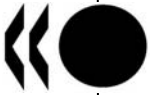


Unclassified

NEA/RWM(2010)1



Organisation de Coopération et de Développement Économiques  
Organisation for Economic Co-operation and Development

09-Mar-2010

English - Or. English

NUCLEAR ENERGY AGENCY  
RADIOACTIVE WASTE MANAGEMENT COMMITTEE

NEA/RWM(2010)1  
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## WORKING PARTIES ACHIEVEMENTS AND APPROVAL OF THEIR PROGRAMME OF WORK

*This document supports Item 8 of the RWMC-43 meeting to be held 24-25 March 2010 at NEA premises.*

[claudio.pescatore@oecd.org](mailto:claudio.pescatore@oecd.org)

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## INTEGRATION GROUP FOR THE SAFETY CASE (IGSC)

### INTRODUCTION

The IGSC serves as the main technical advisory body to the RWMC on deep geological disposal of long-lived and high-level radioactive waste. The focus of its work is on methodologies and strategies for characterising and evaluating disposal sites as well as on repository design and safety assessment aspects for various waste types. The work activities of the IGSC promote pooling of resources, sharing and synthesis of understanding and experience, and communication of findings to varied audiences.

The programme of work for the next several years reflects two major directions for the IGSC in the coming years. The first is a renewed emphasis on the technical and methodological issues at the heart of the safety case (i.e., safety assessment), as there have been significant advances. The second theme is the integration of long-term safety imperatives with operational and engineering considerations, which are of immediate concern as programmes approach licensing and construction phases of repository development. The PoW also emphasises increased coordination by IGSC with the main RWMC and its working parties.

### Reference Documents

IGSC Foundation Document:	NEA/RWM/IGSC(2000)10
IGSC Mandate:	NEA/RWM/IGSC(2008)5 (through December 2010)
Updated IGSC Programme of Work:	NEA/RWM/IGSC(2007)16/REV

### Core Group Members

IGSC chairperson is Hiroyuki UMEKI (JAEA). Members of the Core Group are: Bruno CAHEN (Andra), Paul GIERSZEWSKI (NWMO), Klaus-Jürgen RÖHLIG (GRS-Köln), Eric SMISTAD (U.S. DOE), and Bo STROMBERG (SKI). Piet Zuidema has been providing a link to the RWMC Bureau.

## HIGHLIGHTS

- Workshop on Cementitious Materials in Safety Cases for Geological Repositories for Radioactive Waste: Roles, Evolution and Interactions (November 2009, Brussels, BE)
- IGSC-11 Meeting (Oct. 2009, Paris): Topical Session on organisational issues in developing safety cases
- Significant progress and approval to extend and expand the project on Review of Methodologies for Safety Assessment (MeSA)
- 19<sup>th</sup> Clay Club Meeting (Sept. 2009, Montpellier, FR) in coordination with international conference on “Fault and Top Seals: From Pore to Basin Scale”
- Clay Club mandate updated and extended through December 2010
- Reports and products from the Geosphere Stability workshop, INTESC project, AMIGO project, EBS project, CLAYTRAC and self-sealing properties of clays.
- Transitions in leadership of the IGSC and in the IGSC Core Group membership are foreseen in the coming year.

## PROGRESS/ACCOMPLISHMENTS SINCE RWMC-42 (MARCH 2009)

### *General Meetings and Activities*

#### ➤ **11th Meeting of the IGSC**

- IGSC-11 was held 21-23 October 2009 at NEA, Issy-les-Moulineaux, France.
- Topical session was devoted to “Organisational Issues in Developing Safety Cases.” Aspects such as knowledge management, or broader issues such as organisational structure and interdisciplinary coordination, have sometimes been viewed as peripheral to technical aspects, but this session demonstrated a growing recognition that such factors have direct bearing on the quality of and confidence in the safety case. It was agreed that the topic should be considered for further work by IGSC. A task group will explore the issue and present a proposal for further work, to be considered by IGSC in late 2010.

#### ➤ **Programme of Work**

- The detailed programme of work is documented in NEA/RWM/IGSC(2007)16; it is viewed as a “living document” to be reviewed and revised at regular intervals. This was done at IGSC-10 (in 2009) and again at IGSC-11. Members confirmed their support (including designating participants) for activities in 2010. Activities for 2011 and beyond were agreed in principle, to be confirmed at the next IGSC meeting.
- A new thematic framework was agreed for structuring IGSC activities (augmenting the designation of “Core”, “Technical” and “Technical Projects”). The re-framing shows more clearly how activities relate to one another and how the results may be applied in national programmes. It will be used in reviewing and confirming activities in the programme of work and may be incorporated in the IGSC mandate when it is updated. The themes identified are:

- *What do we know?* Scientific bases (engineering, process and site understanding)
- *How do we use what we know to demonstrate safety?* Assessment strategy and tools
- *How do we achieve safety in practice?* Implementation, technology and feasibility
- *How do we synthesise information and build confidence in safety?* Integration and management

### ➤ **IGSC Transition in Leadership**

- Dr. Hiroyuki Umeki (JAEA, Japan) announced his intention to step down as chairperson of the IGSC following the next meeting in October 2010. He will continue in the IGSC Core Group.
- Several other members will leave the IGSC Core Group by the end of 2010, due to changes in their responsibilities or in the status and priorities of their national programmes.
- IGSC members have been asked to nominate candidates to fill the IGSC Core Group and as the next Chairperson. Priorities are to ensure that the membership of the Core Group continues to be balanced in terms of geography, programme status and type of agency (e.g., especially to ensure that regulators are represented) and that the high level of commitment in the group is maintained.
- Election of a new IGSC chairperson and Core Group members will be confirmed at the next IGSC meeting.
- Piet Zuidema has left the RWMC Bureau. A new link may have to be nominated.

