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## Expert Group on Preservation of Records, Knowledge and Memory across Generations

### Preservation of Records, Knowledge and Memory (RK&M) across Generations - Phase-II, Way Forward Proposal

*This document supports item 10c of the provisional agenda of the 47th session of the RWMC, to be held 26-27 March*

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## **Preservation of Records, Knowledge and Memory (RK&M) across Generations - Phase-II, Way Forward Proposal**

### **Introduction**

Preservation of Records, Knowledge and Memory (RK&M) across Generations is an initiative under the RWMC in the area of knowledge consolidation and transfer. It started in March 2010. (NEA/RWM(2010)9/PROV) Its first phase is scheduled to end in March 2014. The vision for Phase-I is documented in NEA/RWM(2011)6/REV2. The project's many products can be consulted on the project web page [www.oecd-nea.org/rwm/rkm](http://www.oecd-nea.org/rwm/rkm) and, much more interactively, through its wiki-based information platform, which is the project's final deliverable for Phase-I. Annex A to this document also provides an overview to Phase-I topics.

Four main observations from the project are: (a) The context has changed greatly since the 1980s, when RK&M was thought to serve the sole function of deterring intrusion into a repository. Today, the goal is to preserve information to be used by future generations while maintaining technical and societal oversight of the repository for as long as practicable; (b) There are a number of mechanisms, outside radioactive waste management, that can foster RK&M preservation. They constitute a potential resource for waste management organisations and governments; (c) The period of time of a few centuries that will follow repository closure – defined in the RK&M Glossary as the medium term – is rarely specifically addressed in the literature. Yet, this is an important period for RK&M preservation and for preparing the future; (d) The regulatory aspects of long term RK&M preservation are much in need of formulation and systematisation; (e) Terminology is important when discussing long-term issues. Attention is called to the RK&M Project glossary.

At the end of Phase-I, attention is called to the present proposal for Phase-II.

### **Phase-II way forward proposal**

#### *Modus operandi*

The modus operandi should continue as for Phase-I with the aim for the Project to become the reference community worldwide for ideas, aspirations and practices in the area of RK&M preservation.

- Integration of local communities, academics, regulators in the project will continue via the regular RK&M meetings and workshops.
- The wiki will become a communication platform for project members.
- The wiki may also be used to communicate with other interested stakeholders.

#### *Membership*

Members currently represent 14 organisations in 11 countries, plus the IAEA. It is expected that additional members will join the project.

- New organisations that have expressed interest include: Sandia (USA), Enresa (Spain), BfS (Germany) and Rosatom (Russian Federation).
- Japanese and Korean organisations will be contacted.

- Additional regulatory organisations will be solicited.

### Length of Phase-II

3 years: from April 2014 to April 2017

### International Conference

An international conference is planned to be held in Verdun, France, 15-17 September 2014.

Titled “Constructing Memory - An International Conference and Debate on the Preservation of Records, Knowledge and Memory of Radioactive Waste across Generations”, this conference will provide an international venue to present and discuss the substantial findings emerging from Phase-I, get inspiration for further work topics and enlarge the network of interested experts and communities.

### Programme of Work

The RK&M project will continue to upkeep basic tools such as:

- the reference glossary
- the catalogue of national and international laws and regulations
- the bibliography
- the wiki platform

Details are given in Annex A.

Additional work will be performed in areas already identified, such as

- archives
- international mechanisms
- regulation
- markers
- cultural heritage

For each of these areas, exploratory efforts have been conducted in Phase-I and are documented on the wiki<sup>1</sup>. Avenues for further inquiry were also identified in Phase-I and are reported in Annex A. The Phase-II actual programme will select items from the present list and will prioritise them.

The wiki platform will be improved further in Phase-II.

A significant effort will be dedicated to identifying the bases for one or multiple sets of essential records to be associated with geological repositories. These bases will constitute a deliverable of the project for Phase-II.

There will be coordination and cross-fertilisation with the new NEA RepMet<sup>2</sup> project, which addresses the management of metadata during repository pre-closure operation.

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<sup>1</sup> Annex B to this document provides a good overview to Phase-I topics, as well

Overall, the Project will continue to highlight and elaborate the value of systemic approaches that incorporate a variety of complementary means of RK&M preservation. It is envisaged to make more detailed recommendations at the end of Phase-II.

Resources

The programme will continue to need (a) a full-time research assistant to work within the secretariat, supporting the Administrator in the organisation of the initiative and in particular the upkeep of the RK&M wiki; (b) experts and consultants for performing specialist studies and for participating in meetings, workshops and conferences organized with the Programme of Work.

As in Phase-I, these will be funded through grants. The amount of the grant is 5,000 €/year (plus 6.3% OECD overhead) per participating organisations. In-kind contributions will also be acceptable when grants are not possible. In this case, the organisation providing an in-kind contribution will make available one of its staff to perform work for the RK&M project.

