



U.S. Department of Energy
Office of Civilian Radioactive Waste Management



Update on TSPA Peer Review

Presented to:

Nuclear Waste Technical Review Board

Presented by:

Dr. Abraham Van Luik

Senior Policy Advisor for Performance Assessment

U.S. Department of Energy

Yucca Mountain Site Characterization Office

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Las Vegas, Nevada

Outline

- **Background**
- **Status and Schedule**
- **Preliminary Results**
- **Impressions**

Background

- **Consensus review by Expert Team organized by a Joint Secretariat formed by Nuclear Energy Agency (NEA) and International Atomic Energy Agency (IAEA)**
 - **IAEA participates in the context of that Agency's statutory functions to perform services useful in research on, and development or practical application of, atomic energy for peaceful purposes, and to establish international standards of safety and provide for their application**
 - **NEA participates under its mandate for improving and harmonizing the technical basis for dealing with nuclear waste related issues among its member countries**



Background

(Continued)

- **Primary subject of review is Total System Performance Assessment - Site Recommendation (TSPA-SR)**
 - Supporting documents made available (e.g., Process Model Reports and Analysis Model Reports)
 - Documentation of subsequent work also made available (e.g., Supplemental Science and Performance Analyses Uncertainty Evaluation)
- **Review not under Quality Assurance program**
 - Cannot be used for product acceptance or validation



Status and Schedule

- **Two meetings held in Las Vegas (June, August)**
- **Three exchanges of questions and responses by email between meetings**
- **August meeting served to clarify questions, as well as responses**
 - **E-mailed communications less effective, did not discover several misunderstandings until face to face exchange**
- **Preliminary results orally presented at Las Vegas meeting on August 31**
- **Executive Summary due to DOE end October**
- **Final report due to DOE late January 2002**



International Review Team

Tonis Papp	Chairman
David Hodgkinson	Consultant/Writer
Desmond M. Levins	Overview and review abilities
Jesus Alonso	PA/SA & Scenario Analysis
Emmanuel Smailos	Material sciences
Mel Gascoyne	Geochemistry/transport
Ghislain de Marsily	Hydrology
Yasuhisa Yusa	Geology
Claudio Pescatore	OECD/NEA
Phil Metcalf	IAEA



Unofficial Highlights of Preliminary Results

- **Only the international review team can report its findings prior to the final report**
- **These are the recollections of one person in the audience where the team gave an overview of very preliminary impressions**
 - **TSPA-SR methodology conforms to international practice**
 - **TSPA-SR is appropriate for addressing the regulatory compliance requirements that are the basis for the site recommendation decision**
 - **TSPA-SR and process models need more work, however, if it is to provide regulatory “reasonable assurance” of safety, or is to become part of a comprehensive safety case with considerations that go beyond regulatory compliance**



Unofficial Examples of Detailed Preliminary Observations

- **Good choices were made for waste package and drip shield materials, but more experimental work is needed to provide firmer basis for modeling**
- **Much questioning of cladding model**
- **Movement of radionuclides out of waste packages through continuous films of water is incredible, not just conservative**
- **Unsaturated flow and transport modeling is good, but active fracture model needs validation**
- **Saturated zone flow and transport modeling needs additional site specific work and a new regional model (1997 model ‘substandard’)**



Other Unofficial Examples of Detailed Preliminary Observations

- **Uncertainties need an overall strategy for evaluation and reduction**
- **Some large uncertainty ranges conservative at process level, but may be non-conservative at system level (dose dilution, needs evaluation)**
- **Volcanism seems to be handled appropriately**
- **More could be done to evaluate human intrusion**
- **Several FEPs (features, events and processes) were suggested that need evaluation**
- **Documentation is not yet sufficiently transparent**



Impressions

- **The review was technically critical, but balanced**
- **Experience level of reviewers was apparent early in process**
 - **Meaningful areas of weakness quickly identified**
 - **Instances of critical observations based on known problems faced in other nations' evaluations of long-term safety**
- **Important issue for review team was ability to compare safety evaluations of different nations' potential repositories**
 - **U.S. performance measure does not allow such comparison (time constraint combined with locational specificity is unique)**
 - **Alternative performance measures suggested for greater insight (fate of radionuclides beyond 10,000 years and 20 km)**