### *Topical Projects and Activities*

#### ➤ **Review of Methodologies for Safety Assessment (MeSA)** (Core Activity; Assessment Strategy and Tools) -- ongoing

This new activity was approved by IGSC as part of the updated PoW. The last significant NEA document on this topic is a 1991 brochure, “Radioactive Waste Disposal: Review of Safety Assessment Methods.” Since then, the context and application of safety assessment have evolved considerably – notably with the development of the broader “safety case” concept and with the further development (and, in some cases, peer review) of national safety cases. Although specific aspects of safety assessment have been addressed in international projects, it is timely to conduct a comprehensive review of progress over the last decades.

- The first phase of the project was a desk study in 2008-2009 to address the questions:
  - What are the main methodological advances since 1991?
  - What are the implications of the safety case concept for SA methodologies?
  - Which problems in the 1991 brochure are considered still relevant, obsolete, or solved? What other issues have emerged since then and how are they being addressed?
- The study was accomplished by a task group, with participation from more than 20 organisations in 11 member countries. The study took the form of a series of “issue papers” (not intended for publication) addressing key aspects of safety assessment: relationship to the safety case, safety assessment flow chart, site description and scenario development, modelling, safety and performance indicators, treatment of uncertainties, and regulatory issues.
- The outcomes of the study were presented at IGSC-11 (October 2009). They showed that there have been significant evolutions in methods for safety assessment since the 1991 document and that further work would be useful to understand and document these advances.
- IGSC approved a second phase of the MeSA project, to include:
  - Further work on the key issues, with special attention to safety and performance indicators (including a possible survey).

- A workshop in spring or summer 2010, to address cross-cutting issues and identify high-level messages.
- A new state-of-the-art report on safety assessment methods, expected in 2011.

➤ **INTERNATIONAL EXPERIENCES IN SAFETY CASES (INTESC)** (Core Activity; Assessment Strategy and Tools, Integration and Management) -- completed

The IGSC set up the INTESC initiative following the format of its earlier IPAG exercises. The initiative aims to analyse safety cases existing or under development in order to obtain a clear overview of progress in the last decade and assess best practice in this area.

- The project included a detailed questionnaire (2006) and a workshop (2007) to assess recent progress and good practice in the development and presentation of safety cases.
- A full report on the INTESC project was published in 2009.

➤ **HANDLING OF TIMESCALES – STATE-OF-THE-ART REPORT** (Core Activity; Assessment Strategy and Tools, Integration and Management) -- completed

Processes and events affecting evolution of deep repositories for long-lived radioactive waste are characterised by a wide range of timescales and frequencies. Following an IGSC topical session (2005), a report was envisioned to review the current status on handling timescales; to highlight areas of consensus and points of difference between national programmes; and to determine if there is room to improve methodologies to handle these issues in building and presenting safety cases.

- Following publication of the LTSC outcomes, the RWMC Bureau agreed to issue the IGSC Timescales report a “glossy” NEA publication; accordingly, the report was published in 2009.
- [www.oecdbookshop.org/oecd/display.asp?lang=EN&sf1=identifiers&st1=978-92-64-06058-6](http://www.oecdbookshop.org/oecd/display.asp?lang=EN&sf1=identifiers&st1=978-92-64-06058-6)

➤ **GEOSPHERE STABILITY OF CRYSTALLINE ROCKS** (Core Activity; Scientific Basis) -- completed

To provide assurance of long-term safety of an underground repository, one must argue persuasively that the long-term containment capability of the geosphere and underground environment are “stable” and/or able to buffer natural perturbations.

- A first workshop addressing this question for argillaceous media took place in December 2003.
- A second workshop on crystalline (strong, fractured) rocks was held in November 2007. The workshop had notable participation from the broader academic and scientific community.
- Proceedings from the workshop on crystalline rock were published in 2009.
- [www.oecdbookshop.org/oecd/display.asp?lang=EN&sf1=identifiers&st1=978-92-64-06056-2](http://www.oecdbookshop.org/oecd/display.asp?lang=EN&sf1=identifiers&st1=978-92-64-06056-2)
- A fact sheet will be developed to summarise the outcomes of the workshop on crystalline rock; it will be available for free through the NEA web site.
- The IGSC, in updating the PoW, agreed that the geosphere stability project should be concluded with the workshop on crystalline rocks.

➤ **Workshop on Cementitious Materials** (Technical Activity; Scientific Basis) -- ongoing

A workshop on cementitious materials in repository design and performance is planned as part of a new activity on issues concerning both the engineered and geological components of disposal systems and their interaction. An ad-hoc series of technical workshops on the theme of such “cross-cutting issues” was approved as follow-on to the IGSC projects on EBS and geoscience (AMIGO and geosphere stability) and as a natural extension in terms of integrating their outcomes.

- The workshop – entitled “Cementitious Materials in Safety Cases for Geological Repositories for Radioactive Waste: Roles, Evolution and Interactions” – was hosted by ONDRAF/NIRAS from 17-19 November 2009 in Brussels, Belgium. A technical visit to the Mol facility was also provided.
- The workshop focussed on the interactions of cement with EBS, other repository components, and the geosphere. It also examined the integration and treatment of all this information in safety cases and, ultimately, the implications for safety.
- This focus, as well as the very long timeframes of interest, differentiated the workshop from other international workshops during 2008-9 that dealt with the use and durability of cement in nuclear facilities (mainly power plants).
- The workshop was extremely successful. It attracted nearly 80 specialists from academic, research, waste management and regulatory institutions – many from our core constituents, but it also reached quite a number of people outside our usual audience.
- The workshop showed that there is good agreement regarding the processes that are relevant to performance and that methods exist to model them, even when uncertainties remain.
- Proceedings are expected to be published in 2009 or early 2010.

➤ **AMIGO Project** (Technical Activity; Scientific Basis) -- ongoing

The AMIGO project (Approaches and Methods for Integrating Geologic Information in the Safety Case) is a series of workshops focused on collection and integration of geologic information (e.g., geophysical, hydrogeological, geochemical, structural) into PA models and the overall Safety Case.

