an internationally recognised forum for understanding and defining the principles and practice of stakeholder involvement. The RWMC has also provided an important contribution to the understanding of the regulatory function and to increased awareness of the link between project development and stepwise decision making.

In this document, four strategic areas are defined and further described in which RWMC feels that progress would be most beneficial for the further development of national radioactive waste management and decommissioning programmes. Building upon the technical areas in which traditionally it has demonstrated strength, the RWMC will continue to extend its endeavours to the interfaces between technical advances, regulatory developments, societal concerns and their input to the decision-making process.

Most organisations represented in the RWMC already have activities in the four strategic areas identified below. The RWMC will play a role of co-ordination at an international level enabling the sharing of experience, development of consensus, and advancement of the status of the art.

Reinforcement and rationalisation of the OECD outreach activities to the world's major emerging and transition economies will require that the NEA as a whole increases its commitment to co-operation with the Russian Federation and, possibly, other countries. The RWMC will provide the necessary support to the NEA in the areas of RWMC remit. With the conclusion of a memorandum of understanding with Russia, implementation is set to commence in April 2007.

The four strategic areas are defined and presented next. A more detailed description of the strategic area is presented on Annex I to this document; Annex II reproduces the current mandate of the RWMC.

STRATEGIC AREAS

Considerable experience has been accumulated over the past two decades, particularly in the areas of:

- The handling, treatment, storage and disposal of short-lived low- and intermediate-level waste.
- The conditioning (vitrification) of high-level waste and the storage of high-level waste and spent nuclear fuel.
- The minimisation of waste production during plant operation.
- The management of "historical" waste and the management of older waste facilities under changed legislative and regulatory frameworks.
- Decommissioning and cleanup of nuclear power plants and legacy nuclear material sites.
- Public input to decision-making processes, e.g. involvement of policy-makers, regulators, implementers, and the interested stakeholders.

Against the background of experience that has been accumulated thus far, the 2005-2009 NEA Strategic Plan identifies four broad strategic areas, which the RWMC is prepared to address in the coming years. A brief description of each strategic area is provided hereafter. More detailed information is provided in Appendix II.

Area I: Bring about a shared and broad-based understanding on the management of radioactive waste and materials, particularly in the long-lived waste area by:

- providing multidisciplinary fora for exchanging information and experience and for promoting an open dialogue amongst waste management implementers, regulators, policy specialists at government level, research and development specialists and other stakeholders;
- issuing collective opinions on topical issues; and
- providing for information platforms on national waste management frameworks and approaches for technical specialists, decision makers, opinion formers and the general public.

This area considers environmental and safety concerns associated with management approaches for radioactive materials and waste, comparison with comparable non-radioactive hazardous materials management applications, and societal and economic concerns.

This area also considers public perception and confidence, including understanding the concerns of stakeholders, communicating effectively, sharing practical experience from outreach/consultation exercises and public decision-making processes. The generation of societal confidence on how to move forward in stages is an important issue both for waste repository development and decommissioning projects.

This area includes technical information exchange and maintaining dialogue between implementer and regulator, with a view to arriving at consensus on safe, practicable, cost effective and environmentally sound solutions.

Area II: Help elaborate common regulatory approaches in the management of radioactive waste by:

- identifying and analyzing emerging regulatory issues associated with the waste management and decommissioning strategies of member countries;
- promoting the dialogue between implementers and regulators to identify and address future regulatory challenges and integrate technical and non-technical approaches; and
- reviewing regulatory bases, requirements and criteria, and licensing processes with a view to support development and implementation of regulatory approaches.

This area includes continuing work on developing common understanding amongst regulators and also between independent bodies such as implementers, regulators and policy makers on the goals to be achieved and respective responsibilities. Such work complements Area I and is supported by activities under Area III aimed at the development of scientific basis and the resolution of technical issues in order to provide grounds on which to base decision making.

