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

26-Mar-2013
_____

English - Or. English

NUCLEAR ENERGY AGENCY
RADIOACTIVE WASTE MANAGEMENT COMMITTEE

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

"MINIMAL SET OF RECORDS" INITIATIVE - VISION DOCUMENT

(Draft for finalisation within the RK&M Project)

Claudio.pescatore@oecd.org

"MINIMAL SET OF RECORDS" INITIATIVE

VISION DOCUMENT

(Draft for finalisation within the RK&M Project)

INTRODUCTION

Disposal of long-lived radioactive waste in engineered facilities built in stable, deep geological formations is the reference means for permanently isolating the waste from the biosphere. Although this management method is conceived to be intrinsically safe and final, i.e., not depending on the presence and intervention of man for fulfilling its safety goal, there is no intention to forgo, at any time, knowledge and awareness either of the repository or of the waste that it contains. As repository development is reaching industrial maturity, means are being studied to maintain indirect forms of oversight once the repository is closed including monitoring, applying safeguards according to international agreements, maintaining records, and ultimately maintaining memory. Institutional arrangements are an integral part of those provisions, as continuity of records, knowledge and memory (RK&M) will require, in the first place, identifying a chain of responsibilities. At the same time, novel methods ought also to be studied and applied that are less vulnerable to changes in socio-economic conditions and may be less reliant on institutional presence. Overall, this is a multidisciplinary work area in which much learning is expected over the coming years.

The RK&M project set up a Minimal Set of Records (MSR) subgroup in April 2012. The initial findings of the MSR subgroup were presented to the whole project in September 2012 and January 2013. The RK&M project has indicated that the subgroup should focus on the long-term, rely on the project glossary, and continue to cast its work within the context of what the project has produced so far.[1]

DEFINITION OF "MINIMAL SET OF RECORDS" (MSR)

"Minimal set of records" signifies the 'smallest essential' set of records[2], i.e. a small collection of records that, albeit not exhaustive, gives a helpful overview of the repository system, its contents and, possibly, the means to verify its performance. "Minimal" here means "*without which, 'making sense' would be very difficult, if not impossible*".

For the purposes of reflection, it is accepted that sufficient context (knowledge, memory) still exists in the future culture to allow at least an attempt at decoding and interpretation of the record. In other words, there is no requirement placed on the minimal set of records to *teach* the future receiver to read, to perform mathematical operations, etc. It should be emphasised that the MSR is viewed as a tool for communication, not a recommended limitation on what the regulators should require operators to keep.

The concept of a "Minimal Set of Records" applies both to "mediated" and "straight" transmission of records to a set of future persons. However, *in design* it will be an example of straight transmission.

---

[1] See Summary record of the September 2012 meeting, NEA/RWM/RKM(2012)6

[2] 'A usually unique and original object or a selected piece of data / piece of information that has been committed to a medium and that is kept, together with the appropriate context and structure, for later uses.' (RK&M Glossary)

Straight transmission makes no reliance on the presence of intermediaries and the record is delivered directly (i.e. in its original format) from the present-time provider to the future receiver.[3]

Guidance exists as to which records could be kept – the IAEA-Tecdoc-1097[4] in particular gives a comprehensive overview of the type of information which can be transmitted through records. However, to date, no criteria have been established with which to select from the available records a 'minimal set'.

Such criteria would describe what the records need to say – that is, what are the intended messages of the records, and how the records substantiate the messages for communication to future generations. According to the RK&M glossary, '*message*' is '*a significant point that is being conveyed in concise form, either in a written form or through symbols.*'

GOAL OF THE MSR GROUP

The RK&M MSR subgroup intends to design and perform a study to create an intellectual basis for the information and messages in one or more types of minimal sets of records. In this context a few questions arise:

     1. the target timescales for this transmission;

     2. the durability of the medium or the pathway for transmission;

     3. the type of information to pass on;

     4. the amount of information that can be transmitted;

     5. the target recipients.

Although these questions are related, they are considered hereafter one by one, in order to propose a path forward.

THE TARGET TIMESCALES

The RK&M project has stated that the Minimal Set of Records is a tool for *medium* and *long-term* record preservation. An indefinite timescale is not useful as the Minimal Set of Records relies on the recipients being able to make sense of information using their knowledge of history and language. Historical timescales at the present day stretch back a few hundred to a few thousand years. The Minimal Set of Records will therefore provisionally target these timescales as projected into the future, which correspond to the medium and long term as defined by the project.

---

[3] The RK&M project supports a strategy of multiple approaches for RK&M transmission. A reference minimal set of records defined in the hypothesis of straight transmission can provide then a useful consideration for the mediated transmission approach.

