When Dealing with the Long Term, Care as to How Terms are Used: Reflections from the OECD/NEA RK&M Project Glossary – 14437

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ASTRACT

The experience of the on-going NEA Records Knowledge & Memory Preservation project (RK&M project) is that terminology needs to be defined carefully when dealing with long-term strategies. A glossary of key terms is being created during the course of the project, which has the potential to become a reference work in this area. In this paper, we analyze the terminology currently in use in the area of post-repository closure aspects of radioactive waste management. By focusing on three groups of technical terms that are routinely used in this context, we show that clear definitions, determined for the very context in question, are a precondition for clear and consistent communication. Additionally, we point out that a clear distinction between concepts that are sometimes considered as being close to one another or interchangeable is critical, since seemingly small differences between concepts can have major consequences for RK&M preservation strategies. Finally, we elaborate on why it is useful to have not only individual definitions that are clear and unambiguous, but definitions that, as a set, are also readily understandable and internally consistent. We make a case for adopting such a set of definitions in order to foster unambiguous and clear communication within and across expert teams and also between experts and stakeholders.

INTRODUCTION

Deep geological disposal is the reference solution for isolating high-level long-lived radioactive waste from the biosphere. Geological disposal projects span several decades for planning, siting and construction and at least several decades more for disposal operations and closure activities. After closure, and depending on the country's regulatory framework, there may be a period of institutional engagement, possibly connected to the time-frame of any intended retrievability provisions. Although there is currently no intention to give up awareness of the repository at any time, institutional engagement may decrease and even disappear as decades and centuries go by. To help future societies to keep an eye on the repository and make informed decisions, the relevant Records, Knowledge and Memory (RK&M) need to be managed and preserved for as long as possible. The on-going OECD/NEA project "Preservation of RK&M across generations" (hereafter RK&M project) aims to facilitate this task. While the main focus of the project originally lay on the post-operational phase, the comparison of the life phases of the repository from the aspect of suitable RK&M preservation measures has also revealed fruitful perspectives. The project was presented at WM12 and an update is being given at WM14 [1, 2]. Information on the project can also be found on the project web page www.oecd-nea.org/rwm/rkm.

The experience of the RK&M project is that, as we move further into the future, terminology used for describing present-day actions and activities in radioactive waste management becomes less and less adequate. What is possible when society is attentive to the repository may not be

possible when society is inattentive or unaware. It is also observed that the context in which terms are used may change over relatively short timescales. Thus, over the past 25 years, both the societal context of geological disposal and views on the appropriate attitude towards future generations have evolved. In parallel, new technical concepts have been developed, moving, for example, from “performance assessment” to “safety case” and from “validation” to “building confidence”. New concepts such as retrievability have also come to the fore. Lastly, the new ICRP-122 publication [3] states that geological repositories for long-lived radioactive waste shall never be intentionally released from oversight. It is to be expected that terminology will be further adapted as a reflection of the evolving context.

As will be discussed later in this paper, the field of post-repository closure aspects of radioactive waste management could benefit considerably from clearly defined terminology. In this context, a glossary of key terms is being created during the course of the RK&M project. Its primary goal is to provide internally consistent and unambiguous terminology for the project documentation. At the same time, the glossary represents one of the main outcomes of the project in its own right and has the potential to become a reference work in this area. Experience shows that adequate terminology can be more than just practical. It can uncover and address conceptual gaps and thus provide actual added value to concepts and strategies.

By way of an introduction, we will briefly outline the guiding principles behind the RK&M project glossary. Then, in the main part of the paper, we will discuss three groups of key terms, highlighting the conflicts between current terminology and concepts. Finally, we will explain why it would be beneficial to exercise care in how terms are used.

METHOD: THE RK&M PROJECT GLOSSARY

The RK&M project glossary of key terms [4] (hereafter glossary or RK&M glossary) defines important concepts and terminology in the field of RK&M preservation across generations. It is being developed as a reference for those terms that are commonly used within the RK&M project in order to achieve clear and consistent communication and to help better understand key RK&M issues. Reaching beyond the project, the glossary more generally provides useful terminology in the area of RK&M preservation for geological disposal, including the pre- and especially post-closure phases of the repository, taking the corresponding timescales into account.