Area III: Facilitate the elaboration of waste management strategies at national and international levels by:

- reviewing strategies adopted by member countries with a view to identify and analyse emerging technical and policy issues, and improve understanding and consensus;
- organising peer reviews of national programmes for such activities as research and development and performance assessment, as requested;
- examining and improving approaches for performing long-term safety analyses and for documenting safety cases;
- examining criteria for stepwise decision making;
- preparing good practice documents; and
- liaising with other relevant, international institutions.

This area includes continuing work on the review of member country strategies and analysis of emerging technical and policy issues; continued conduct of requested peer reviews, including reviews in new areas of management of radioactive materials and waste; development of good practices documents; and continued close coordination of activities with other international organisations, which includes the examination of the implications of, and participation in, international guidance and agreements.

Area IV: Enable the management of radioactive waste and materials to benefit from progress of scientific and technical knowledge by:

- reviewing the state of the art of scientific and technical bases of geological disposal concepts and decommissioning technology for nuclear facilities with a view to identify areas where additional efforts are required;

- promoting co-operative efforts to compile internationally applicable data and information, and benchmarking exercises;

- promoting joint technical initiatives in support of repository development and decommissioning technologies;

- promoting initiatives to maintain relevant competencies, as well as the accumulated knowledge, within organisations during the execution of long-term waste management and decommissioning projects; and

- promoting initiatives to transfer current waste management and decommissioning knowledge to future nuclear systems, including new fuel cycles.

This area includes identifying the emerging waste management and disposal technologies, for exchange of information and consideration of their implication at the system level.

CONCLUSIONS

In order to maintain the effectiveness of the RWMC as a forum that is of value to the member countries, the mandate, structure, and working programme of the RWMC must recognise and respond to current national situations and international concerns. Four strategic areas have been identified to guide the programme of work of the committee in the coming years. Continued assistance will be provided to enable further evolution in radioactive waste management and decommissioning in line with new technical developments, as well as continued attention to issues at the interfaces between technical advances, regulatory developments, societal concerns and their input to the decision making process. Priority setting and resource allocations may vary with time, and will take advantage of opportunities for co-ordination of efforts and collaboration within OECD/NEA and with other institutions, e.g., IAEA, EC.

RWMC members will take a direct and active part in ensuring that the issues are properly identified and addressed, and that the results of these efforts are effectively and widely communicated in a way that is convincing also to outside groups, especially other decision-makers or those that influence them. Collaboration with other parties within and outside the NEA will be important to ensuring this work is successful. In particular, decision-makers with different institutional responsibilities need to assure themselves, and also to communicate to other audiences, that they are seeking reasonable solutions to the problems associated with these strategic areas, and that the needs of stakeholders have been sufficiently identified. Effective communication is thus required within the body of the experts and decision-makers from different national programmes, with different cultural settings and different constraints, across the "regulator-implementer boundary", and between experts and decision-makers and the wider community.

The RWMC is uniquely placed internationally to provide the necessary neutral ground, expertise and information base for effective and constructive communication on the relevant topics.

APPENDIX I

DESCRIPTION OF STRATEGIC AREAS[1]

Area I: Bring about a shared and broad-based understanding on the management of radioactive waste and materials, particularly in the long-lived waste area by:

- providing multidisciplinary fora for exchanging information and experience and for promoting an open dialogue amongst waste management implementers, regulators, policy specialists at government level, research and development specialists and stakeholders;
- issuing collective opinions on topical issues; and
- preparing documents and databases on national waste management frameworks and approaches for technical specialists as well as decision makers, opinion formers and stakeholders.

Bringing about shared and broad-based understanding on the management of radioactive waste and materials includes addressing: (a) environmental concerns, safety and sustainable development; (b) comparison of the principles of radioactive and non-radioactive waste management and of the evaluation of their impact; (c) economic concerns; and (d) public perception and confidence.