## ANNEX A: MAIN ELEMENTS OF THE PHASE-II PROGRAMME OF WORK

### Upkeep of Basic Tools Developed in Phase-I

#### *Glossary*

- The existing definitions will continue to be refined.
- New definitions will be added as needed.

#### *The catalogue of national and international laws and regulations*

- The catalogue of regulatory requirements will continue to be updated and augmented in Phase II.
- The RWMC RF will be asked to participate in the upkeep of the catalogue.

#### *Bibliography*

- As further documents are developed during the time frame of the RK&M project, either within the project itself or in parallel with it, these documents may be added to the bibliography.
- The indexing of documents for the RK&M wiki search engine will be extended to documents both within and outside the current core group of key documents in the bibliography.
- The entire bibliography will be reviewed in order to identify existing documents that are important enough to be included in the core group.
- Abstracts in the standard format and style will be prepared for newly-identified core documents and added to the bibliography.

#### *Wiki*

- An all-public version of wiki will be produced at the end of Phase-I and made available online. This has to be seen as a project document.
- The internal wiki will continue to be developed during Phase II and will be promoted to interested parties.
- The internal wiki will be actively monitored and updated by the Secretariat and the RK&M members.

### **Continuing work items – sub-items in these lists will be selected for prioritisation in Phase-II**

#### *Archives*

- An initiative could be created to specifically allow archivists to interact in the RWM context. Aims and questions to be addressed by this initiative are listed below:
  - Member archivists would help identify current issues and possibilities for standardisation.
  - Requirements regarding the structure of records collections, metadata and contextual information, media, language, retention periods, access and confidentiality could be developed in concert with the institutional stakeholders (in particular the regulator) for RK&M preservation and compared to current archival policies and practices, as defined by international (e.g. ISO) and national standards.
  - Interaction with RepMet will be sought.

- As one of the key elements of RK&M strategies is redundancy, it would be useful to keep sets of records in several archives at multiple levels, e.g. in local (municipal), regional and national and international archives. Is this feasible?
- National archives already cooperate at international level. How can sharing waste repositories' RK&M be fostered? Which are potential difficulties that could arise?
- To what extent could other mechanisms such as the World Digital Library and others be used by national organisations as one further means to disseminate information?
- In the context of the Set of Essential Records initiative, implementers and regulators and policy makers could be invited to define *jointly* what they would consider a reference set of essential records for archiving.
  - Studies of questions related to the types of RK&M that are most likely to be useful in the long-term may become important input for the development of regulatory requirements for long-term preservation of RK&M
- Similarly, it should be investigated whether several stakeholders (such as the implementer and the regulator) could compile a *joint set of records* that would synthesise the context and procedures, as complementary practice to the regulator, implementer and others sending their separate files to their national archives.
- Finally, the experience of Andra at the low-level waste repository "Centre de la Manche" and other organisations in organizing records at different levels of detail should be tapped.
- The possibility to establish a dedicated archive, either at the national or – given the relatively small number of projects – at the international level, with dedicated funding, should be kept in focus. The project of a Nuclear Archive drafted by the Nuclear Decommissioning Authority (NDA, United Kingdom) should be tracked.

### ***Prevention of Loss of Records, Knowledge and Memory***

The study conducted in Phase I lists potential causes of loss of RK&M in the field of hazardous waste management in the short term. These causes should be investigated with regard to the medium and long term.

- Which causes could be avoided? Which methods could be used?
  - Can remediating measures be envisaged for loss of RK&M?
  - Develop more the issue of “knowledge reconstruction”, e.g. explore the concept of “mothballing”,
  - Examples of reconstruction of extinct languages, interpretation of symbols

### ***Connection to safety***

- The position of the RK&M Project on safety (as expressed in its strategic article on the Wiki) will be tested and developed further with the help of other audiences.

### ***Cultural Heritage***

- Develop this concept further as a potential means of RK&M preservation, e.g., could the surface facilities be turned into cultural objects and function as markers? Can a deep repository be considered as cultural heritage? Can rituals keep knowledge and memory alive? Etc.
- Study, or keep track of, or join projects that pertain to creating “an archaeology of the future”, such as the Memory of Mankind project in Austria or the Long Now Foundation in the USA.
- Study examples of reconstruction of extinct languages, interpretation of symbols

