

**Second Phase of the OECD NEA International Initiative on the Preservation of Records,
Knowledge and Memory across Generations – 15616**

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ABSTRACT

The OECD/NEA initiative on the Preservation of Records, Knowledge and Memory across Generations (RK&M) constitutes an activity within the area of transfer of information about radioactive waste disposal projects for the benefit of future generations. Launched in 2011, the initiative has now entered Phase-II, which will run through to 2017. Building on results of Phase-I, which was dedicated to exploring issues of strategic relevance for the preservation of RK&M, Phase-II of the initiative will focus on developing an understanding of the interactions between the identified issues, while continuing to examine hitherto little aspects of the same issues. This corresponds to a systemic approach to RK&M preservation consisting in employing different means and methods to preserve RK&M, which are in a complementary but also redundant relationship to each other, and in situating and analysing activities in a wider context than radioactive waste management. The strategic issues for RK&M preservation are the use of archives, cultural heritage, the so-called Key Information File, transfer of responsibilities after closure, regulations governing RK&M preservation, markers and international mechanisms that could be adapted to foster RK&M preservation. The issues were discussed extensively at “Constructing Memory – An International Conference and Debate”, which was organised by the OECD/NEA with the support of Andra (French Radioactive Waste Management Organisation) and took place in September 2014 in Verdun, France.

INTRODUCTION

Several OECD/NEA member countries are currently developing deep geological disposal projects for high-level and/or long-lived radioactive waste and spent fuel. These projects take decades to implement and operate. Once closed, the facilities are meant to remain safe for millennia and their safety is not to depend on human presence and intervention. There is, however, no intention to forgo, at any time, records, knowledge and memory of the repository and the waste it contains.

Against this backdrop, countries in various stages of development of their programmes for final radioactive waste management (RWM) are seeking to improve their understanding of the preservation of records, knowledge and memory (RK&M) about radioactive waste and geological repositories. The NEA Radioactive Waste Management Committee’s (RWMC) initiative on Preservation of Records, Knowledge and Memory (RK&M) across Generations was launched in March 2011 to meet the demands from member countries for facilitating exchange and fostering reflection in this area.

The initiative is based on the acknowledgement that the preservation of RK&M is needed to support lengthy and complex decision-making processes across the long operational and post-operational lifetimes of radioactive waste repositories. These processes concern, for instance, licensing, monitoring, ensuring retrievability, supporting land-use restrictions and assisting with the transfer of responsibilities for oversight. The initiative is also based on the belief that enabling future members of society through the preservation of RK&M to make informed decisions is part of a responsible, ethically sound and sustainable RWM.

¹ *The opinions expressed and arguments employed herein are those of the author and do not necessarily reflect the official views of the OECD or of the governments of its member countries.*

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In addition, as stated in the NEA/RWMC collective statement entitled “Foundations and guiding principles for the preservation of records, knowledge and memory across generations: A focus on the post-closure phase of geological repositories” [1], the preparation of preservation of RK&M is best undertaken while waste management plans are designed and implemented, as this is usually also the period of time when funding is available. During the operational phase of a repository, the transfer of responsibilities for the repositories to other stakeholders following the closure of the repository should be addressed. Cooperation with other institutions and international bodies should be sought early on and geared towards long-term cooperation that would ideally last after the closure of the repository. An international approach is identified to contribute positively to the further development of national programmes.

In March 2014, the 47th session of the RWMC approved Phase-II of the RK&M, which will run through to 2017. At present, seventeen from 13 countries and representing implementers, regulators, policy making and R&D institutions have joined the initiative.

In Phase-II, the initiative will seek to identify and examine inter-relations between the issues having emerged in Phase-I as being strategic for the preservation of RK&M. This is based on one important result from Phase-I, namely that successful RK&M preservation necessitates multiple strategies which draw on multiple means. This is referred to as the “systemic approach” and is explained in more detail below.

MAIN FINDINGS OF PHASE-I (2011–2014)

At the end of Phase-I, five main conclusions can be drawn:

- *The context has changed greatly since the 1980s, when RK&M preservation 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.*

Oversight, understood as a general term for “watchful care” and referring to society “keeping an eye” on the technical system of the disposal facility and on the actual implementation of plans and decisions, may take many forms. This concept, which has been promoted by the ICRP, could be implemented through regulatory supervision in the form of monitoring of pathways, through active memory keeping by preserving archival information and/or through society maintaining memory about the facility through lore and local history societies. While it is not planned to cease oversight, the potential loss of oversight needs to be anticipated and planned for. Provisions for the preservation of RK&M could facilitate recovery of oversight [2].