(a) Environmental concerns, safety and sustainable development

There is a heightened awareness in society of the role of energy in the context of sustainable development, with emphasis on conservation of resources, the possible adverse environmental impact of the exploitation of natural resources,[2] and long-term protection of the environment. Thus:

- While it is recognised that many relevant concepts are already incorporated in policy statements for the management of long-lived radioactive waste – e.g. the principles of "the polluter pays", "reasonable assurance" and "not placing undue burdens on future generations" – it will be helpful to clarify the meaning of waste management principles and terminology within the context of sustainable development.
- While geological disposal is broadly accepted by technical experts and decision-makers as a technically sound, safe, and feasible solution for disposing of long-lived radioactive wastes, it

1. The text of this document is primarily based on text of the original brochure published in 1999, which has been updated to reflect the strategic areas for radioactive waste management identified in the NEA Strategic Plan for the period 2005-2009. Further updating is expected in conjunction with the next revision of the NEA Strategic Plan, anticipated to commence in 2008.
2. There is increasing awareness of the scale of the remediation problems to be faced as a result of some former, unsafe practices regarding the management of various forms of waste (non-radioactive, chemically-hazardous waste and radioactive waste) that may lead to the need for intervention.

will be helpful to examine, in parallel, long-term-storage and other potential approaches such as partition and transmutation (P&T) in an overall waste management strategy within the context of sustainable development. At issue are the implications, for the whole life-cycle, of the different options as well as the assessment of long-term environmental impacts.

- While it is recognised that a geological repository provides the possibility of retrievability and reversibility in the near term, it will be helpful to examine the implications for current concepts of deep geological disposal if retrievability/reversibility were provided over longer time scales. This also introduces the issue of how to determine the timing of closure based on environmental and ethical concerns.

- It is important that, whatever the approach considered for long-term waste management, it be consistent with the objective that knowledge, research capability, know-how and funding are preserved in the intervening years. This issue remains important even if nuclear energy is not preserved as an option for future generations.

There is a need to examine the place of waste management within the broader debate on environmental and ethical issues, in particular to gain a better understanding of long-term waste management options from the point of view of sustainable development.

(b) Comparison of the principles of radioactive and non-radioactive waste management and of the evaluation of their impact

Different regulatory and licensing approaches, and associated safety standards, are applied to radioactive and non-radioactive wastes. Further, the chemical toxicity of some radioactive waste—as well as toxicity due to biological agents—is becoming a more prominent issue.[3]

It will be helpful to review:

- The principles and regulations adopted in the management of non-radioactive, chemically-hazardous waste, and naturally-occurring radioactive materials, including tailings from uranium mining.

- The burden of proof of compliance that is expected for radioactive waste disposal facilities relative to other hazardous waste disposal facilities. In particular, it is of interest to understand how differences of the burden of proof of compliance are reflected in Environmental Impact Statements/Assessments (EIS/EIA) studies.

- The role of the EIS/EIA as required in several national programmes, in bringing an integrated perspective on the radiological and non-radiological impacts of repository development.

- The potential environmental impact of radioactive-waste disposal, compared to that of the by-products of other energy sources.

It may be that a comparison that places nuclear-waste disposal in perspective with other practices that impact the environment, including regulation and licensing, is required before nuclear-waste disposal

3. "Mixed waste" also exists, and is part of the remit of RWMC interests. This waste is recognised to be, at the same time, radio- and chemo-toxic.

can be widely perceived as being sufficiently safe.[4] Consistency amongst practices should also favour the allocation of resources in a way that is more attuned to the actual needs of society.

(c) Economic concerns

Financial pressures that affect the whole nuclear fuel cycle, (e.g. resulting from de-regulation of the electricity market) may tend to favour short-term goals, at the expense of long-term objectives. In particular, even though at the expert decision-maker level, a wide acceptance has been achieved that deep geological disposal represents a safe and ethical path, (i) short-term economic factors may tend to favour delaying final disposal, and (ii) political factors may tend to favour the proposition of indefinite or very-long term surface storage of all types of long-lived waste or the proposition of approaches, such as P/T, misleadingly depicted as alternatives which would preclude the need to pursue disposal.

