

WM2014 Conference Panel Report

PANEL SESSION 114: Records, Knowledge and Memory (RK&M) Preservation for Geologic Repositories of Nuclear Waste

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Panel Reporter: **Russell Patterson**, *US DOE*, assisted by **Tom Klein**, *URS*, and **Abraham Van Luik**, *US DOE*

Panelists

- **Claudio Pescatore**, *NEA-OECD, France*
- **Erik Setzman**, *SKB, Sweden*
- **Roger Seitz**, *SRNL, USA*
- **Jantine Schröder**, *SCK-CEN, Belgium*
- **Simon Wisbey**, *NDA, United Kingdom*
- **Peter Van Wyck**, *Concordia University, Canada*

This session focused on the preservation of records, knowledge and memory across generations as it will pertain to geologic repositories of nuclear waste. This session opened with comments from the co-chairs, followed by a short presentation from each panelist. The audience asked questions of each of the speakers and made comments, using a microphone.

SUMMARY

The complexity of this topic stemming from the difficulties of dealing with long timeframes and ethical judgments was referred to by several speakers as well as commenters throughout this panel discussion.

Jantine Schröder and Claudio Pescatore began the discussion by giving a presentation on Markers and Deep Geologic Repositories –Learning within the OECD/NEA Project on the Preservation of Records, Knowledge and Memory (RK&M) across generations. Accomplishments of the NEA’s RK&M group were discussed. This included a literature survey and a paper on the efficacy of the Japanese tsunami stone markers. The RK&M group has developed a glossary of definitions and defined repository program timeframes into short-, medium- and long-term. Countries that have legal and regulatory requirements were identified (Switzerland and the US). These regulatory and legal requirements have their own definitions for regulatory purposes that relate to the medium- and long-term. The literature studies have shown that misunderstanding of preserved information, and its future neglect, cannot be ruled out whether mediated (using societal institutions to convey information into the future) or non-mediated (markers and monuments that directly interface with the future person) are used.

Review of the effect of the tsunami stones in Japan showed that survival of markers is possible but effectiveness was based on the nature of the local society (stable or transient) and its institutions (educational, mainly). The dual track strategy of mediated information plus non-mediated markers was discussed with identification of a need for a defense-in-depth approach. The RK&M Project seeks to create guidance for such an approach.

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There are no easy approaches to the RK&M preservation challenge. An overall systematic approach is required, and it was observed that there are many questions yet to be asked and answered.

Erik Setzman gave a presentation on Preservation of Information and Communication with Future Generations. Discussion of the Forsmark Repository closure in the 1990's and early 2000's was reviewed. Current actions by the Swedish government include involvement with NEA-OECD, cooperation with ANDRA (France), archaeological and language research and techniques for spreading awareness of the repository. The conclusions so far from the work in Sweden primarily involves avoiding inadvertent human intrusion and giving future societies the ability to make their own well informed decisions. Continued international cooperation is suggested to establish a framework of principles and guidelines, to reach consent on time perspectives and stepwise requirements, and the need for transparency at every step in managing and closing a repository.

Areas and concepts of interest include the dual track approach, self-marking sites, national and international redundancy of archives, monitoring to keep knowledge and memory alive, and engaging local communities, new societal groups and institutions, and even specific key individuals with influence and decision authority.

Roger Seitz provided an update on approaches for records, knowledge and memory as it applies to near-surface nuclear waste disposal in the United States. The regulatory framework for nuclear waste disposal by the Department of Energy, State and Federal requirements was reviewed. The Department of Energy Office of Legacy Management identified numerous locations of anticipated legacy management sites across the United States and Puerto Rico. The current institutional controls were discussed along with current Department of Energy site-preservation activities. DOE activities included active public outreach, commitments for active institutional controls, visitor centers, and deed restrictions. Institutional controls are generally assumed to only last 100 years in terms of safety analyses, even though requirements may be for site protection to be provided 'in perpetuity.'