- The proceedings of the 3<sup>rd</sup> AMIGO workshop were published in 2009.
- A brochure has been developed to summarise the key messages and lessons learnt over the entire AMIGO project, including all three workshops and the questionnaire results.
- A draft version was approved in principle by IGSC at its meeting in October 2009. The brochure is expected to be published in early 2010. It will be made available for free on the NEA web site.

➤ **Engineered Barriers Systems (EBS) Project** (Technical Activity; Scientific Basis, Implementation and Feasibility) -- ongoing

The EBS project is a series of workshops intended to improve understanding of how to achieve the integration needed for successful design, construction, testing, modeling, and performance assessment of EBS and to clarify the role that an EBS can play in the overall safety case for a repository.

- A brochure will summarize topics and conclusions of the full series of four EBS workshops, drawing on updated examples from national programmes. Development of the document was financed by the EC, with a review team of NEA members.
- A draft version was approved in principle at IGSC-11 and publication is expected in early 2010. The final report will be published by NEA as a joint NEA-EC report.

### ***Co-operative Projects***

#### **➤ Clay Club**

- The 19<sup>th</sup> Clay Club meeting was held September 2009 in Montpellier, FR, in coordination with an international conference on “Fault and Top Seals: From Pore to Basin Scale.”
  - The Clay Club co-sponsored and participated in the conference, which was organised by the European Association of Geologists and Engineers. A special session of the conference was devoted to radioactive waste disposal and carbon capture and storage. Participation in the meeting fulfilled the programmatic interest of the Clay Club in gas migration and further expanded communication and knowledge transfer from the petroleum industry and other sectors.
- The report for the CLAYTRAC project was published.
  - Tracer profiles in argillaceous rock formations can be considered large-scale and long-term natural experiments for transport properties.
  - The results of CLAYTRAC show that natural tracer profiles can provide convincing evidence that diffusion is the transport-controlling process over geological timescales for the formations studied.
  - The results are also intended to be published in the open scientific literature. There are good prospects for this to be accomplished in 2010.
- The report on “Self-Sealing Properties of Clays” was approved in principle at CC-19.
  - The report examines evidence of self-sealing in clays and associated process understanding.
  - A full draft underwent review (including an independent review) in 2009. The final report is expected to be published in 2010.
  - The results will also be featured in a keynote presentation of the 2010 International Conference on Clays in Natural and Engineered Barriers for Confinement of Radioactive Waste (Nantes, March-April 2010), of which the Clay Club is a co-sponsor.
- The mandate for the Clay Club was updated and extended through 31 December 2010 [see NEA/RWM/CLAYCLUB(2009)1.] This brings the timeframe for renewal into alignment with those of the RWM and IGSC, consistent with guidance from the NEA Steering Committee.

### ***Knowledge Consolidation and Transfer***

#### **➤ Publications and Documents**

- Stability and Buffering Capacity of the Geosphere for Long-term Isolation of Radioactive Waste: Application to Crystalline Rock: Proceedings of the IGSC Workshop held 13-15 November 2007 in Manchester, United Kingdom.
- Consideration of Timescales in Post-Closure Safety of Geological Disposal of Radioactive Waste.
- International Experience in Developing Safety Cases for Deep Geological Disposal: Outcomes of the INTESC Project.
- Natural Tracer Profiles Across Argillaceous Formations: The NEA CLAYTRAC Project.



- Approaches and Challenges for the Use of Geological Information in the Safety Case for Deep Disposal of Radioactive Waste: Third AMIGO Workshop Proceedings, Nancy, France, 15-17 April 2008, Nancy, France.

#### ➤ **Stocktaking**

- A fact sheet on the concept and evolution of the safety case was considered at IGSC-11. It has been revised since the earlier version in order to take better account of recent developments and new national approaches in safety cases. The proceedings of the 2007 International Symposium on the Safety Case, along with the upcoming report on the INTESC project, reinforce the definition and role of the safety case in national decision-making and consolidate current understanding and good practices. A final version should be issued in 2010.
- The IGSC PoW includes plans for another international symposium on safety cases in the 2012-2013 timeframe, in order to take stock of progress.
- Brochures on the AMIGO and EBS projects will consolidate current understanding and best practice regarding the role of geoscience and engineered barriers, respectively, in safety cases.
- The MeSA project will take stock of progress made in the field of safety assessment methodology since the early 1990's.

#### ➤ **Knowledge Transfer and Visibility**

- Key message and lessons learnt are being compiled in brochures covering two recent major IGSC projects: AMIGO and EBS. The brochures will be made available for free on the NEA web site.
- IGSC produced an “identity flyer” on its mission, membership and activities.
- Fact sheets are being developed on specific topics and activities:
  - the concept and evolution of the safety case, taking account of the international symposium and INTESC.
  - the outcomes and conclusions of the workshops on geosphere stability in crystalline rock and AMIGO-3.
- A survey was conducted in 2009 to review how IGSC members utilise information on the NEA web site, and to establish priorities for updates and improvements to the IGSC web pages.
- Co-sponsorship and participation of Clay Club in general scientific meetings and conferences— which was continued with the conference on “Fault and Top Seals: From Pore to Basin Scale”— to foster knowledge transfer from related disciplines and other industrial applications.

#### ➤ **Other Outreach, Presentations and Coordination**

- IGSC contributions to the reversibility and retrievability project as well as input on emerging issues for the RWMC-RF (especially regarding very long timescales).
- IGSC participation in the NEA Nuclear Science Committee's Expert Group on Assay Data of Spent Fuel, in order to ensure that radionuclides of interest for waste disposal can be considered for inclusion in future databases and testing programmes.
- Information sharing (including national programme data, with permission) and coordination with EC PAMINA project, which examines and documents methodological aspects of safety cases, with a focus on uncertainty management.

## **MAJOR AREAS OF ACTIVITY FORESEEN IN 2010 – 2011**

### ***General Meetings and Related Activities***

- 12th Meeting of the IGSC planned for week of 18 October 2010.
  - A topical session on “Optimisation” will be organised. The session will examine the issue broadly, not solely focussed on dose minimisation, but also taking into account how to reconcile multiple sets of requirements, choose among and justify design options, etc.
- IGSC fact sheets to be completed on the safety case concept and on outcomes of recent workshops; intended to be made available for free on the NEA web site and for distribution at meetings and conferences.
- Update and extension of the IGSC mandate beyond 2010.
- Transition within the IGSC Core Group and election of a new chairperson of the IGSC.