New economic forces need to be better understood and incorporated into the understanding of the decision-making process, e.g. on decommissioning, repository development and waste generation. There is also a need to understand better the interplay of financial and "political" factors, and the way that they can affect the decision base.

(d) Public perception and confidence

Issues of public perception and confidence must be considered across all the strategic areas, with the further understanding that these issues are not specific to radioactive waste management, but also to the broader acceptance of nuclear power as part of the future energy mix. These issues have been most critical in gaining approval for development of repositories for long-lived radioactive waste at specific sites, which raises the question how best to achieve confidence with a non-specialist audience regarding the ethical, economic, political and technical aspects of a waste management strategy, and disposal in particular. The "public", however, is not a homogeneous group, and its various components and the concerns they have need to be better identified and understood.

Because of changes in society's decision-making environment and heightened public sensitivity to all matters connected with environmental protection, nuclear power, radioactivity, and especially radioactive waste, any decision regarding whether, when and how to implement waste management solutions will typically require thorough public examination and the involvement of many relevant stakeholders. The latter include waste management agencies, safety authorities, local communities, elected representatives, and technical intermediaries between the general public and decision makers. The involvement of stakeholders will become increasingly important as countries develop their strategic choices for long-term radioactive waste management, and/or move towards siting and developing final repositories. Since the decision-making process and avenues for stakeholders' involvement differ from country to country, it is important to identify similarities and differences, understand the key concerns of various stakeholders, and develop means to interact effectively with the different audiences.

A broad aim of waste management programmes is to promote understanding of, and public trust in, the decision-making process e.g. through an open and fair decision process for repository development. Considerable progress has been made regarding how best to communicate with local and wider communities. Licensing of uranium mill stabilisation projects is a reality in many countries. Acceptance of repository siting remains, however, a difficult area for most programmes. An important aspect is that stakeholders should be afforded opportunities to interact as early as possible in the process of repository development. In addition, the process by which proposals are brought forward must be trusted, and

4. Indeed, co-disposal of radioactive waste and chemically-hazardous, non-radioactive waste has been proposed by some, to take advantage of the safety provisions that proposed repositories would incorporate.

decisions made with sensitivity to local concerns. Thus, a specific issue for consideration is how to elicit more meaningful public involvement in the decision-making process.

The RWMC must be useful to its members in their obligation to take into account the input of various audiences in their respective countries. The needs of these audiences may not always be anticipated and dialogue with stakeholders may need to be sought,[5] while not interfering with the primary role of governments in deliberations and decision-making process. Among the targets are the intermediaries between the public and the technical community, e.g. scientists in other fields.

In order to ensure that progress is being made, it is imperative that the technical community also tries to understand stakeholders' interests, answer technical questions that the stakeholders feel need to be answered, and participate in a two-way communication. The needs of the stakeholders must be determined while the technical work is being done.

There is a need to identify audiences, perspectives, and expectations and to develop the RWMC as a forum to share experience in building public confidence and, in particular, in how to involve and gain the trust of local communities, their representatives, and their intermediaries with the technical decision makers. Public input to decision making, while maintaining a workable decision-making process, needs to be explored more fully, especially in relation to the role of the regulator.

Area II: Help elaborate common regulatory approaches in the management of radioactive waste by:

- identifying and analysing emerging regulatory issues associated with the waste management strategies of member countries;

- promoting the dialogue between waste management implementers and regulators to identify and address future regulatory challenges and integrate technical and non-technical approaches; and

- reviewing regulatory bases, requirements and criteria, and licensing processes with a view to support regulatory approaches.

At the international level, the achievement of shared understanding of key concepts of repository development among and between implementers, regulators and policy makers, has the potential to facilitate the enhancement, and wider communication, of the process of repository development (step-wise approach); and to identify, discuss and explain the basis for national specifications and differences in regulatory, policy and policy-implementation approaches. Interaction between implementers and regulators brings further benefits in that the regulator understands the concepts and strategy by which the implementer intends to demonstrate that a proposal is acceptable, and the implementer is made fully aware of what is expected by the regulator in a proposal.