In fact, the reference timescales constitute one of the main structuring elements of the project. Thanks to their clear definition, the glossary has developed not only into a generic collection of terms and definitions, but also into a set of terms and definitions that are consistent with one another and within the relevant timeframes. Indeed, each definition should not be seen in isolation, but as complementary to the definitions of other terms in the glossary. The usefulness of this approach will become apparent when discussing some selected key terms in the groups.

Finally, unambiguousness is the ultimate aim for each individual definition, requiring both precision and clarity. The definitions in the glossary are brief—as far as possible—and self-explanatory, i.e. not calling on any external references or specialist knowledge to be understood. In summary, the guiding principles can be described as follows: usefulness within the wider RK&M preservation context, understandability, internal consistency and unambiguousness.

It should be pointed out that, since no new words are created for the RK&M glossary, its key terms

may well be used with different meanings elsewhere in the radioactive waste management literature (and even more so in other areas of science and technology). Indeed, the glossary definitions do not strive to capture a “mainstream” usage of the terms. Instead, while the definitions do, in the main, coincide with widely used notions of the terms, they are elaborated according to the principles mentioned before.

The RK&M glossary is a living document and is still evolving. It is available online [4]. Comments and suggestions are very welcome.

VERY SHORT / SHORT / MEDIUM / LONG TERM

The unprecedented time spans under consideration in the area of RK&M preservation for geological repositories call for a definition of the commonly used terms “short term”, “medium term” and “long term”. Otherwise, these terms would be meaningless in this subject area since, by everyday standards, most of the period addressed would be “long term”. As these terms are widely used indeed to address the different time horizons involved in repository management glossary definitions are very much needed.

The RK&M project uses the following definitions:

- “Short term” refers to the period of time that ends with repository closure. This period includes both the pre-operational and the operational phases of the repository. Timescales are in the order of 100 years.
- “Medium term” refers to the period of time of indirect oversight activities that would follow repository closure. Timescales are in the order of a few hundred years.
- “Long term” refers to the period of time with no repository oversight. This period extends over the time of concern in the safety regulations, typically over hundred thousands of years in the case of high-level waste.

These three reference timescales are not only ordered by increasing length, but they also succeed one another (see Fig. 1). Thus, the “long term” is the timescale addressing the time furthest away from today—which is in line with the common understanding of this time expression—but it also has a start which is not now but in the future. The same is true for the “medium term”. A fourth timescale is different in this respect:

- “Very short term” refers to a period of time consistent with staff stability, cycles of organizational change and regulatory expectations of periodic safety reviews. Typical timescales are 10 to 20 years.

This shortest of the four reference timescales is not in any chronological order of succession with respect to the other timescales (see Fig. 1). It is a subordinate timescale within the short term and, to a minor extent, it is also relevant within the medium term. Its definition pays respect to probably the most common catalyst for the loss of RK&M in the industry: Staff retirement.