### ***Activities and Projects***

- Review of Methods for Safety Assessment (MeSA) Project:
  - Further work on the key issues, with special attention to safety and performance indicators (including a possible survey).
  - A workshop in spring or summer 2010, to address cross-cutting issues and identify high-level messages.
  - A new state-of-the-art report on safety assessment methods, expected in 2011
- Consolidations of key messages and outcomes of the AMIGO and EBS projects, in brochures to be available for free on the NEA web site.
- A proposal will be developed regarding further work on the topic of “organisational issues in safety cases.” Key issues and challenges will be further defined and the timeframes and mechanisms for future work will be recommended. Links will be made also with a proposed study (in 2011 or beyond) on factors that contribute to achieving confidence in safety cases.
- A workshop on gas generation and migration will be planned for 2011. It is part of the series of ad-hoc workshops on cross-cutting issues affecting (and affected by) both the geosphere and engineered barriers. A possibility is to co-organise a workshop with the EC, linked to the FORGE project that addresses similar issues.
- The issue of operational safety will be revisited at the 2010 meeting to assess interest and define possible future activities by IGSC on this topic.

### ***Knowledge Consolidation and Transfer***

- Publications Expected
  - Brochure on the outcomes and main messages of AMIGO project.
  - Brochure on the outcomes and main messages of EBS project.
  - Proceedings of the workshop on Cementitious Materials in Safety Cases for Geological Repositories.
- Knowledge Transfer and Visibility
  - Release of IGSC fact sheets on the safety case, on several technical workshops, and on the outcomes of the AMIGO and EBS projects.

➤ Other Coordination and Outreach

- Continue participation in EG on Assay Data of SF.
- Continue coordination with TDB and Sorption Projects.
- Participate in, and support (as needed), RWMC project on reversibility and retrievability, 2nd RWMC-RF workshop, other RWMC-RF initiatives (i.e., on very long timescales).
- Coordination with the EC on FORGE (gas migration) and MoDeRN (monitoring technology) projects. Evaluate possibility for co-organised workshops and international conferences in the 2010-2012 timeframe.

***Co-operative Projects***

➤ **Clay Club**

- A comprehensive and up-to-date report on self-sealing properties of clays is expected to be published in 2010.
- Publication in technical journals of papers by Clay Club addressing Fault Zones and CLAYTRAC
- 20th Meeting of the Clay Club, September 2009, in Toronto, Canada. A topical session will address anomalous heads in clay media. A technical visit to the Bruce site will also be organised.
- Publication of the CLAYTRAC project results in open scientific (i.e., peer-reviewed) literature.
- The Clay Club celebrates its 20<sup>th</sup> anniversary in 2010. It is expected that this milestone will be commemorated at the annual meeting.
- Update and extension of the Clay Club mandate beyond 2010.
- Workshop on emerging technologies and methods for observation of clays at the microscopic level (2011).

## FORUM ON STAKEHOLDER CONFIDENCE (FSC)

### INTRODUCTION

The integration of wider socio-political considerations is a major challenge for all waste management programmes. The RWMC provides a forum for information exchange in this area that also allows for exchange of views with relevant stakeholders. The Forum on Stakeholder Confidence is composed of nominees from NEA Member countries with responsibility, overview, and/or experience in the field of stakeholder interaction and confidence. The FSC meets at least once per year, typically alternating between two meeting formats. Regular (annual) FSC meetings focus on information exchange among the members and in-depth discussion of specific topics. National workshops and community visits, hosted by a member institution, allow for interaction with a broader range of stakeholders in the national context, on topics of concern to the stakeholders. These workshops provide FSC members with an opportunity to view the inner workings of waste-management programmes, the methods they have employed for stakeholder interactions, the successes and failures they have had, and to hear directly from involved stakeholders their own views about the methods by which they were involved in the decision-making.

### MAIN POINTS FOR THE RWMC ON BEHALF OF THE FSC CORE GROUP

In its meeting of February 2010, the FSC Core Group considered requests from the RWMC, its Bureau and Working Parties. The Core Group is happy to engage the FSC in supporting the RWMC's preparation of the **ICGR-2011**; one FSC focus in particular, "*cooperating with Regional Elected Authorities in RWM decision-making*", could provide useful material. FSC input has been made to the **Reversibility and Retrievability Project** draft report, and further input will be offered at the June 2010 R&R project meeting. The FSC also will submit to the Reims Conference (Dec. 2010) a presentation detailing the multi-stakeholder, multi-national views on R&R gathered during the FSC National Workshop held in Bar-le-Duc, France in 2009.

At the close of the current mandate, the FSC will hold a special **Ten-Year Anniversary Event** in association with its regular meeting (event to be held on 15 Sept. 2010). This event is the opportunity to recognize the range of stakeholders who have made substantial contributions to the FSC over the years. It will include a dialogue between invited civil society representatives and FSC members around chosen themes, and feedback from stakeholders who formerly hosted or participated in National Workshops and Community Visits. *RWMC members and other NEA divisions and working parties are invited to attend the event.* The Core Group subsequently will welcome a 3-year renewal of the FSC mandate when the RWMC itself has been renewed. Phase-4 will retain the same PoW themes with new topical activities (the five themes range from "RD&D and Stakeholder Confidence" to "Increasing the Value of Waste Management Facilities to Communities", and two transversal themes are "Symbolic Dimension of RWM" and "Knowledge Consolidation and Transfer").