- *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.*

A 2011 collective statement of the RWMC on RK&M preservation [3] called for the systematic identification of mechanisms for RK&M transfer. In the course of the initiative, a wide array of international mechanisms for RK&M preservation has been identified and will be further examined in Phase-II of the initiative.

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- *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.*

The medium term refers to the period of time of indirect oversight activities that would follow repository closure. The envisaged timescale is in the order of a few hundred years. During Phase-I of the initiative, an extensive literature review was conducted. The review indicated that the period conceived as the “medium term” by the RK&M initiative has often not been addressed as such, most of the literature dealing either with the current period or with an indefinite “long term”.

- *The regulatory aspects of long-term RK&M preservation are much in need of formulation and systematisation. Transfer of responsibilities is an important area. Much information is lost typically during changes in responsibilities.*

During Phase-I, the RK&M initiative reviewed national instruments (legislation, regulation, guidelines) governing the preservation of RK&M. This has shown that long-term RK&M preservation is not covered adequately at the moment, nor is the question of transfer of responsibilities after closure. In order for oversight to continue after closure, other institutions and stakeholders than those having formulated relevant regulation and operated the facility will need to become involved.

- *Terminology is important when discussing long-term issues.*

Discussions regarding RK&M preservation have underlined that it is important to use a consistent and well-elaborated vocabulary, especially because commonly used concepts may change meaning when used with regard to the long term. For this reason, the RK&M initiative has developed a glossary of terms [4].

SYSTEMIC APPROACH AND DUAL-TRACK STRATEGY

The fundamental importance of the concepts of systemic approach and dual-track strategy represent an additional conclusion from Phase-I of the RK&M initiative.

Systemic Approach

The RK&M glossary defines the systemic approach as a “communication approach whose components offer a variety of information avenues. These components are linked and act as indexes to one another, and reinforce each other’s information content” [5]. The components referred to are, for instance, archives, markers, cultural links between the repository and the site region, and international mechanisms. The different elements would complement each other but also ensure redundancy in RK&M preservation, thus maximising the chances of preserving RK&M.

Within the RK&M initiative, the systemic approach represents both the overall approach for RK&M preservation as well as a separate item on the initiative’s agenda in Phase-II. Regarding the latter, the initiative will seek to develop a knowledge map of the various components of the approach and their interactions.

Dual-track Strategy

The dual-track strategy constitutes the second pillar of RK&M preservation. It is defined as a “communication strategy relying on both non-mediated and mediated transmission of records to a future generation received” [6]. Mediated transmission refers to a record being transmitted from one generation to another, whereas non-mediated transmission does not rely on intermediaries to transmit the record.

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These two tracks of transmission may address different audiences and consider different levels of detail, timescales and technical means.

Conceived in combination, the systemic approach and dual-track strategy motivates the development of an integrated approach.

PHASE-II WORK PRIORITIES

During Phase-II, the initiative is focused on developing its understanding of areas identified in Phase-I as being important for the preservation of RK&M [7].

Archives

The RK&M initiative will learn more about participating organisations' experiences with and expectation regarding archives in their country, especially national archives. Participants will provide an overview of their current relations with archives. These overviews will be utilised for developing an understanding of how (national) archives can contribute to RK&M preservation. As archives traditionally work in a historical perspective, there is a possible need for dedicated nuclear archives that take safety aspects into account. In addition, the RK&M initiative is building up a working relationship with representatives of national archives in order to examine preservation and accessibility issues with these specialists.

Key Information File

Related to the question of archives, the RK&M initiative has originated and is developing the concept of a Key Information File (KIF). The KIF corresponds to the top-level within a three-tiered information system, consisting of the following levels:

- A basic level consisting of documents sent to the archives due to legal and regulatory requirements. Typically, public bodies have to send all the documentation in their internal archives to the national archive. This documentation goes beyond safety case documents.
- A second level at which a selection would take place that aims at extracting the documents that are related to the post-closure safety. These documents would be identified as such and also kept in the national archives and elsewhere.
- A top, third level which would consist of a summary of the previous documentation in a format and language accessible to a public of non-specialists. The summary would contain information not necessarily limited to safety, but referring also to the history of decision making concerning the repository. (Key Information File, KIF)

The RK&M initiative will develop a table of contents for the KIF. Existing national examples of similar documents, such as Andra's synthesis document based on documents related to its *Centre de la Manche* disposal facility will serve as useful references. In a following step, the table of contents will be tested among participating organisations.