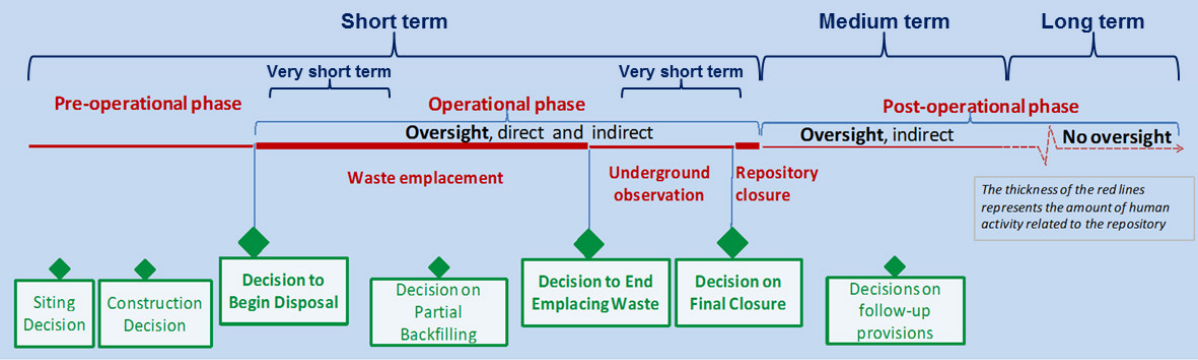

Fig. 1. RK&M glossary definitions of timescales in connection with the life phases of the repository and the presence of oversight

Having the timescale definitions linked to those life phases of the repository given above (and in Fig. 1) has a number of implications:

- Strategies for RK&M preservation vary mainly according to the oversight conditions prevailing during the timescale under consideration, e.g.:
  - Mediated transmission, where records are passed on from one generation to another, is reliable only on the short and medium term.
  - Non-mediated transmission, i.e. not relying on the presence of intermediaries, is the complementary method of choice for passing records on to a future generation on the long term.
  - Ensuring that the records that will be needed in the future are actually created and selected for preservation is an issue for the short term.
- Discussion of how long oversight can reasonably be assumed is not essential for setting up a strategic action plan for RK&M preservation, since the absolute number of years is actually of secondary importance for the strategy.
- There is probably not much controversy about whether these timescales are relevant and should be considered at all in connection with RK&M preservation and repository management in general.
- Reasons for loss of records (and possible prevention and remediation strategies) can be studied systematically according to the defined timescales. Comparison with examples of record loss in the past can be made even though the absolute times involved are different.

We are aware of the fact that timescale expressions can be defined in different ways. We wish to emphasize, however, that it is not possible to use these expressions in a meaningful way in the field of repository management without invoking any explicit definition.

DATA, INFORMATION, RECORDS, KNOWLEDGE, MEMORY

Defining the key terms used in its own project title is naturally a must for the RK&M project. Closely connected to the terms “records”, “knowledge” or “memory” are the expressions “data”, “metadata”, “information”, “message” and “archive”. The RK&M glossary definitions of all of these terms are listed in the Annex.

We find that Data–Information–Records–Knowledge–Memory constitute a hierarchical order in

terms of what could be called “quality level of data processing”. The differences between these five terms, however, are important, since they have implications for preservation issues. It is therefore useful to define the terms as follows:[1]

- Data: Facts and ideas in the form originally collected.
- Information: Organized data that may or may not be recorded on a medium.
- Record: A usually original object, or a selected piece of information that has been committed to a medium, that is kept, together with the appropriate context and structure, for later use.
- Knowledge: The result of learning processes. Once acquired in a particular field, knowledge provides insights and skills. It results in the ability to understand, interpret and use the relevant data, information and records. Preservation of knowledge in a particular field is about maintaining or creating learning processes in that field.
- Memory: The awareness of events, people, places and levels of knowledge in the past.

At the focal point of this group of key terms is “knowledge”: It is most easily confused with other concepts, particularly with information or memory, and it is most controversially discussed when it comes down to agreeing on a definition. This has actually been true for thousands of years, since “knowledge” is not only a key issue for technical experts in radioactive waste management, but also a favored word in everyday language and a technical term (and the seed of its own branch) of philosophy. For the purpose of the RK&M project, it was realized that the glossary definition needed, first and foremost, to make a distinction from information and memory — because in common language “knowledge” blurs widely with these two — and to deliver practical guidance about knowledge ”management”, such as knowledge “transfer” and “preservation”.

The RK&M glossary definition of knowledge given above does not strive for the profoundness of philosophical studies. It is supposed to be appropriate, i.e. in general agreement with the common understanding of the term, useful and unambiguous.[2] In many cases, though, it does not coincide with how the word is actually used in international texts. This is not too surprising since the new definition would be almost superfluous otherwise and the difficulty or impossibility of finding a “one-fits-all” definition has been mentioned. It is still worth noting here because there are some prominent examples, also in the very field of RK&M preservation.