[4] IAEA-TECDOC-1097; Maintenance of records for Radioactive waste disposal; IAEA, VIENNA, 1999. In the Appendix we examine the relevance of IAEA-Tecdoc-1097 that addresses record keeping over time; the present proposal by the subgroup implements novel ideas.

It may be that the Minimal Set of Records should aim to be time-independent – that is, in the manner of a marker, records should be selected with the intention that they will be available to interpretation for an indeterminate length of time, limited by people's ability to make sense of what we bequeath them rather than by the time-bound relevance of the information. The MSR study, as it is proposed later in this document, may shed light on this aspect of time-independence[5].

THE DURABILITY OF THE MEDIUM OR THE PATHWAY FOR TRANSMISSION

Within the target periods (the medium and long term), there are different sub periods and technological and institutional choices to consider. For instance, for up to 1,000 years paper may be a viable option for records preservation and some institutions may also survive; over a longer period paper is no longer viable and the continuity of any institutional arrangement would be highly questionable.

In order to achieve straight transmission, one option could be underground monuments (such as the clock of the Long Now Foundation) or surface and subsurface markers of various kinds. Another possibility would be archives of paper records and Arnano type disks[6].

THE TYPE OF INFORMATION TO PASS ON

The aim of the RK&M initiative is to help provide future generations with the means to understand and make their own decisions. In this perspective, by "Minimal Set of Records" we mean as stated above the 'smallest essential' set of records: that is, a concise collection of records that, albeit not exhaustive, gives **a helpful overview of the repository system, its contents and, possibly, the means to verify its performance**. This is in the present view of the RK&M project the message, or messages, which the MSR will need to substantiate. However, a partially different or complementary set of messages could conceivably be identified as essential by different stakeholders. The reasons for choosing the MSR messages, whichever they are, should be explicable and justifiable. It is proposed to build a rationale, or intellectual basis, for the MSR through canvassing the opinions of a wide range of interested persons, which can then be analysed to create the criteria for the selection of a Minimal Set of Records. Moreover, different stakeholders might imagine different forms through which agreed essential information may be expressed or substantiated. The study should tap this "crowd intelligence".

---

[5] Namely, the proposed inquiry will proceed through considering people's ability to interpret information from two points in the past, representing respectively a high and a lesser degree of continuity between historical society and our own[5]. It is thought that by comparing findings related to these two anchoring points, we may be able to identify fundamentally similar and, to a large extent, time-independent record elements.

[6] Archives do rely on institutional presence, but they may survive the institution itself provided the archival medium is adequate, like the clay tablets of the Babylonian archives, which survived neglect and fire. Also, if the record had special qualities (the examples are old, ornate manuscripts), it would be desirable to continue to own it once discovered. There would then be a switch from straight to mediated transmission.

THE AMOUNT OF INFORMATION THAT CAN BE PASSED ON

In all cases, the amount of information that can be passed on is limited by the relevant medium. The Arnano disk or sheets of paper take only a certain amount of information; a monument may only transmit one critical message or set of messages.[7]

THE TARGET RECIPIENTS

Future societies, rather than individuals, are the target recipients of the information. The Minimal Set of Records will assume that there will be future societies able to function as a collection of individuals and able to make sense collectively of the records/information.

Determining which kind of future societies one might expect in the distant future would lead to endless speculations or at best to systematic scenario making, which is beyond the scope of the RK&M project. However, the target recipient determines what the message of the Minimal Set of Records should be, so "a reference society or world" is needed.

We propose that we use present-day society as the reference society. Thus, instead of using more or less sophisticated guess work to decide what a selected subset of an infinite variety of possible future societies may want to know, we will ask, 'What would we (as society) want to know?'. In order to to do this, we will proceed as outlined below.

This approach breaks new ground vis-à-vis currently available materials and approaches; the MSR subgroup has found no previous example of a similar approach to identifying the criteria for a Minimal Set of Records. A particular advantage of the proposed approach is that it does not depend upon a restricted group of one sort of specialist for our understanding of what society at large considers to be the most important messages to relate regarding the Repository. Instead, it is open to understanding the wishes of broader society and to involving the latter – and especially the local communities – in devising these messages. The findings from this initiative will then provide a methodically formulated basis upon which to base the criteria for the MSR. Additionally, this approach will help the project widen and deepen dialogue with both local communities and the rest of society.

THE MSR STUDY

The aim of this initiative is to provide documented and reasoned argumentation on what could constitute a Minimal Set of Records.

An intern will interview interested stakeholders, technical and non-technical, on what that "Minimal Set of Records" should contain in a long-term perspective. This consultation is an opportunity to:

- *1. **Establish the intellectual basis for a minimal set of records** by collecting a wide spectrum of ideas and viewpoints will be collected from civil society on the message or messages the minimal set of records needs to substantiate. These expectations and reasons for a minimal set of records in a long-term perspective will be documented.*

---

[7] Recall the difference between "record" and "message" (see definitions provided above from the RKM project Glossary).