In particular:

- Although there is common acceptance that the development of a repository is a step-wise process, a dialogue between implementers and regulators must be maintained in order that a gap does not develop in how this process is perceived. The repository development process is also a

5. The need has also been identified to make some of the RWMC work, e.g. the collective opinions, better accessible to the public at large, as well as the media. To that effect, select RWMC documents may need to be drafted with the help of non-specialist writers.

matter of interest to other stakeholders and decision makers. In some countries, there is a need to define more clearly the approaches by which the stages of repository development are derived, to define the requirements in order to progress from one stage to the next, and to ensure that the process is perceived as being equitable outside the community of technical specialists and decision makers. Site characterisation and siting should also be viewed within the stepwise approach to repository development.

- The decision to proceed from one development stage to the next is normally supported by a safety case that entails a quantitative performance assessment and other, more qualitative arguments related to confidence in the quality and reliability of the performance assessment and the quality of the repository system (site and design) with respect to safety. Further progress is required to integrate within the safety case confidence-building measures that facilitate the decision-making process.

- There exists a range of regulatory approaches that are used in the step-wise process to reasonably assure meeting the protection goal. Common understanding should be sought of the meaning and usefulness of these approaches and their implications, e.g. time frames and safety indicators.

As nuclear-power plants reach the end of their operating lives, OECD Member countries will be increasingly faced with the task of decommissioning and dismantling[6] facilities and managing the potentially large amounts of very low activity materials that arise from this process. Characterisation of these materials, along with strategies for their management, will require increased attention as the volumes of waste that may be generated could make disposal in a repository designed for more active waste impractical. The timing of dismantling is also an important strategic issue.

The NEA has a significant role in focusing the private sector and its member countries on the need to balance the risks associated with re-use of materials used in nuclear applications with the cost of treatment and disposal of such materials and potentially the cost involved with providing new materials from natural resources. In this area, the NEA's co-operative programme on decommissioning, administered through the RWMC, has promoted developments in the understanding of the costs involved in the decommissioning and dismantling process; the decontamination of the site, equipment and materials; and the recycling and reuse of materials from decommissioning and dismantling activities. As decommissioning and dismantling technology matures, increased attention should be given to institutional and regulatory issues to allow its full application. In this area, as in others, dialogue between implementers and regulators is needed in order to achieve a mutual understanding of each groups' responsibilities, constraints and requirements, and to arrive at consensus on a practicable approach to resolving key issues.

The regulatory oversight process during decommissioning needs to reflect the significant reduction in hazard potential from the facility after removal of the spent fuel and highly active materials. At the same time, regulators need to recognise that decommissioning and dismantling are dynamic processes, inherently subject to continuous change, and more conventional industrial safety risks to the workforce may sometimes be increased as compared with the operational phase. These issues are leading to the development of specific regulatory requirements for decommissioning, and associated principles for licence termination.

6. In this document, decommissioning means the actions taken to allow the removal of some or all regulatory controls from a facility. This term is taken to include dismantling, meaning the later stage of dismantling of larger structural elements and buildings.

The RWMC will take up a more analytical role in the areas of regulatory aspects of management of radioactive materials and waste. In particular, the RWMC will participate in, and foster, the debate on the regulatory function and regulatory criteria placing the present approaches in a societal context.

Area III: Facilitate the elaboration of waste management strategies at national and international levels by:

- reviewing strategies adopted by member countries with a view to identify and analyse emerging technical and policy issues, and improve understanding and consensus;
- organising peer reviews of national programmes for such activities as research and development and performance assessment, as requested;
- examining and improving approaches for performing long-term safety analyses and for documenting safety cases;
- examining criteria for stepwise decision making;
- preparing good practice documents; and
- liaising with other relevant, international institutions.