Cultural Heritage

Cultural heritage refers to the legacy of a group or society that is inherited from past generations, maintained in the present and bestowed for the benefit of future generations. In the context of the RK&M initiative, it represents a potential mechanism to preserve RK&M for future generations. For instance, the notion of "industrial heritage" indicates that industrial facility can be regarded as cultural heritage worth preserving. An NEA working party, the Forum on Stakeholder Confidence [8], concluded in one of its studies that "cultural features [of facilities] help transmit an honoured legacy, to communicate symbolic

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meaning, or to advance ideals.” [9] This very much corresponds to the idea that waste management facilities should be built as part of, and not apart from, the community.

In Phase-II, the initiative will examine how such mechanisms related to cultural heritage can be effectively mobilised to support the preservation of RK&M across generations.

Markers

The RK&M initiative defines a marker as a “long-lasting object that indicates an area of influence, power or danger. It is placed strategically at or near the site for immediate recognition or for discovery at a later time.” [10] A marker is a good example for a non-mediated mode of information transmission under the dual-track strategy as it aims to reach an audience in the medium and long term without intermediaries.

In December 2013, the initiative published a “Literature Survey on Markers and Memory Preservation for Deep Geological Repositories” [11].

Phase-II will study the issue of markers by discussing national case studies as well by discussing emerging concepts such as surface traces that could be left behind on relevant sites to indicate past activity.

Underlining the concept of a systemic approach, markers could, for instance, point to the KIF outlined above. Also, they are strongly linked to the question of cultural heritage as they may persist if deemed culturally important and if they are becoming a part of society, which can also be a result of certain functions markers may have.

International mechanisms

Started in Phase-I, the RK&M initiative has reviewed international mechanisms from different fields, for instance cultural heritage (e.g. UNESCO), that could be collaborated with and / or adapted to the particularities of the field of radioactive waste management to support the preservation of RK&M. In preparing Phase-II the RK&M has subdivided international mechanisms in two different classes, for the purpose of studying them better in view of a systemic approach to RK&M preservation. These two classes are as follows:

- International governmental mechanism (IGM): an IGM consists of entities and activities that are based on mutual agreements between a number of national governments.
- International non-governmental mechanism (INGM): an INGM consists of entities and activities that bring together non-governmental, private or commercial organisations.

Regulation

During Phase-I of the initiative, participants were asked to provide an overview of legislation, regulation and guidance governing preservation of RK&M in their countries. These national instruments have been compiled into to an internal regulatory catalogue, which will be further developed and analysed (for gaps, best practices, (un) complementarity ...) in Phase-II of the initiative.

Transfer of Responsibilities

The question of transfer of responsibilities is important (i) in order to demonstrate the willingness to continue maintaining oversight of the facility and (ii) because it is typically when responsibilities are handed over to another institutional body that much information is lost. Regulation and legislation tend

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not to address or be specific on this issue. The RK&M initiative will also make use of the presence of regulators and implementers among its participants to develop a discussion document on this issue. To further explore this question, the RK&M initiative will receive input from the OECD/NEA Regulators' Forum.

The RK&M initiative has published two studies that are related to the question of transfer of responsibilities. "Monitoring of Geological Disposal Facilities – Technical and Societal Aspects" [10], which includes a contribution by the FSC, discusses the role of local communities in maintaining the memory of a facility, while also providing an overview of questions of technical monitoring. The study on "Loss of Information, Records, Knowledge and Memory – Key Factors in the History of Conventional Waste Disposal" [12] concludes, amongst others, that records and information are often lost when responsibilities change.

CONSTRUCTING MEMORY CONFERENCE

Marking the end of Phase-I and the beginning of Phase-II, the OECD/NEA, with the support of Andra, organised "Constructing Memory – An International Conference and Debate", in Verdun, France, in September 2014. The programme committee for the conference was made up of a number of participants in the RK&M initiative.

Consisting in equal parts of panel and group discussions, this three-day event brought together nearly 200 participants from 17 countries. The scope of "Constructing Memory" was to present and discuss prospects and projects related to the preservation of RK&M both in radioactive waste management and in other domains, such as archiving, cultural heritage, archaeology, communication, semiotics and the arts.

The conference also allowed for the participatory evaluation and refinement of work priorities of the RK&M initiative for its Phase-II.

CONCLUSIONS

Since its launch in 2011, the OECD/NEA initiative on the Preservation of Records, Knowledge and Memory across Generations has produced a number of studies and other resources, such as a glossary of terms and a reference bibliography², which represent important contributions to the issue of long term knowledge management in the field of radioactive waste management that has not been addressed quite as often as other scientific issues by RWM actors in the past.

Based on the finding of Phase-I, the initiative seeks to identify, in Phase-II, relations between issues of strategic importance to the preservation of RK&M. This will help national waste management programmes in further developing their activity so as to ensure that records, knowledge and memory about radioactive waste are not lost but preserved for future generations.

² See <http://www.oecd-nea.org/rwm/rkm/>

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