For example, the EC directive (2011/70/EURATOM) [6] legally requires the “national programmes” of the Member States to include in particular “the means to be employed to preserve knowledge of that facility in the longer term”. The Directive does not define the meaning of “knowledge of that facility”, but the term is probably being used as a synonym (according to the RK&M glossary definitions) for “memory and information on the repository”. If the term in the Directive were to be interpreted according to the strict RK&M glossary meaning of “knowledge”, i.e. the “ability to understand, interpret and utilize the relevant data, information and records of the facility” or “insight into the technical details of the facility”, it would indeed be a considerably

[1] These are slightly shortened versions of the RK&M glossary definitions.

[2] The RK&M definition of knowledge is more specific than the IAEA glossary [5] definition, which states in particular: “The term ‘knowledge’ is often used to refer to bodies of facts and principles accumulated by humankind over the course of time. [...] knowledge is gained by acquiring, understanding and interpreting information. [...] Knowledge for an organization is the acquiring, understanding and interpreting of information“.

greater challenge to preserve this on the longer term than “memory and information on the repository”, which is the alternative, more feasible interpretation.

This example shows how the application of the RK&M glossary definitions can help bring out, and reflect on, the conceptual meanings that an apparently simple statement in international guidance may have. For the RK&M project documentation itself, the glossary can effectively prevent this kind of ambiguity from occurring.

CONTROL AND OVERSIGHT

“Control” is a core concept in the international system of radiological protection. It usually refers either to controlling the radioactive source (or some physical parameters influenced by the source) so that it does not disperse, or to controlling access to the source in order to prevent unrecognized radiological exposure and as a safeguard. In the wider sense, control also refers to quality assurance procedures and inspections. In all cases, the application of corrective actions as needed is essential to the concept of control. Whether or not the controlled radioactive material is declared as waste is not relevant to this concept.

The situation changes when radioactive waste is disposed of in a geological repository. When the disposal gallery is backfilled and later the whole repository is sealed, the waste stops being accessible without major effort. Control of the source is no longer possible, at least not in the same direct sense as before when people had the power to apply corrective actions to the source. To take this into account, the concept of “control” of a repository site (“institutional control”) was introduced at an early stage. While “control of a site” may sound quite similar to “control of a source” (with the control being just slightly more indirect in the former case), “control of a site” is in fact very close to being the equivalent of “control of access to a source”. Metaphorically speaking, of the two opposite aspects “controlling impact of the source on humans” (to protect humans) and “controlling access/impact of humans to/on the source” (to protect the source/facility), the latter is the one on which institutional control—as it has been developed in the last two decades—is almost entirely focused. It should also be pointed out that all these forms of control rely on human actions.

Back in the 1980s, when disposal terminology was introduced, this was not a major issue, since long-term management of the waste was considered in a different way, namely that the fate of the repository would, at some point after closure no longer be a matter for the regulators and society to follow up on. Institutional control was discussed as an addition that was disconnected from the time of concern in the safety regulations. Today, the view is that “memory”, “control” and “oversight” of the repository should be planned for, even if the decision to close the repository is based on long-term safety provisions that do not depend on the active care of humans. But can the concept of institutional control deliver this and is the term “institutional control” adequate at all to describe a concept that would deliver this? Can the term be used for times when institutions no longer exist, or exist but no longer carry out the function of controlling?

We observe that other organizations such as the ICRP have recently shown great sensitivity to the terminology issue. Thus, ICRP-122 [3] overcomes some of the terminological ambiguities related to the terms “control” and “institutional control” by defining and using the new, more flexible concept of “oversight” for any activities under the purview of man and by introducing the concept of “built-in controls” for control functions carried out by the system components.