The activities in this strategic area are discussed hereafter in relation to repository development, decommissioning, and liaising with other international organisations.

Repository Development

The RWMC has provided an important mechanism for co-ordination of international R&D programmes enabling the sharing of experience and development of consensus on the state of the art, as well as the development of specific technical tools, and the modern concept of a safety case for disposal. Based on its pool of technical experts, the RWMC has also enabled timely and authoritative peer reviews of programmes in the area of assessment of long-term safety.

Continued progress is needed in support of repository development, especially in relation to developing technical safety cases that command an adequate level of confidence and can usefully support decision making in the step-wise process leading, eventually, to repository licensing and operation. Key to this progress will be the continued interaction between the representatives of safety authorities, waste management agencies, and R&D institutions.

Significant progress has been made in the clarification of the technical aspects of integrated performance assessments. Further work can still be done to foster full integration of all aspects of the safety case, including the integration of site data and understanding; and to define acceptable engineering practice in systems having individual specificity and where both natural and man-made barriers are expected to play a significant role. The RWMC will continue to stay abreast of R&D programmes, including site investigations and demonstration experiments, so that there can be effective knowledge transfer, as applicable, of the results among member programmes. Methodological approaches to safety assessment continue to evolve, and it is important to examine the motivations and results of such changes. In addition, as national programmes approach licensing processes, there is increased emphasis and a better understanding to be achieved of what types of complementary evidence (beyond safety assessment and numerical calculations) support a demonstration of safety; how the safety case can be communicated effectively to the public and decision-makers; and the role of the safety case in decision-making.

The RWMC is structured as a forum of regulators, implementers and policy makers in respect of waste management systems. Cross-party participation is especially necessary at the present stage of repository development.

It is essential that RWMC continues to provide a forum for cross-party dialogue, that the need for a common understanding should underlie the specific activities of the RWMC, and that RWMC initiatives in repository development should remain founded on an active programme on technical issues.

Decommissioning

The RWMC has long recognised the importance of decommissioning in its work programme. As decommissioning technology has become mature, and decommissioning is getting increased visibility, the broader societal implications have come to the fore, which requires a dialogue amongst all institutional and non-institutional actors. The RWMC has traditionally provided a neutral ground for such broader debates.

The activities of the RWMC and its working parties have shown that decommissioning is becoming a mature industrial process and many projects have been safety completed with support of local communities. The Regulatory frameworks for public health and environmental protection in the context of decommissioning are well-developed in place, and more efficient licensing processes are emerging based on the enlarging body of practical experience. It is recognised that further integration is needed in national programmes of the decommissioning and waste management strategies to ensure that long-term solutions will be available for all wastes generated from decommissioning, and this is an area to which the cross-party dialogue of the RWMC could contribute.

A range of decommissioning strategies and technologies for decontamination and dismantling are available. The selection of a strategy is influenced by technological and operational factors as well as by political and socio-economic factors. It is recognised that the safety case for decommissioning a facility is necessarily different from the safety case for its operation; the safety case must address the specific range of hazards that apply, taking into account of their changing nature as decommissioning activites proceed, and of the uncertainties. As local communities are increasingly demanding involvement in planning for D&D, examining approaches to public involvement will be a topic of continuing focus for RWMC in coming years.

It is also a priority to ensure that the necessary resources, financial and otherwise, are available in the future to accomplish decommissioning for facilities that today are still be in operation or even in the planning stages. Member countries have put in place mechanisms for providing decommissioning funds especially for large nuclear facilities. Member countries use a range of approaches for the evaluation and estimation of costs and this is an issue where continued involvement of the RWMC, especially in terms of highlighting best practice, is warranted. RWMC also has a continuing role in ensuring that experience gained from completed decommissioning projects is passed on to designers of new nuclear plants. As with other aspects of the nuclear field, continued support of education in critical skills is needed to ensure the availability of the necessary expertise for decommissioning projects in the future.

