Presentation to NWTRB

The joint NEA/IAEA International Peer Review of the

Yucca Mountain Total System PA for the Site Recommendation

Pahrump
30th of January 2002
Tönis Papp, IRT chairman

Most recent Peer Reviews under NEA and IAEA auspices

- Performance assessment of the WIPP (USDOE) NEA/IAEA 1997
- Methodology for scenario and model development (UK) NEA 1999
- H-12: Technical basis for HLW disposal study (JAPAN) NEA 1999
- Site Selection procedure for LLW/ILW (Hungary) IAEA 2000
- SR-97 Post-closure safety (Sweden) NEA 2000
- Biosphere modelling for YMP (USDOE) IAEA 2001

The Review Team

Tönis Papp, Sweden	Chairman
Jesús Alonso, Spain	
Ghislain de Marsily, France	
Melvyn Gascoyne, Canada	
David Hodgkinson, UK	Technical writer
Des Levins, Australia	
Phil Metcalf, IAEA	
Claudio Pescatore, OECD/NEA	
Emmanuel Smailos, Germany	
Yasuhisa Yusa, Japan	

Objective:

To critically analyse PA methodology

- Compare methods used by USDOE with international current or developing recommendations, standards and practices
- Statement regarding adequacy of overall PA approach for supporting the site-recommendation decision by the secretary of Energy
- Detailed recommendations for improvements to help PA better support next programmatic decision-point in case the site is recommended

International Perspective

- **YM setting - unusual**
  - Closed basin and Oxidising environment
- **Rationale**
  - Normally no release from redundant EBS for 10 000 years
  - Focused on TSPA and numerical "Likely Compliance"
  - Approach has basis, but alternatives exist
- **Methodology - Conforms to int.´l practice**
  - More probabilistic, Less natural analogues
- **Regulation - more prescriptive than is common**
  - 10 000 years, Stylised intrusion, Defined biosphere

Statement by IRT (1)

- While presenting room for improvement, the TSPA-SR methodology is soundly based and has been implemented in a competent manner. Moreover, the modelling incorporates many conservatisms, including the extent to which water is able to contact the waste packages, the performance of engineered barriers and retardation provided by the geosphere.

- Overall, the IRT considers that the implemented performance assessment approach provides an adequate basis for supporting a statement on likely compliance within the regulatory period of 10 000 years and, accordingly, for the site recommendation decision.

Statement by IRT (2)

- On the basis of a growing international consensus, the IRT stresses that understanding of the repository system and its performance and how it provides for safety should be emphasised more in future iterations, both during and beyond the regulatory period. Also, further work is required to increase confidence in the robustness of the TSPA.

Recommendations for future assessments

- 27 recommendations in various areas
  - **Overall system methodology**
  - **Sub-system methodology**
  - **Disruptive events & human intrusion**
  - **Documentation**

Overall system methodology

- Safety Case
  - A higher level document to address strategies for safety, confidence, compliance, stepwise decisions
- Sensitivity analysis
  - IRT favourably impressed by the quality
  - Could be further developed to build understanding
- Systems understanding
  - Equal importance to compliance
  - Requires realistic (non conservative) analysis
  - Conservative analysis for compliance

Sub-system methodology

- Engineered barrier materials
  - In line with international best practice, start long term testing
- Transport within EBS
  - Mechanism overly conservative and complex - possibly not credible
- Saturated zone
  - IRT concerned about level of knowledge, flow model not "state of the art"
  - Significant effort for new data, calibrations and model