

**ADVISORY COMMITTEE
ON NUCLEAR WASTE
MEETING WITH NRC
COMMISSIONERS**

**G. M. Hornberger
March 20, 2002**

INTRODUCTION

- **Focus on high-level waste issue resolution program and key technical issues (KTIs)**
- **Highlights from recent letters**

INTRODUCTION (Cont'd)

- **ACNW'S perspective on KTIs**
- **Observations from review of NRC research program**

ISSUE RESOLUTION AND SUFFICIENCY REVIEW

ACNW REVIEW

- **Features vertical slice reviews of U. S. Department of Energy's (DOE) site recommendation (SR) for Yucca Mountain**
- **Evaluates staff's tools, guidance, and capability**

MAIN MESSAGE

- **ACNW agrees with staff's findings**
- **ACNW concerns relate to adequacy of information for possible License Application**
 - **Additional information is needed from DOE**

OBSERVATIONS

- **Staff is well-equipped to conduct reviews of DOE products, including possible License Application**
- **Issue resolution process is sound**

OBSERVATIONS (Cont'd)

- **Documentation needed on how risk insights were used**
 - **Publication of Yucca Mountain Review Plan and Integrated Issue Resolution Status Report**

OBSERVATIONS (Cont'd)

- Illustration that Yucca Mountain Review Plan is risk – informed**
- Clarification on use of conservatism**

KTI PROGRAM STATUS

MAIN MESSAGE

- **Major issues confronting repository licensing identified**
- **Areas requiring backup information identified**
- **Integration across KTIs still of concern**

KTI AGREEMENTS

- **293 agreements but only few significant issues**
- **Agreements vary greatly in scope**
- **Issue resolution process is working**

MOST IMPORTANT KTIs

- **Container Life and Source Term**
- **Igneous Activity**
- **Unsaturated and Saturated Flow under Isothermal Conditions**
- **Total System Performance Assessment (TSPA) and Integration**

TOTAL SYSTEM PERFORMANCE ASSESSMENT

B. J. Garrick

VERTICAL SLICE REVIEW BASIS

- **Principal drivers of performance**
- **Extent to which results are risk informed and evidence-based**
- **Transparency, traceability, and defensibility of the results**

MAIN MESSAGE

- **Backbone of safety case**
- **Risk informs licensing process**
- **Ensures integration between various KTIs**

MAIN MESSAGE (Cont'd)

- **Gain understanding of differences between the NRC and DOE analyses – Enhance Public Confidence**

ACNW Supports TSPA

Provided:

- **Performance measures are well-defined**
- **Analysis models are realistic**
- **Results, including uncertainties, are quantified**
- **Quantification is evidence-based**

CONCLUSIONS

- **NRC's Total-system Performance Assessment (TPA) code is adequate as a confirmatory tool**
 - **Simplicity of the code allows evaluation of scenario-based approaches**

CONCLUSIONS (Cont'd)

- **DOE's TSPA complexity inhibits confidence in the results:**
 - Inconsistent assumptions**
 - Mix of conservative and non-conservative elements**

CONCLUSIONS (Cont'd)

- Linkage between assumptions and supporting evidence lacks transparency**
- Margins of safety not known**

CONCLUSIONS (Cont'd)

- **DOE's TSPA-SR — Does not answer “What is the Risk?”**
- **Post TSPA-SR documents indicate more realistic performance assessment**

RECOMMENDATIONS

NRC ensure that DOE:

- **Performs realistic analyses (evidence-based)**
- **Improves traceability**
- **Abstracts a simplified model**

RECOMMENDATIONS (Cont'd)

NRC Uses TPA Code for:

- **Sensitivity analyses**
- **Enhancing realism**
- **Quantifying uncertainties**

RESEARCH

R. G. Wymer

INTRODUCTION

- **2002 ACNW Annual Report is based on:**
 - **staff presentations**
 - **expert panel report**
 - **discussions with Center for Nuclear Waste Regulatory Analyses**
 - **ACNW-sponsored workshop**

FOCUS OF PROGRAM

- **Office of Nuclear Regulatory Research (RES) -sponsored work emphasizes modeling of flow and radionuclide transport**
- **Office of Nuclear Material Safety and Safeguards (NMSS) - sponsored work focused on proposed Yucca Mountain Repository**

PRIORITIZATION

- **Allocation of resources between reactors and waste arenas needs a high-level policy decision**

PRIORITIZATION

- **Framework for prioritization process should utilize formal decision theory methodology**
- **Analytical Hierarchy Process is a useful innovation but needs to be improved**

OBSERVATION

- **RES radionuclide transport plan prepared**
- **RES program needs modest component of long-term anticipatory research**

RESEARCH WORKSHOP

- **Use lessons learned at closed facilities**
- **Consider research by others**
- **Leverage resources by collaboration**
- **Peer review the research**

CONCLUSION

- **RES-supported work is very high quality and appropriate**
- **NMSS-supported work at CNWRA is well managed, very high quality, and addresses important issues**