Built-in control is in fact the missing "control of the source" which institutional control does not deliver. Previous terminology used "passive safety" to describe the effects of what is now called "built-in controls". By using the term "control" here and not for the surface-based "institutional control", the new terminology draws the connection to the original radiological protection concept of control. It expresses in a natural way why the built-in controls are crucial from the point of view of radiological protection principles.

To replace not only the concept of "institutional control" by the new concept of "oversight", but also the terminology "institutional control" by the new terminology "oversight" has a number of reasons:

1. "Oversight" may in fact not always strictly mean controlling, i.e. checking and implementing corrective actions.
2. It is generally recognized today that bodies other than the safety authorities and commissioned "institutions" (e.g. political bodies and local communities) play a role in decision-making, meaning that oversight activities are not necessarily in the hands of a single institution.
3. "Oversight" naturally expresses that human activities are required, without which there would be no oversight.

For institutional control, the latter is less clear. Sometimes it is suggested that institutional control may be in place without any human activity: markers, for example, are often termed "passive institutional controls" in international texts. However, a marker does not carry out any control by itself; it can deter but also incite intrusion. While it can *support* institutional oversight, it will no longer have an institutional support function when the institutions have ceased to exist or are no longer committed to oversight. The problem is that "institutional control" suggests that something is being controlled and that this is done by an institution. If neither is the case, then the use of the term in this context is misleading.

The RK&M glossary contains both "control" and "oversight" as key terms. "Control" is defined in such a way that the composite expressions "institutional control", "regulatory control", "intrinsic control" and "built-in control" are all extensions of the same, common definition of "control". Beyond this, the definition of "control" is rather narrow by focusing only on the function of controlling. It thus captures the core meaning of control and prevents calling "controls" objects that only under very particular circumstances or within very limited time frames have the potential of being involved in a controlling process at all. The definition also overcomes the issue of the "active" vs. "passive" duality of institutional control. Since control, as a function, is always active—be it performed by people/institutions or inanimate objects—there is no need to use the adjective "active" and the use of the adjective "passive" is discouraged.

The RK&M glossary definition of "oversight" is in line with the concept of "oversight" elaborated in ICRP-122 [3]. The glossary definition aims to pinpoint the essentials of this concept in a way that is consistent with the previously defined concept of "control". This is required because there are multiple connections between the two concepts:

1. Regulatory controls are measures of (usually direct[3]) oversight.

[3] For the distinction between "direct oversight" and "indirect oversight", see Annex (definition of "oversight").

2. Institutional controls are measures of (usually indirect) oversight.
3. The concept of “built-in controls” complements the concept of “oversight”. Both are cornerstones in the new ICRP-122 [3] reference terminology.

With this level of interconnection, oversight and control not only need to be defined in a consistent manner, there must be also one common concept of “control” supporting regulatory control, institutional control and built-in control at the same time. The complete RK&M glossary definitions of “oversight” and “control” (see Annex) meet these requirements.

CONCLUSIONS

The experience of the on-going NEA Records Knowledge & Memory Preservation project is that terminology needs to be defined carefully when dealing with strategies for the long term. A glossary of key terms [4] is being created during the course of the project which, along with other project materials, has the potential to become a reference for work in this area. In this paper, we have analyzed terminology currently in use in the area of post-repository closure aspects of radioactive waste management. We have focused on three groups of technical terms that are routinely used in the context of medium- and long-term stewardship of geological repositories: “Short term” / ”Medium term” / ”Long term” — “Information” / ”Knowledge” / ”Memory” and finally “Control” / ”Institutional control” / ”Oversight”. The paper shows that clear definitions, as have been fixed in the glossary of the RK&M project, are a precondition for clear and consistent communication.