An active role will be taken in the area of decommissioning to ensure that the technology and knowledge base are state of the art and the decision-making processes reflect best practice. International co-operative programmes will play an important role.

Liaising with Other International Institutions

With regard to its relationship with other international organisations, a goal identified in the NEA strategic plan is "to ensure complementarity and increase synergy with the International Atomic Energy Agency (IAEA) and other international organisations to optimise resources, capitalise on NEA expertise and disseminate the results of NEA work to a wider audience."

This goal is to be achieved by RWMC activities to enhance co-operation with the International Atomic Energy Agency (IAEA) and undertake additional efforts to maintain the different profiles of the two agencies by:

- ensuring full implementation of the co-ordination and consultation mechanisms provided for in the existing Agreement between the two agencies;
- co-ordinating with the IAEA to maintain the complementarity of the two agencies' programmes;
- undertaking activities jointly with the IAEA in appropriate areas and when organising meetings and international conferences;
- benefiting from the participation of non-member countries in RWMC activities through the IAEA, whenever the principle of added value is met;
- transmitting the results of RWMC work to the IAEA so that they can also be applied outside the NEA; and
- ensuring cross-participation in the governing bodies and relevant committees of the two agencies.

Activities to enhance interaction with the European Commission (EC) address this goal to ensure complementarity and increase synergy by:

- holding periodic co-ordination meetings and organising cross-participation in relevant activities;
- undertaking activities necessary to help OECD members benefit from the results of activities sponsored by the EC, i.e., ensuring timely feedback on results from the EC framework programme for R&D; and
- helping the EC to benefit from NEA results in its formulation of work programmes and policies.

RWMC activities to enhance interaction with other international groups include:

- co-operating with the G8 Nuclear Safety and Security Working Group, as appropriate, notably when NEA expertise is required in terms of nuclear legislation and liability or radiological emergency preparedness;
- co-operating with other bodies, such as the European Bank for Reconstruction and Development, on a case-by-case basis; and
- participating in the review of the work of the International Commission on Radiation Protection.

There have been developments in international policy guidelines and agreements that have a direct impact on national radioactive waste management programmes. For example, the International Commission

on Radiological Protection (ICRP) recommendations on radiation protection, e.g. Publication 77 (applicable to radioactive waste) are widely reflected in national and international standards. Several countries have now ratified the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management, for which the IAEA provides the secretariat function. The Joint Convention imposes additional requirements on countries seeking to demonstrate the appropriateness, adequacy and quality of their waste-management programmes. It will also force a higher degree of transparency in national programmes.

It is important that international guidance be formulated in a way that practical implementation is feasible. Thus, it must take into account a diversity of viewpoints and should be properly reviewed. The RWMC is well qualified to provide constructive reviews of international guidance under consideration as well as to participate in drafting this guidance.

There is a need for continued awareness of developments in national international strategies and guidance, to consider their implications and to integrate these implications in the programme of work of the RWMC. The RWMC will continue to accept and seek interaction with other international bodies.

Area IV: Enable the management of radioactive waste and materials to benefit from progress of scientific and technical knowledge by:

- reviewing the state-of-the-art of scientific and technical bases of geological disposal concepts and decommissioning technology for nuclear facilities with a view to identify areas where additional efforts are required;

- promoting co-operative efforts to compile internationally-applicable data and information, and benchmarking exercises;

- promoting joint technical initiatives in support of repository development and decommissioning technologies;

- promoting initiatives to maintain relevant competencies, as well as the accumulated knowledge, within organisations during the execution of long-term waste management and decommissioning projects; and

- promoting initiatives to transfer current waste management and decommissioning knowledge to future nuclear systems, including new fuel cycles.

