

The staff demonstrated that risk-informed, performance-based regulatory concepts can be implemented transparently in a regulatory review, and that a complex performance assessment can be thoroughly reviewed and used to assess the safety case for a one-million-year period of performance. Although professional disagreements occurred during the review, having objective technical advisors outside of the review teams was critical to implementing a process that achieved consensus on issue resolution. Staff's independent technical investigations during pre-licensing were extremely useful in developing risk insights and confirming the acceptability of the applicant's methods and results, but care was needed to ensure that this information was not substituted for the applicant's safety case. More information about NRC staff's review of the DOE license application, including links to the technical evaluation reports, is available at www.nrc.gov/waste/hlw-disposal/yucca-licapp.html.

References

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NRC, 1987, "Rule on the Submission and Management of Records and Documents Related to the Licensing of a Geologic Repository for the Disposal of High-Level Radioactive Waste; Establishment of an Advisory Committee for Negotiated Rulemaking," *Federal Register*, Vol. 52, No. 150, August 5, 1987, pp. 29024–29030.

Nuclear Waste Policy Act of 1982, as Amended, Pub. L. No. 97-425, 96 Stat. 2201 (1983).

U.S. Code of Federal Regulations, "Rules of Practice for Domestic Licensing Proceedings and Issuance of Orders," Part 2, Chapter I, Title 10, "Energy."

U.S. Code of Federal Regulations, "Disposal of High-Level Radioactive Wastes in a Geologic Repository at Yucca Mountain, Nevada," Part 63, Chapter I, Title 10, "Energy."

Session Report – F. Boydon (UK-ONR)

This report summarises presentations nationally and identify specific areas of interest followed by general comments observations out of all the presentations in the session.

France

Recognised good progress being made towards an application in 2015 and planned start of operation in 2025 and that this would be preceded by a public debate in 2013.

Aspects of specific interest

- Approach to reversibility
- Closure not part of license application but by specific decree
- List of regulator requirements including organisational structure
- Stepwise phased approach

Regulator has its own independent R&D programme to enable it to take a position on the R&D carried out by the implementer especially with respect to long term issues and the use of surveillance specimens.

Regulator needs clarity that implementer has adequate funding.

Early engagement between regulator and implementer to clarify expectations but need for care to ensure regulator does not become part of the design process with the result that it assesses its own designs and suggestions.

Regulator is updating its regulations on procedures for waste conditioning design and waste acceptance. It would be interesting to know what aspects of existing regulations are considered inadequate.

Canada

Two prospective repositories are being looked at, one for primarily LLW (90%) at Bruce which will be licensed to Ontario hydro and the other for spent fuel which will be licensed by the Nuclear waste management organisation (NWMO). NWMO is likely to design both.

It is interesting to note the differences in the 2 sites, e.g.

- Available skills
- Potential explosives at an existing nuclear site
- Assertion that the facility is not a mine as no mineral is being extracted

It is good advice to work with local authorities and regulators at an early stage to clarify what regulations will apply and which will not.

Again the value of a stepwise approach to design and operation was emphasised.

Switzerland

There is a legal requirement for all nuclear waste to be disposed underground. Two facilities are being envisaged but these could be combined.

Currently the siting process is underway and 20 potential sites in 6 regions have been identified.

A construction licence is planned for the underground research laboratory for 2020.

Current focus is on post closure safety and work to develop the design is progressing in a step wise manner.

The workshop supported the approach, "Decide as late as possible but as early as necessary."

The design was being considered in 3 integrated areas,

- Surface facilities – where it was unlikely anything new would arise except for dealing with the required integrity of the canister seals.
- The access from the surface to the repository where again nothing particularly new was anticipated, and
- The disposal facility which needs to focus on minimisation of damage to the surrounding rock infrastructure and to characterise the rock, modifying the design as necessary.

It was noted that the Swiss legal basis requires regulators to produce guidelines and a waste management programme for the waste producers. These guidelines will cover issues such as the possible need for testing, implying the removal of backfill and future monitoring of the facility.

It was also noted that there is a requirement for a justification of staffing and organisational structure for an operational license.

General Comments

All countries endorse a stepwise phased approach as being necessary to iterate designs in the light of developments such as geological findings.

Early engagement with regulators is encouraged but regulators need to be cautious to avoid becoming involved in the design process themselves.

Regulators need to be clear about their expectations including any R&D requirements especially how to deal with ageing effects. Is it necessary for regulators to have their own independent research carried out and if regulators do perform research it is important to base regulatory judgements on the research results provided to them rather than their own research.

Information management both in terms of volume, and what is necessary to retain are likely to be important issues as will the format of the information to ensure that it is available for the desired time period.

Most regulators consider that the organisational structure of the license applicant is important but this structure is likely to evolve with time from that of a design organisation to one of a constructor/contractor to an operator (and constructor combined). How this evolution is managed will also be important.

The challenges of a deep geological nuclear waste repository are likely to be novel and it is important that regulators consider in advance what these might be and implement suitable recruitment and training processes for its staff.