Peter Van Wyck proposed five areas of discussion. The first is that in retrospect there is no more space to dispose of waste on the surface and that waste is our cultural heritage. We are addressing this question of development of markers and signs as a technical question and response. To develop a "sign that can shout louder in order that it can mean longer." Second, "the meaning of every message rests ultimately with the receiver of that message – in this case, the unknown addressee in the future – and not with its source." The receivers of the message must be able to produce a meaning from the message. Third, custodianship of these markers or signs will require a "living witness" if possible. Fourth, "To be custodians, guardians, curators of this massive and distributed radioactive museum of non-art (Morton), requires a seismic shift in thinking from the impassive didactics of markers, to an active and ongoing process of curations, interpretation, reinterpretation and dissemination. The Records, Knowledge and Memory initiative moves in this direction..." And fifth, "what is the threshold – the semiotic dosage – in the present, to ensure the transmission to the future? How much and how long? After all, if you remind us too much, we will not listen, and thus forget. But then, if you do not

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remind us, there will have been nothing to listen to, and we shall certainly have already forgotten.”

Jantine Schröder gave a presentation looking at Records, Knowledge and Memory as a Socio-Technical challenge. The flow of technical content must be in coordination with the flow of social change. Radioactive waste management strategies must integrate technical and social concerns and constraints. The current approach to geological disposal is with passive safety, requiring a multi-barrier system that is technically safe. The challenge is to solve a technical problem with a solution that will be able to accommodate future social change with its own inherent uncertainties. The RK&M project offers a valuable learning opportunity for all aspects of radioactive waste management.

Simon Wisbey discussed the current need for a formal process for radioactive waste management employees to share their expertise and pass on knowledge before they leave an organization. This process is unique to the United Kingdom. This is done by shadow working where a new employee shadows the exiting employee for a period of time prior to the latter's release. This type of activity will ensure that knowledge is not only passed on through generations, but also “adjusted” to the changing social environment. Another process used in the United Kingdom is knowledge harvesting where employees are required to document their knowledge through interviews, mapping, etc... resulting in a written record of the knowledge they used in performing their work and making decisions.

Summary

At the end of the Panel Session, the panel was asked to answer two questions. The first, what is their impression of this panel topic? And second, should there be more sessions like this in the future, like in 2016? The answers are as follows:

- Simon Wisbey: Re-emphasis on the low risk being dealt with and awareness that we are trapped in a current social context. As for a new session on this range of topics? Yes, when there are advancements to report and discuss.
- Jantine Schröder: I liked the differing opinions on risk and ethics. We should continue the discussion. Mid-term time is becoming the focus, not short term or long term. There needs to be more social discussion. Yes, more sessions are needed to discuss practices and discussions that are ongoing.
- Peter Van Wyck: We need to elaborate more on the ethical questions. Yes, more sessions are needed to continue the discussion.
- Roger Seitz: I was interested in the discussion on managing uncertainties and the use of the facility as the marker. Also the discussion on living knowledge and the facility as part of the local community. Yes, more sessions are needed to discuss how RK&M will fit into a safety case.
- Erik Setzman: This is a complicated topic but we must be realistic. We need to have joint discussions on what really needs to be looked into on this topic. Yes, more sessions will help to discuss how to implement the step-wise decision process.

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- Claudio Pescatore: We need more discussion on marker and markings. Also on adding value to the community, safety by inclusion and nuclear waste as a cultural heritage. Yes, we should have another session in two years.

Pulsing the panelists as well as the audience made it clear that most thought the topics covered in this session were worthy of continued work and discussion, but another panel session of this kind ought to occur at WM 2016.

This is not to suggest, however, that there ought to be no papers given on specific topics related to the RK&M Project at WM 2015 relevant paper sessions. One reason for not having a panel session in 2015 is that it would be too soon after a conference in Verdun, France, sponsored by the NEA's RK&M Project in September of 2014: "Constructing Memory An International Conference and Debate on the Preservation of Records, Knowledge and Memory of Radioactive Waste across Generations," Centre Mondial de la Paix, Verdun, France, 15-17 September 2014.