The first example regarding timescales reveals that expressions like “short term” and “long term” are meaningless if no specific definitions are provided and that connecting these terms to the phases and oversight conditions of the repository helps to structure key RK&M issues. In the second example, we see that when terms like “knowledge” are used in a broad sense, they can merge with closely associated concepts (such as “information” and “memory” in this case). While this may be less of an issue in other contexts, it makes a considerable difference for medium and long term RK&M preservation whether “knowledge” or “memory” is at stake; distinct definitions of similar terms and concepts are therefore required. The third group of concepts is the most complex one, since all four of them—“control”, its variant “institutional control”, another variant “built-in control”, as well as “oversight”—are connected with one another in a number of ways. We find that the prevalent use of the term “[passive] institutional control” for objects or arrangements that are neither in the hands of institutions nor actually perform control is misleading. Also, the “control” concept behind this notion of “institutional control” is different from the radiological protection concept of “control”, which is, however, important also in the post-closure period of a geological repository, as was recently pointed out by the ICRP. The ICRP-122 guidance [3] on radiological protection in geological disposal introduces the concept of “oversight” for the management of repositories, applicable for the short, medium and long term. We make a case for adopting a set of definitions for “control”—including combined expressions such as “institutional control” and “built-in control”—and for “oversight” that is internally consistent. Such definitions would facilitate unambiguous and clear communication within and across expert teams and also between experts and stakeholders.

Apart from pointing out the benefits of using a set of adequate and consistent definitions for work in the area of medium- and long-term preservation of RK&M for geological disposal of radioactive waste, the paper demonstrates why the RK&M project glossary, which is still evolving, is suitable

to become an international reference work.

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ANNEX: RK&M GLOSSARY DEFINITIONS OF KEY TERMS DISCUSSED IN THIS PAPER

Archives:

Collection of records that have been selected for permanent preservation and accessibility due to their continuing administrative, informational, legal and historical value as evidence of the work of the creating organisation or programme.

The term archives also refers to the building or part of a building in which archives are preserved and made available for consultation, as well as to the agency or programme responsible for selecting, acquiring, preserving and making available archives.

Commentary: National archives acquire, preserve and make available for research national records, in particular those created by national agencies. They usually establish policies and procedures for managing these records and assist national agencies in carrying out their records management responsibilities.

Archives differ from libraries in the sense that libraries are usually created with the intention of providing public access to collections of published materials.

Control:

The function of directing, ruling, regulating, restraining or limiting.

Commentary: Control can be carried out by individuals, groups of individuals, institutions and inanimate objects. These are referred to as “controllers”.

Control implies not only checking or monitoring something but also ensuring that corrective or enforcement measures will be taken.

Control is about influencing people or (features of) a technical system.

The transitive verb “to control someone/something” is used with the meaning of “to exercise control over someone/something”

Care should be taken not to confuse the following: (A) control as a function (i.e. the function of controlling), (B) the controller (i.e. the subject/object that exerts control), (C) the means of control (i.e. the device or resource that the controller employs to exert control). While all three can be, and have occasionally been, termed “control” in the past, this glossary definition applies to (A) only. For instance, markers and archives do not perform control functions; therefore they are not “controls”.

Control – composite expressions:

- **Institutional control**: Control by an authority or institution.

- **Regulatory control**: Control by the national nuclear safety authority.

Commentary: Institutional control is broader than, and includes, the regulatory control by the national nuclear safety authority. Various forms of additional institutional controls will take place in parallel to regulatory controls strictu sensu, such as controls by advisory bodies to Government/Parliament, by environmental courts and bodies, by other regulators – local and national – than the nuclear safety one, e.g., the occupational safety regulator, the mining safety regulator, by local committees legally entitled to carry out forms of controls. Additional institutional controls may also take place to fulfill international agreements, e.g., on safeguards.

- **Built-in control**: Control that is exerted by components of the system itself (e.g. buffer, barriers) over technical features of the system such as the influx of groundwater, the temperature of the near field, the release of radionuclides, etc.

- **Intrinsic control**: Same as built-in control.

Commentary: Preferred terminology depends on context. “Built-in” – rather than “intrinsic” – calls attention to human intentionality, but could detract from control by geological features and be misinterpreted as control that has been “built” also literally – while literally, what is “built” is the controller, i.e. the barriers. (The concept of “built-in controls” constitutes a cornerstone in the new ICRP-122 reference terminology. It complements the concept of “oversight”, which is a function carried out by people, with a control function carried out by system components.)