Finally, the Core Group wishes to communicate to the RWMC a major message of reflection. FSC meetings, and particularly the workshops held in a national setting, typically aim at the joint creation of knowledge about RWM themes. The interaction among stakeholders is organized in the goal too of enhancing mutual understanding and building mutual trust. The FSC, over ten years of operation, with analysis of case study experience and live encounters in the workshops, has come to believe that *the*

*process of creating and exchanging meanings is as important as the actual topical outcomes of this process.* Moreover, it must be considered that in society, certain central RWM concepts and principles (for instance: safety; reversibility...) cannot be successfully defined in a top-down manner; instead, their multiple meanings should be clarified through dialogue. Importantly, this dialogue must be renewed at various decision points over the multi-year cycle of RWM, because even when decisions have been “banked”, over intervening periods the societal views on e.g., ethical values, priorities, or other features of definition may very well shift and should be checked in order to tune actual implementations.

### Reference documents

Strategic document: <http://www.nea.fr/html/rwm/docs/2001/rwm-fsc2001-2-rev2.pdf>

FSC Phase-3 Programme of work (2010-...): NEA/RWM/FSC(2010)1

Mandate: NEA/RWM(2005)13/REV2 (updated 8 January 2010)

### Core Group Members

FSC chairperson is Janet Kotra (US NRC). Core Group members include: Elisabeth Atherton (UK NDA), Jo-Ann Facella (NWMO), Sébastien Farin (ANDRA), Mariano Molina (ENRESA) and Eva Simic (Swedish National Council for Nuclear Waste).

### HIGHLIGHTS

- The 2009 National Workshop and Community Visit was held in France (Bar-le-Duc and environs) on the theme “Repositories and Host Regions: Envisaging the Future Together”. Some 50 international delegates attended (FSC institutional colleagues and invited local representatives from Sweden, Hungary, Canada and the UK). The workshop relied on the support of Andra and benefited from the close involvement of the CLIS (Local Information and Monitoring Committee). Publication of the full proceedings has been expedited by the translation provided by Andra and by the timely review performed by both Andra and the CLIS.
- At the Tenth FSC regular meeting in September 2009, the workshop debriefing centred on the sessions that had dealt with reversibility and retrievability, and with monitoring and memory. Andra scientists participated in this debriefing and the link was made with the relevant projects of the RWMC. The FSC expressed interest in following up these projects and in contributing to them where possible, notably through a contribution to the Reims conference planned for Dec. 2010. The PoW was accordingly updated.
- The FSC-10 regular meeting also included topical sessions addressing Regional Elected Authorities as stakeholders in radioactive waste management, and the Creation of a durable relationship between a community and the main institutional actors. The latter topical session included a review of the substantial collaborative publication “Partnering for Long-Term Management of Radioactive Waste”. A first topical session was held under the new PoW theme “Changing Dynamics of Interaction among RWM Institutions”. The meeting benefited from the participation of external experts including Swedish academics and leaders of EC part-sponsored research projects in the area of RWM governance.
- The new modus operandi was repeated, with review of *country update information* organized according to PoW themes and session topics, and small-group discussion including plenary feedback. A major aim of the meeting was to review and update the Phase-3 PoW; the chosen discussion format proved fruitful for gathering and consolidating FSC member inputs.

## PROGRESS/ACCOMPLISHMENTS SINCE RWMC-42 (MARCH 2009)

- **FSC 7<sup>th</sup> National Workshop and Community Visit, Bar-le-Duc, France, April 2009**
  - ✧ Sessions on public information and communication; reversibility; monitoring and memory.
  - ✧ Publication of Proceedings (Synthesis and International Perspective) expected early 2010.
  
- **FSC-10 Meeting, Issy, September 2009**
  - ✧ Topical session on *Regional Elected Authorities as Stakeholders in RWM: Their Needs, Interests and Aspirations*. Proceedings are in production.
  - ✧ Topical session on *Creating a Durable Relationship Between a Host Community, a Facility and the Main Institutional Actors*. Proceedings are in production.
  - ✧ Topical discussion on *Reversibility and Retrievability*, including presentations by two outside experts.
  - ✧ Topical discussion on *Changing Dynamics of Interaction Among RWM Institutions*, including presentations by two outside experts.
  - ✧ Topical discussion on *The Symbolic Dimension in Radioactive Waste Management: Building Mutual Understanding Amongst Stakeholders*.
  - ✧ Key messages from international research programmes, including presentations by outside experts and the NEA Legal Division.
  - ✧ Oral updates from national organizations including a special focus on Italy (*Sogin* stakeholder engagement activities).
  
- **Outreach**
  - ✧ Core Group participation in the Paris, June and Washington, December 2009 meetings of the Reversibility and Retrievability project.
  - ✧ Secretariat invited or submitted presentations:
    - *Contribution of the OECD Nuclear Energy Agency to the European Workshop on the practical implementation of the Aarhus Convention in the Nuclear Field - Luxembourg, 24th-25th June 2009*
    - *Records, Markers and People: For the Safe Disposal of Radioactive Waste*, VALDOR, June 2009, Stockholm
    - *Conference on Deliberation – Way to the Deep Geological Repository, 25-26 November, Prague*
  - ✧ Production in French and English of two-page flyers for dissemination by members, on FSC National Workshops. Translation of existing flyers into Spanish (posted on homepage)
  - ✧ Updates and offer of published proceedings to FSC stakeholder contact list.
  - ✧ Update of public webpage (and full availability of documentation on internal FSC site).
  
- **Publications released (available on public-access webpage)**
  - ✧ Article “The Forum on Stakeholder Confidence” in NEA News Vol. 27 n° 1 (2009).
  - ✧ Article “Partnering with stakeholders in radioactive waste management” in NEA News Vol. 27 n° 2 (2009).
  - ✧ Flyers as detailed above in Outreach.
  
- **Publications awaiting completion and/or final production**
  - ✧ “*More Than Just Concrete Realities: The Symbolic Dimension of Radioactive Waste Management*”. The report presents key issues and examples in order to build awareness of the

importance of symbols and symbolism in communicating about perceptions and interpretations of radioactive waste and its management.