### ***International Mechanisms***

- With a view to the medium and long term, continue the investigation of the potentialities of existing international mechanisms linked to RK&M preservation in RWM, in order to build a comprehensive set of relevant international mechanisms.
  - New ones vis-à-vis Phase-I have been identified already, for example the IAEA Net-Enabled Radioactive Waste Management Database (NEWMDB), the Hague Convention of 1954 for the Protection of Cultural Property in the Event of Armed Conflict, the Intangible Cultural Heritage Convention of 2003.
  - Renew contacts with the IAEA & EURATOM safeguards groups on memory aspects.
- Continue to identify and build relationships to other stakeholders that may have set up similar international mechanisms, e.g., companies that manage hazardous waste, seed banks, etc.
- Considering that the subject of RK&M for radioactive waste repositories in the short and medium-term consists of (i) emplacing radioactive waste packages and radioactive materials (ii) in a geological layer (iii) in order to protect mankind and the environment (iv) and preserve the related records, knowledge and memory, a systematic research of additional, relevant mechanisms that could be helpful will be based on four tracks:
  - Mechanisms devoted to controlling radioactive waste and materials circulation
  - Mechanisms devoted to sharing knowledge on geology
  - Mechanisms related to environment protection
  - Mechanisms related to cultural heritage preservation.
- Relevant mechanisms may be commercial or semi-commercial projects, not only institutional.
  - For example, referring to the second track above (geology), the Solution Mining Research Institute (SMRI). Established in 1958, the Solution Mining Research Institute (SMRI) is interested in the production of salt brine and the utilisation of the resulting caverns for the storage of oil, gas, chemicals, compressed air and waste; the solution mining of potash and soda ash are also of interest. SMRI is a non-profit, worldwide organisation with more than 150 member organisations in Asia, Australia, Europe, and North and South America.
  - Another example is the International Society for Photogrammetry and Remote Sensing (ISPRS), which is an international non-governmental organisation that enhances international cooperation between the organisations worldwide with interests in photogrammetry, remote sensing and spatial information sciences. Established in 1910, ISPRS is the oldest international umbrella organisation in the field of “information from imagery”.
- The analysis of the mechanisms will be deepened on the products and activities triggered by the mechanisms (cooperation, database, expertise...). Namely, attention will be devoted to identifying

possibilities of cross reference or index used to locate information. The possibilities related to land registers could be investigated.

### **Markers**

- The topic was explored in Phase I and deserves further investigation.
- Important questions are:
  - Which role can markers play for RK&M preservation and on which time periods?
  - How can they be part of a systemic approach to RK&M preservation?
  - Is international standardisation of at least some types of markers a good idea?
- Time capsules will be looked at as a type of markers having potential to carry information that goes beyond a simple concise message.

### **Regulation**

- The role of regulators and other oversight bodies in ensuring that RK&M will be preserved for long periods of time needs to be better understood and discussed, especially in light of the recent (June 2013) release of the ICRP-122 guidance document and its recommendations regarding the need to maintain oversight a geological repository for as long as practicable.
  - The work on regulatory aspects should be undertaken in the first place by groups such as the RWMC's Regulators' Forum.
  - Since some of the issues related to preservation of RK&M in the long-term may transcend the typical boundaries of responsibility of present-day regulators, the roles of other policy-making national and local institutions merit further investigation.
- The RK&M project will liaise with regulators and ensure adequate representation of regulators in the discussions, and will address the implications for RK&M of factors such as sharing of responsibility among institutions and transfers of responsibility for oversight, e.g., at the time of closure.
  - It would be useful to study the question of how policy makers and regulators formulate and put in place requirements to ensure that applicants address medium and long-term preservation of RK&M in their repository projects and what role this has in the stepwise licensing process.
- It will be useful to investigate the potential role of international governmental mechanisms and their interactions with regulatory aspects of RK&M preservation.

### **Set of Essential Records**

- The Phase-I preparations will be refined and put into operation
  - The vision document of the SER project gives indication on the work programme on how to create the intellectual basis for sets of essential records based on input from society at large and/or from specialists.
- In the context of preserving RK&M implementers and regulators and policy makers could be invited to define *jointly* what they would consider a reference set of essential records.
  - Studies of questions related to the types of RK&M that are most likely to be useful in the medium and long-term may become important input for the development of regulatory requirements for long-term preservation of RK&M



***Knowledge Management (short-term)***

- There will be close collaboration with the Repository Metadata project (RepMet) of the NEA
- Liaise and follow current developments at IAEA, as well as European initiatives such as IGD-TP (JA14 and JA15), Petrus II, etc.

***Systemic Approach***

The RK&M project supports a systemic approach to RK&M preservation, i.e. the implementation of a system whereby, within a strategy of either mediated or non-mediated transmission of RK&M, the various elements are linked to each other, act as indexes to each other, and reinforce each other by offering redundant functions<sup>3</sup>. At the same time any strategy should distinguish between the various life cycle phases of a repository<sup>4</sup>. These are cross-cutting aspects that will be taken into account in carrying out studies and structuring all discussions and initiatives.

***Other***

The RK&M project will identify its Phase-II priorities from the above lists at its kick-off meeting in May 2014. Intention is to revisit and updated priorities after major events such as the Verdun conference of September 2014.

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<sup>3</sup> For example, a systemic approach to reach out to future generations in the medium term through a strategy of mediated transmission of RK&M may include both national and international archives; creating tacit knowledge reservoirs; continuation of oversight and monitoring; building cultural links between the waste and the site region; use of markers placed visibly and in strategic locations; etc.

<sup>4</sup> Four such time frames are defined in the RK&M glossary: very short term, short term, medium term, and long term.