- **Active/passive control**: The “active/passive” wording connected to the word “control” is not endorsed by the RK&M project. Simply use "control".

Commentary: Control as defined in this glossary, is the function of directing, ruling, regulating, restraining or limiting. As a function, control is always active – be it performed by people or inanimate objects.

The active/passive control duality has its origins in the active/passive safety terminology in use in reactor systems, and would need to be interpreted in an analogous way.

Data:

Facts and ideas in the form originally collected.

Information:

Organised data that may or may not be recorded on a medium.

Knowledge:

The result of learning processes. Once acquired in a particular field, knowledge provides insights and skills. It results in the ability to understand, interpret and utilize the relevant data, information and records.

Knowledge – composite expressions:

- **Knowledge preservation**: Preservation of knowledge in a particular field is about maintaining or creating learning processes in that field. An example over the medium term would be the funding of a university chair; another example over the medium term would be facilitating the passing of skills from one generation to another.

- **Knowledge reconstruction**: Over the long term, knowledge will inevitably be diluted as interest fades. Tools / opportunities then need to be devised for knowledge reconstruction. For instance, the Rosetta Stone proved to be a vital tool for reconstructing the knowledge of the ancient Egyptian language.

Long term:

This term refers to the period of time with no repository oversight. This period extends over the time of concern in the safety regulations, typically over hundred thousands of years in the case of high-level waste.

Medium term:

This term refers to the period of time of indirect oversight activities that would follow repository closure. Timescales are in the order of a few hundred years.

Memory:

The awareness of events, people, places and levels of knowledge in the past.

Message:

A significant point that is being conveyed in concise form, either in written language or as symbols and pictograms.

Metadata:

Metadata is additional information describing the context, content and structure of a record, as well as its management through time. Contextual data is a subset of metadata.

Oversight:

Oversight is a general term for "watchful care" and refers to society "keeping an eye" on the technical system and the actual implementation of plans and decisions.

Commentary: Oversight is the new reference concept promoted by the ICRP. Oversight is always by people and has a different, partly broader focus than control. Oversight includes regulatory supervision (such as control and inspection), institutional control (e.g. monitoring), preservation of societal records (such as archiving) and societal memory-keeping of the presence of the facility. Oversight is complemented with the "built-in controls" carried out by the technical system itself. The level of oversight has an impact on the application of the radiological protection system (ICRP-122).

Three "levels" of oversight are distinguished: direct oversight, indirect oversight and no oversight, respectively, during the repository lifetime (see also Fig. 1). In particular:

- Direct oversight of the technical system refers to oversight of the repository when the waste is accessible (without disproportionate effort; depending on system design, this could be equivalent to "gallery not yet backfilled"). Thus, direct oversight implies the availability of measures comparable to the control functions at other licensed nuclear facilities that handle similar radioactive materials.

- Indirect oversight of the technical system refers to oversight of the repository when the waste is no longer readily accessible. This will take place when sections of the repository or the whole of the repository are sealed. Any measurement of the state of the technical system is then by remote or indirect means.

It should be noted that there is a period of overlap between direct and indirect oversight of the technical system, namely while the repository is being developed and not all its parts are yet fully backfilled and sealed. Indirect oversight after closure may include monitoring of release pathways under a variety of institutional arrangements. Land use controls are means to exercise further oversight of the repository at all times and are part of the protective measures that can be enforced.

Record:

A usually unique and original object or a selected piece of data / information that has been committed to a medium and that is kept, together with the appropriate context and structure, for later use.

Short term:

This term refers to the period of time that ends with repository closure. This period includes both the pre-operational and the operational phases of the repository. Timescales are in the order of 100 years.

Very short term:

A period of time consistent with staff stability in role, cycles of organisational change and regulatory expectations of periodic safety reviews. Typical timescales are 10 to 20 years.