- ✧ Proceedings of the National Workshop “*Repositories and Host Regions: Envisaging the Future Together*”, held in Bar-le-Duc, France, April 2009, as described in Highlights above.
- ✧ “*Partnering for Long-term Management of Radioactive Waste – Evolution and Current Practice in Thirteen Countries*”. This major publication includes a Secretariat study of changes seen in the stakeholder engagement area over the past decade, based on comparisons with the survey taken at the time of initiating the FSC.
- ✧ Proceedings of the topical session on *Regional Elected Authorities as Stakeholders in RWM: Their Needs, Interests and Aspirations* held in September 2009.
- ✧ Proceedings of the topical session on *Creating a Durable Relationship Between a Host Community, a Facility and the Main Institutional Actors* held in September 2009.
- ✧ New flyers are under study; one on “partnering”, based on the “partnering” report has been approved.

## MAJOR AREAS OF ACTIVITY FORESEEN IN 2010

- **10-Year Anniversary Event in conjunction with FSC-11 regular meeting in Issy (Sept. 2010)**
  - ✧ Invitation to former National Workshop and Community Visit hosts and participating stakeholders to reflect on the impact of the FSC workshop and on evolutions in their context over the past 10 years.
  - ✧ Possible invitation to civil society stakeholder representatives, federations, to present issues of interest or concern, in the perspective of a dialogue with the support of FSC topical work in the areas touched upon.
- **Foreseeable activities to develop PoW themes:**
  - ✧ Link between R, D & D and Stakeholder Confidence
    - Case studies on how programmes or institutions have engaged a (sustainable) process of joint knowledge creation with societal stakeholders, and to illustrate how specific topics have been elucidated through such efforts.
  - ✧ Changing Dynamics of Interaction among RWM Institutions and Stakeholder Confidence
    - A questionnaire survey on transparency efforts by member organisations.
  - ✧ Media, Internal and External Communication, and Stakeholder Confidence
    - Topical session planned for Sept. 2010 on “*Broadening Journalists’ Knowledge Base and Contacts*”, including a review of academic work on interface between science and journalism.
  - ✧ Tools and Processes to Help Society Prepare and Manage Decisions (e.g., about Technology, Sites) through Stakeholder Involvement
    - Topical Session planned for Sept. 2010 on *Cooperation with Regional Local Authorities on Development Objectives*
  - ✧ Increasing the Value of Waste Management Facilities to Local Communities: Stakeholder dialogue planned for Sept. 2010.
  - ✧ The Symbolic Dimension
    - Proposal made on future activities including topical sessions with case studies; invited lectures.
  - ✧ KCT
    - Continued development of flyers and identification of international comparative reports to be updated and augmented by the FSC.

➤ **Outreach**

- ✧ FSC input to Retrievability and Reversibility project: participation in project meetings, discussion of international R-Scale elaboration process.
- ✧ Continued cooperation with other working parties and NEA divisions.
- ✧ Communication of FSC lessons learnt to international meetings.
- ✧ Continued development of additional FSC two-page information documents summarizing the major reports and products of the FSC

➤ **Expected Publications**

- ✧ Documentation of topical sessions
- ✧ Documentation of major 10-Year Anniversary Event
- ✧ Flyers, e.g., on “Partnering”

**OTHER AREAS OF ACTIVITY FORESEEN IN 2010 AND BEYOND**

- ✧ The RWMC is requested to renew the mandate of the FSC.
- ✧ The strategic directions should remain as in the current FSC strategic document.
- ✧ The themes identified in the current, updated PoW will continue to inform the activities of the group.
- ✧ National workshop in 2011
- ✧ Support to the RWMC for ICGR-2011

**THE FSC KNOWLEDGE CONSOLIDATION AND TRANSFER STRATEGY**

First and foremost, the FSC is a “learning organisation”. Through the FSC, members seek to improve themselves as responsive actors in the governance of RWM. Delegates attend in order to benefit from in-depth pragmatic exchanges with both peers and stakeholders beyond the membership. They then consolidate their learning: the FSC takes as a responsibility to mature its lessons in discussion and cooperation with those concerned, and then to validate its conclusions with the help of academic researchers. The third step in the cycle is to make the learning available to others.

There are several prongs in the knowledge consolidation and transfer strategy. Members’ personal involvement is helping to promote a cultural change in their home organisations, stimulating a new approach to RW management and decision making. Learning is systematically published for the record, in open access on the internet. The FSC has an excellent publication record disseminating the proceedings from numerous topical sessions and from the workshops. Significant desk studies (including member and stakeholder consultation) on social science-related topics have been published, as well as member surveys on such issues as communication practices or organizational change. Seeking to make the lessons learnt even more accessible, the FSC has chosen to produce a set of flyers. These represent a new way to pass on the messages that the FSC can deliver with confidence. Finally the FSC continues to work in integrated fashion, as much as possible, with the IGSC, the WPDD, and the RF.



## WORKING PARTY ON DECOMMISSIONING AND DISMANTLING (WPDD)

### INTRODUCTION

The WPDD supports the RWMC by keeping under review the policy, strategic, and regulatory aspects of decommissioning of phased-out nuclear installations. Its scope of work includes decommissioning and dismantling of shutdown facilities up to and including the release of the site but excluding fuel removal, removal of nuclear processing fluids, post-operational clean out of fuel residues and removal of operational wastes.

In accordance with the 'WPDD Strategic Document for Phase 2' the work programme of the WPDD comprises activities in the following key areas (each of which are further described in greater detail below):

- Policy, regulation and strategy,
- Funding and costs,
- Techniques,
- Decommissioning materials management and site release; and
- Human and organisational factors

An analysis of the 'country updates' provided annually by delegates concluded as follows:

- Policy, regulations and strategy – most countries had adopted policies for decommissioning and for funding provisioning but a range of options were being applied to the decommissioning of nuclear power plants (early dismantling, safe store and entombment),
- Funding and costs – cost calculations for decommissioning are very sensitive to the assumed end state and to the levels of contaminations on the sites and may be greatly influenced by stakeholder requirements,
- Techniques – the focus of current R&D was on the development of innovative technology for segmentation, dismantling and concrete decontamination, together with better instrumentation for material management and control
- Materials management and site release – there was a significant acceleration in the number of decommissioning projects, including provision of infrastructure for storage of materials and for undertaking clearance and recycling of disused materials;

- Human and organisational factors – efforts were being made to structure decommissioning contracts to optimise the supply chain relationships, with greater transparency and better communication amongst all concerned parties; and
- Stakeholder participation and knowledge management – there was a range of approaches to stakeholder involvement in developing decommissioning plans and to rule making though, in general, this issue was gaining momentum.