In principle, waste management and decommissioning considerations should be addressed as early as possible in the design specifications of all new nuclear facilities, and new technologies for dealing with the waste should be examined for their integration at the system level. For instance, the characteristics of end products (or final waste forms) from treatment and conditioning processes are an important input to the design of waste repositories. Thus, a good understanding is required of the waste treatment options, the long-term behaviour of waste forms, and their interaction with engineered and natural materials in the repository environment, in order to provide a sound scientific basis for demonstrations of safety for disposal. Promoting information exchange and fostering technical excellence for safety cases are traditionally strengths of the RWMC, and work in upcoming years will continue to support member programmes in this regard. Issues regarding quality assurance and testing of, for example, engineered components and waste products (re: repository waste acceptance criteria) are gaining importance as national programmes move closer to licensing reviews.

Continued exchange on development and application of technologies in decommissioning projects is also a priority. The decommissioning strategy, the timing of final disposal and, more specifically, the need to provide waste forms that can be safely and economically stored and disposed at a future date, must be considered. An integrated view is necessary to find optimal solutions to these problems.

There is a large amount of experience in pre-disposal waste management technologies, namely for waste treatment, conditioning, transportation, and interim storage. These technologies are being exploited commercially and some have been developed through international co-operation. Information in these areas has been exchanged through the RWMC and other international fora.

Although the above developments are not necessarily critical at any given time, they have an important bearing on waste management strategies, and impact the options available. For example, given that partitioning and transmutation (P&T) could markedly impact on disposal strategies of wastes for future nuclear programmes, progress in these technologies should be followed. Continued attention should also be given to the issue of mixed-waste.

It is important that RWMC continues to be informed about on-going technological developments in technologies for waste treatment and conditioning and for dismantling of facilities. Consideration of the broader implications of waste technology alternatives will be used to promote best practice in relation to the overall system approach. An active role will be taken, especially in the areas of storage, disposal, and decommissioning, to bring the technology and knowledge base forwards, e.g. through international co-operative programmes.

APPENDIX II

MANDATE OF THE RADIOACTIVE WASTE MANAGEMENT COMMITTEE

The NEA has an acknowledged role in developing a global strategy for considering aspects of sustainability concerning the use of nuclear power and nuclear materials. The general objective of the NEA in the field of radioactive waste management is to assist member countries in the area of management of radioactive waste and materials, focusing on the development of strategies for the safe, sustainable and broadly acceptable management of all types of radioactive waste, in particular long-lived waste, and spent fuel. In this context, the mandate of the Radioactive Waste Management Committee (RWMC) shall be:

1. To provide a forum of senior representatives from national agencies, regulatory authorities, policy-making bodies, research and development institutions with responsibilities in the management of waste and materials, as well as other government-nominated specialists, for the exchange of information and experience on waste management policies and practices in NEA member countries, and for advancing the state of the art on the technical and societal aspects in this area.

2. To contribute to the dissemination of information in this field through the organisation of specialist meetings and the publication of reports and consensus statements summarising the results of joint activities for the benefit of the international scientific community, competent authorities at the national level and other audiences generally interested in the subject matter.

3. To develop a common understanding of the basic issues involved, and to promote the adoption of common philosophies of approach based on the discussion of the various possible strategies by keeping under review the state of the art in the field of management of radioactive waste and material at the technical, scientific, regulatory and societal levels, and in public acceptance matters.

4. To offer, upon request, a framework for the conduct of international peer reviews of national activities in the field, such as R&D programmes, safety assessments, specific regulations, etc.

5. To promote co-operative efforts such as the establishment of joint R&D projects, or the development of databases, and to promote initiatives to maintain relevant competencies and knowledge.

For developing its work programme, and in its modus operandi, the RWMC will rely on discipline-oriented working parties in the areas of disposal, decommissioning and associated societal issues. RWMC members delegated from regulatory authorities meet also in the RWMC Regulators' Forum (RWMC-RF) to exchange specific information on issues of specific regulatory significance. The RWMC-RF maintains appropriate links with the Committee on Nuclear Regulatory Affairs.

In the fulfilment of its responsibilities, the RWMC will interact with relevant NEA Committees, OECD directorates, scientific bodies and international organisations."