

WM2016 Conference Panel Report

PANEL SESSION 58: Progress on Deep Repository Programmes Around the World

Co-Chairs: Andrew Griffith, *US DOE-NE*
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Panel Reporter: Abraham Van Luik, *US DOE-EM*

Panelists:

1. **George Dials**, *Pajarito Scientific Corporation*
2. **Gérald Ouzounian**, *Andra (France)*
3. **Thilo Von Berlepsch**, *DBE Technology GmbH (Germany)*
4. **Bruce McKirdy**, *Radioactive Waste Management (United Kingdom)*
5. **Leif Eriksson**, *Nuclear Waste Dispositions*

About 60 attendees listened to presentations by the panelists and asked questions and made comments during this session. This panel session represented a mixture of advanced repository programs either in licensing or close to licensing, and ones still in the site selection phase. The panelists discussed challenges being faced and lessons being learned. In terms of finding a repository site, technical issues were not considered as significant as societal aspects, although an interesting aspect that mixes the two is the need for a potential volunteer community to know whether or not its geology is acceptable. One does not want to stick one's neck out, politically, and volunteer, to later have the proposed geology be found inadequate.

Summary of Presentations

George Dials reviewed the history of the repository siting program in the United States starting in the 1970s when Lyons, Kansas was under consideration and was studied as a potential repository site in salt. Technical as well as political difficulties were encountered. A decision to not recycle aggravated the volume of waste to be disposed of. In that same 70s timeframe, a decision was made to separate alpha bearing and beta/gamma bearing wastes and plan separate repositories for each waste type. As Lyons, Kansas was abandoned as a potential site, Carlsbad, New Mexico, volunteered to host an alpha waste repository for weapons waste, which resulted in the Waste Isolation Pilot Plant being located there.

The 1980s saw site definition and recommendation activities which ended with the Nuclear Waste Policy Amendments Act of 1987, designating the Yucca Mountain Site in Nevada. Nevada did not take kindly to being chosen by Congress. Nevada was then already very different from the more risk informed citizenry of Southern New Mexico where mining and the oil and gas industry were major components of the economy. Northern New Mexico opposition faded with time.

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Technology has improved on all fronts from waste production, handling, and treatment perspectives, so technology is not the issue impeding progress on repositories. Socio-political aspects rule the day, controlling and largely impeding forward progress.

WIPP was opened by decree, but the permitting process by the Environmental Protection Agency was a consent-based process. Now there is about 70% support across New Mexico, including support from Native American tribes near Los Alamos National laboratory, who want that site cleaned up.

Based on this history, Mr. Dials offered his advice for DOE-NE (the Nuclear Energy part of DOE charged with designing a Consent Based Siting program): "...do not hold Consent Based Siting meetings only in population centers."

Due to time constraints there was no discussion of this presentation

Gérald Ouzounian described the proposed CIGEO Project repository. Waste would move into the repository via a 4.2 km long ramp at a 12% angle, requiring a funicular type conveyance system to assure safety. Low and Intermediate-Level Waste will be placed in rooms dedicated to those waste types in boxes that will be stacked. High-Level Waste cells are 100 m long and 70 cm tall, accepting steel, over-packed, high-level waste containers in a horizontal configuration. The repository will be built at a depth of 500 meters in an impermeable layer of clay more than 130 m thick. There will be 65 meters of impermeable clay above and below the repository, so there is no need for exotic waste packages.

Retrievability is the tool for reversibility. Decision-making is to be progressive over ~120 years of operations. The future can change the process or even reverse it. There is an ability to move to the direct disposal of spent fuel if need be. To assure the opportunity for future decision-making, to introduce new solutions, perhaps, the repository will start with a pilot phase. Reversibility is by necessity time limited. As presently considered it represents only a few percent of the life cycle cost.

There was discussion about the uncertainties in the life cycle cost estimates, which were stated to now be more firmly in hand. There was a question about the licensing process and regulatory oversight and assurance was given that there would be regulatory oversight after licensing.

Thilo Von Berlepsch mentioned the German Site Selection Act of 2013 and how it restarted the Back End ("Site Selection Procedure for Disposal Sites") siting process. This process is to select sites for characterization. An advisory group has been stood up to help define how the Act is to be implemented. The advisory group report is due by the end of June of 2016.

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Expected site selection criteria will include requirements for error-correction/reversibility; for organizational structure and approach; and for public involvement.

In addition, BfE (Bundesamt für kerntechnische Entsorgung) has created a new Disposal Commission.

The status of German radioactive waste management facilities was outlined:

- a. Asse – retrieval of all LLW historically emplaced is planned
- b. Gorleben – (for heat emitting waste) is on hold, with no planning allowed
- c. Konrad – (for non-heat emitting waste) is under construction
- d. Morsleben – is being decommissioned.

There was a question about the plans for Asse, and the answer was that the retrieval ordered by the regulatory agency with jurisdiction, is under study.

Bruce McKirdy gave a rather detailed account of the history of radioactive waste management in the UK. In 1976 the “Flowers Report” suggested there be no new reactors until a path forward on radioactive waste management is established. In 1983 the London Dumping Convention stopped seabed disposal, the Nirex corporation was formed as the repository siting entity.

The Nirex-proposed a high-level waste site as well as four shallow land burial sites, which were all abandoned for various reasons over the next decade. In 1997 the rock characterization facility at Sellafield was cancelled. By 2006 all Nirex activities were subsumed under the Nuclear Decommissioning Authority, which in turn created the Radioactive Waste Management (RWM) organization to perform this work.

In 2001 the government published its “Managing Radioactive Waste Safely” program description. This was followed by an advisory committee in 2003 that reported out in 2006 recommending a deep geological disposal solution be pursued through consent-based siting.

A Consent Based Siting White paper was published by RWM in 2008. Communities were made aware of the program and two communities in Cumbria formed a partnership to be considered with the county they were both part of. Then came a vote and the two communities voted to continue with the program but the county in which they both resided said no, and the county’s vote stopped the siting effort.

Feedback from this effort suggested that ~70% of the populace in the villages needed some prior reassurance that their geology showed promise before they would commit to participating. No sense creating division over this issue if some preliminary studies can already eliminate them as candidates. The stated withdrawal right was mistrusted. There was a need to know the planning regime in advance as well as the proposed waste inventory and benefits.

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In part in response to this feedback, the program of siting has a preliminary phase of geologic screening (2 years), a 15-20 year siting process (starting in 2017), and then an operating life of a hundred years or more.

After the presentation, there was no time for discussion, but in response to a remark it was noted that the outcome of the upcoming UK referendum on European Union membership was an unknown, potentially affecting many government decisions and programs.

Leif Eriksson described two Nordic repository programs. The Finnish Onkalo repository for spent fuel is under construction. It is co-located with the encapsulation plant and near the Olkiluoto Nuclear Power Station. Operations are expected to start in 2024. The inventory is to be 65,000 metric tonnes of uranium. The KBS3-Vertical emplacement design is being implemented.

The repository for spent nuclear fuel in Sweden at Forsmark is in its licensing phase, involving first the Swedish nuclear safety regulator (SSM) and then the Environmental Court. A 2030 repository opening is planned currently. The encapsulation plant is to be located at Oskarshamn. Both Forsmark and Oskarshamn are locations with nuclear power reactors.

At the end of the Eriksson presentation the session was over its allotted time by a few minutes and was closed without further discussion.