#### **MAIN POINTS FOR THE RWMC ON BEHALF OF THE WPDD CORE GROUP**

- Much of the current R&D related to decommissioning is applied (rather than fundamental) research and it is often project specific. There are also research activities taking place outside the nuclear industry that have potential applications for decommissioning, e.g. developments in robotics and laser technology. The conversion of research activities into industrial applications requires good interaction between the research institutions (including universities), the decommissioning and waste management organisations and the industrial partners who develop the technologies on an industrial scale. For this process to work efficiently there is a need for good coordination and information transfer between the above groups, in order to avoid unnecessary duplication of efforts and to deal with issues of Intellectual Property. There are some instances where some coordination is being achieved at national levels but it is likely that greater synergy in research efforts related to decommissioning may yield significant benefits.
- Decommissioning and material and waste management are very interdependent and issues affecting one will generally have implications for the other, e.g. deciding the best strategy for the management of large components from decommissioning requires a parallel consideration of issues relating to dismantling, waste packaging, transport, interim storage and final disposal (including options for reuse). Overall optimisation in the context of this interdependency is a complex issue often involving different national authorities, different political institutions and a variety of stakeholder interests.
- Compiling information on lessons learned from decommissioning (some of which may be learned from mistakes) and making this available to decommissioners, and indeed designers of new reactor projects, remains a difficult issue for the decommissioning industry. Various databases have been developed at national levels but they are not well known outside the relevant country. At the international level, the NEA's CPD network and the International Decommissioning Network (IDN) of the IAEA offer templates for better sharing of information, though currently the CPD is a closed network and the IDN focuses largely on transferring expertise from advanced programmes to those that are less advanced. More efforts are needed – in cooperation with IAEA and the European Commission - to further improve the processes for sharing experience and to providing access to information on lessons learned.
- Decommissioning can and is being done, but it is relevant to collect lessons to be passed on for new build. New plant designs provide for significant improvements in the context of plant operation and maintenance, and many of these (but not all) will also be helpful for eventual decommissioning. Current technologies enable future deconstruction sequences to be considered as part of the design process enabling potential future difficulties to be avoided or reduced. This should lead to shorter timeframes for decommissioning and production of less waste, which will translate directly into cost gains and with less funding needing to be set aside before decommissioning takes place. It may also have advantages vis-à-vis stakeholders, to reassure them that a decommissioning sequence is identifiable (or has been identified) ahead of time.

## Reference Documents

*WPDD Strategic Document for Phase-2*: NEA/RWM/WPDD(2006)2

*WPDD 3<sup>rd</sup> Programme and Method of Work*: NEA/RWM/WPDD(2006)9

*Mandate for the WPDD; Confirmation of validity through 2010*: NEA/RWM(2008)8

## Core Group Members

WPDD chairperson is Ivo TRIPPUTI (SOGIN). Members of the Core Group are: Doug METCALFE (Natural Resources Canada), Jean-Guy NOKHAMZON (CEA), Rateb (Boby) ABU-EID (USNRC), Juan-Luis SANTIAGO (ENRESA), Michel DUTZER (ANDRA), Gérard LAURENT (EDF) and Jan CARLSSON (SKB).

## HIGHLIGHTS

Highlights of WPDD's activities since RWMC-42 include:

- Two new task groups have been established and have begun their work: a task group on *Management of Large Components from Decommissioning* (being coordinated by Michel Dutzer, ANDRA); and a task group on *R&D Needs from Decommissioning* (being coordinated by Gérard Laurent, EDF/CIDEN).
- Completion of the study on *Applying Decommissioning Experience to the Design and Operations of New Plants*, and publication of a status report on the same topic;
- Completion of the study on cost drivers for decommissioning and publication of a status report entitled: *An International Overview of Cost Elements, Estimation Practices and Reporting Requirements*;
- Publication of a joint NEA/IAEA booklet based on the main findings of the above cost study (in which IAEA and the European Commission participated): *Towards Greater Harmonisation of Decommissioning Cost Estimates*;
- Updating of the Publication *A Map of International Activities on Decommissioning and Dismantling*;
- Publication, in English and French, of a glossy brochure on completed decommissioning projects: *Decommissioning of Nuclear Facilities: It can and has been done*; versions in German, Italian, Finnish and Japanese are in preparation; and
- WPDD-inspired presentations at ICEM-2009 and at a Conference organised by the French Nuclear Society and R&D Requirements for Decommissioning.

## PROGRESS/ACCOMPLISHMENTS SINCE RWMC-42 (MARCH 2009)

### *Topical Projects and Activities*

#### ➤ **Policy, regulation and strategy**

A study on *Applying Decommissioning Experience to the Design and Operations of New Plants* has been completed and published. The report from this study provides a synthesis on current practice in applying lessons from decommissioning to the design and operation of new reactor systems. It notes that several advances being made for reasons of extended plant lifetime, greater

safety, improved maintenance provisions, lower waste production and reduced doses to the workforce would also be beneficial for decommissioning. The project took account of inputs from regulatory authorities, electrical utilities, decommissioners and waste management organisations.

➤ **Funding and costs**

A study on *Decommissioning Cost Elements, Estimation Practices and Reporting Requirements* was completed in 2009. The study noted that cost assessment methodologies should be continuously updated using cost data from actual decommissioning projects, thus improving the cost assessment, providing better control of uncertainties and contingencies for each major cost category, and facilitating the preparation of an annualized schedule of expenditures for each facility. An important conclusion of the study is that scope changes and scope growth may have the greatest impact on cost estimates, and therefore these aspects must be controlled and identified immediately, and incorporated into the estimate so that the estimate can be a viable benchmarking resource.