- *2. **Categorize and examine the documented ideas.** Review the documented ideas, perform a preliminary analysis and start a reasoned reflection in the whole RK&M project on how minimal set(s) of records could be constructed.*

Further work will needed within the MSR group and the RK&M to identify criteria and choose amongst possible types of minimal sets of records .

Approach. In order to establish the intellectual basis, the study will collect structured qualitative data on what present-day stakeholders would require, if placed in a similar situation to the one the Minimal Set of Records will be designed to address. The study will ask in essence: *Suppose that our own society received information, more or less detailed,[8] that hazardous materials were buried deep underground at great expense and effort 500 years ago, or, a few thousand years ago. What would we, as a society, want to know? And why?* A detailed study design will be developed in May/June 2013. Data will be collected in June/July.

Sample. The project should reach out to communities beyond the sole RK&M project members, such as local communities' representatives, authorities in charge of other wastes or of environmental monitoring, historians, anthropologists, and others. A list of people to reach out to should be compiled with the help of RK&M project members and consultants. The intern will contact the target persons or institutions, if necessary with support from project members, explain and conduct the structured study.

Analysis. The intern will categorize and document the survey. A set of findings of the structured qualitative study will be prepared by the intern and the NEA Secretariat for discussion and preliminary analysis by the MSR subgroup. The available results will then be discussed with the RK&M project members through e.g. a short report, a session at the Sept. 2013 international workshop of the RK&M project, etc. Steps in completing the analysis, in setting selection criteria, and in formulating an MSR will be identified and dates set as of the September workshop.

 Way forward

1. The initial proposal was presented and approved in principle at the January 2013 Conference Call. The current text implements the suggestions of the January 2013 Conference Call.

2. A set of guidelines for the interviewer will accompany this document.

3. The RK&M project members will discuss the MSR initiative, in order to identify names of individuals or organizations to be approached in their countries.

4. Progress is reviewed at the Project meeting in April 2013, where a division of work should be agreed. Namely, the work to be carried out by the intern, by the Secretariat and by project members. How can they help one another?

5. The detailed qualitative study design is elaborated in May/June, and the interviews are conducted in June/July 2013.   Findings and preliminary analysis are reported at the September 2013 workshop. Next steps and the calendar for achieving them are set at that time.

6. The analysed results of the study would be used by MSR subgroup and then RK&M project members as an empirical basis for drawing up a set of criteria for selecting the MSR.

---

[8] Several memorial medallions have been found that suggest that there was some type of deep mining activity where materials were buried underground. The text or imagery on the medallion suggests being aware of this.

7. The resulting MSR can then be reviewed for how concise and complete it is. This review may benefit, if wished, from review external to the project.

8. Publications, in professional and scholarly journals, as well as through the NEA website, will be considered.

APPENDIX: Connection to work identified so far

The IAEA-TECDOC–1097 was identified by the RK&M project as a potentially relevant document providing an example of how to constitute a Minimal Set of Records. A closer look showed this not to be quite the case.

TECDOC-1097 is very much about *mediated transmission* through the use of a Record Management System that would operate through the "active post-closure control phase", what we would call the medium term, and in the presence of a regulator. The "passive post-closure control phase" is not addressed. (see Fig 1 of TECDOC-1097)

The records in the proposed management system are suggested to be structured with high-, intermediate- and primary-level information: "*The HLI (high-level information) would give sufficient information to provide a fundamental understanding of the repository system. The HLI has to meet the needs for future generations. The HLI would be placed on a national and perhaps if also decided by national authorities on an international level*".

Section 4.2 of the document identifies the contents and where to place this HLI information. It says "*Information which is transferred to the HLI would not be more detailed than that provide to the Member State regulatory body (...) except to include performance and/or safety assessments and safeguard required reports if they are not part of the licensing information. The HLI information to be collected and retained in the Member State archive and to possible international archiving would cover the following subjects: ...*"

In sum, this IAEA document

1. does raise, in a way, the question of the minimal set of records and the needs of future generations, but

2. does not explain which are the needs of future generations,

3. is situated within the logic of forward-looking perspective of mediated transmission, and

4. deals with the HLI in the light of regulatory needs and as part of a record structure to be maintained over time – suggesting retaining a fairly large amount of information.

The present approach by the MSR subgroup implements novel ideas. A particular advantage of the proposed approach is that it is open to understanding the wishes of broader society and to involving the latter – and especially the local communities – in the quest for an answer. The findings from this initiative could then be used more defensibly to generate recommendations than if they came from a restricted specialist group. Additionally, this approach will help the project widen and deepen dialogue with both local communities and the rest of society.