A project to provide an update to the NEA document *Nuclear Decommissioning: A Proposed Standardised List of Items for Costing Purposes* (“*The Yellow Book*”), began in 2009. The project is a collaborative effort between the NEA, the IAEA and the European Commission (DG-TREN). The deliverable from the project will present an updated version of the standardised cost structure first published in 1999 and will include an associated Users’ Manual which gives general guidance on developing a cost estimate for decommissioning a nuclear facility and, in particular, on using the standardised cost structure. A survey of user experience carried out at the beginning of the project indicated that, although several countries do use the Yellow Book cost structure – either directly for cost estimating or by “mapping” their estimates onto the standardised structure – several large nuclear countries do not currently use it. It is intended that the cost structure laid out in new Yellow Book will lend itself to greater harmonisation of cost reporting, and will facilitate easier comparison and better understanding of different cost estimates.

➤ **Techniques**

The work of the two current task groups of the Cooperation Programme on Decommissioning (CPD) has continued during 2009:

- Task Group on Decontamination and Dismantling of Concrete Structures; and
- Task Group on Remote Handling Techniques.

The concrete task group has produced a draft final report of its study and this has been approved in principle for publication at WPDD-10, subject to the satisfactory conclusion of the CPD review procedures and subject to a final check being done by the WPDD Core Group. The duration of the study being performed by the task group on remote handling has been extended and a draft report is not expected until the end of 2010 at the earliest.

➤ **Decommissioning materials management and site release**

A Task Group on *Management of Large Components from Decommissioning* was established in November 2009 and presented a topical session on this issue at WPDD-10. This group will produce a guidance document setting out the factors relevant to the decision about whether large components should be segmented into smaller pieces and then packaged in standard waste packages for storage and ultimate disposal or whether the component should be removed from a decommissioning site as one or more large components and then retained in that form for storage

and eventual disposal or recycling. The report will address also the regulatory approval process and public acceptance issues.

### ➤ **Human and organisational factors**

This thematic area was not addressed directly during 2009, though it was noted in the DCEG study on cost drivers that then contractual strategy adopted can have an important impact on the overall project costs.

## ***Outreach and Coordination***

### ➤ **Publications**

#### **– OECD/NEA publications:**

- *Applying Decommissioning Experience to the Design and Operation of New Nuclear Power Plants*, OECD Nuclear Energy Agency, Report No. 6924, Paris (2010)
- *Le retour d'expérience du démantèlement et les nouvelles centrales nucléaires*, Agence de l'OCDE pour l'Énergie Nucléaire, Paris (2010)
- *Decommissioning Considerations for New Nuclear Power Plants*, Joint NEA/IAEA Report, OECD Nuclear Energy Agency, Report No. 6833, Paris (2010)
- *Decommissioning of Nuclear power Plants: It Can and Has Been Done*, OECD Nuclear Energy Agency, Report No. 6829, Paris (2009)
- *Cost Estimation for Decommissioning: An International Overview of Cost Elements, Estimation Practices and Reporting Requirements*, OECD Nuclear Energy Agency, Report No. 6831, Paris (2010)
- *Towards Greater Harmonisation of Decommissioning Cost Estimates*, Joint NEA/IAEA Report, OECD Nuclear Energy Agency, Report No. 6867, Paris (2010)
- *Vers une harmonisation des estimations des coûts du déclassement*, Joint NEA/IAEA Report, Agence de l'OCDE pour l'Énergie Nucléaire, Rapport 6868, Paris (2010)

#### **–Committee reports (General Distribution Documents):**

- *Applying Decommissioning Experience to the Design and Operation of New Nuclear Power Plants: Proceedings of the Topical Session at the 9th Meeting of the WPDD*, NEA/RWM/WPDD(2009)3
- *A Map of International Activities on Decommissioning and Dismantling*, NEA/RWM/WPDD(2009)9

### ➤ **Other Outreach, Presentations, and Coordination**

- WPDD has begun a process of analysis of the country updates presented at its annual meetings in order to capture general trends. These updates, which provide brief updates on key national developments in the field of decommissioning, are structured according to main thematic areas identified in the WPDD Strategic Document for Phase 2. The reports are posted on the WPDD Members' Area of the NEA website.

- WPDD-inspired presentations at ICEM-2009 and at a Conference organised by the French Nuclear Society and R&D Requirements for Decommissioning.

## **MAJOR AREAS OF ACTIVITY FORESEEN IN 2010-2011**

### ***General Meetings and Activities***

- The 11<sup>th</sup> Meeting of the WPDD will be held in Washington, 16-18 November 2010.
- A topical session at the meeting will be devoted to the topic of *R&D Needs for Decommissioning*.

### ***Topical Projects and Activities***

#### ➤ **Policy, regulation and strategy**

- A joint NEA/IAEA booklet on *Decommissioning Considerations for New Nuclear Power Plants* will be published taking account of the main outcomes of the WPDD study on *Applying Lessons from Decommissioning to the Design and Operation of New Reactor Systems* and on a parallel IAEA study on *Design Lessons Learned from the Decommissioning of Nuclear Facilities*.

#### ➤ **Funding and costs**

It is planned that the updated version of the Yellow Book (*Nuclear Decommissioning: A Proposed Standardised List of Items for Costing Purposes*), will be considered for approval at WPDD-11 (November 2010).

#### ➤ **Techniques**

The recently-formed Task Group on *R&D Needs for Decommissioning* will provide the results from the first phase of their study at WPDD-11, and will organize a topical session on the same topic as an integral part of that meeting.

#### ➤ **Decommissioning materials management and site release**

- The task group working on the management of large components from decommissioning expect to produce a draft guide to the assessment of different options by March 2011.

#### ➤ **Human and organisational factors**

### ***Outreach and Coordination***

- The brochure *Decommissioning of Nuclear Power Facilities: It Can and Has Been Done* will be published in German, Italian, Finnish and Japanese.