

NOV 08 1993

Mr. Dwight E. Shelor, Associate Director
for Systems and Compliance
Office of Civilian Radioactive Waste Management
1000 Independence Avenue, NW
U.S. Department of Energy RW-30
Washington, D.C. 20585

Dear Mr. Shelor:

SUBJECT: PROPOSED TOPICS FOR FUTURE INTERACTIONS

Enclosed is the Nuclear Regulatory Commission staff's list of proposed topics for discussion at the November 18, 1993, interactions scheduling meeting. The NRC staff is providing the U.S. Department of Energy (DOE) with this information for its use in preparing for this meeting. The format used to identify the proposed topics is consistent with that agreed upon at previous interactions scheduling meetings. This meeting is scheduled to begin at 8:30 a.m. (EST), and will be held in conference room 5A092 of DOE's Forrestal Building, Washington, D.C.

Enclosure 1 is a list of proposed interaction topics that covers the six month period from January to June 1994. Enclosure 2 represents a list of technical exchanges that the NRC staff would like to have scheduled during the spring 1994 interactions scheduling meeting.

In order to conserve resources, NRC advocates scheduling consecutive interactions on successive days at the same location when staff of similar technical disciplines are required to be involved. This is the case in May, where NRC proposes the following technical exchanges: "DOE's Approach to the Characterization of Faults and Fractures at the Yucca Mountain Site," and "Stratigraphy, Structure, and Rock Properties Along the North Ramp of the Exploratory Studies Facility."

Although the interactions listed in Enclosure 1 have proposed time frames and locations, definitive dates and locations need to be established for each of the selected technical exchanges at the meeting.

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Mr. Dwight Shelor

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If you have any questions on this subject, please contact the responsible NRC Project Manager, Mr. Robert D. Carlson. He can be reached at (301) 504-2435.

Sincerely,

Original Signed by *William Pearson*

for

Joseph J. Holonich, Director
Repository Licensing and Quality
Assurance Project Directorate
Division of High-Level Waste
Management
Office of Nuclear Material
Safety and Safeguards

Enclosures: As stated

- cc: R. Loux, State of Nevada
- T. J. Hickey, Nevada Legislative Committee
- C. Gertz, DOE/NV
- M. Murphy, Nye County, NV
- M. Baughman, Lincoln County, NV
- D. Bechtel, Clark County, NV
- D. Weigel, GAO
- P. Niedzielski-Eichner, Nye County, NV
- B. Mettam, Inyo County, CA
- V. Poe, Mineral County, NV
- F. Sperry, White Pine County, NV
- R. Williams, Lander County, NV
- L. Fiorenzi, Eureka County, NV
- L. Vaughan II, Esmeralda County, NV
- C. Shank, Churchill County, NV
- E. Holstein, Nye County, NV
- L. Bradshaw, Nye County, NV

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. NRC'S PROPOSED INTERACTIONS FOR JANUARY - JUNE 1994

Topic: "Evaluation of the Potentially Adverse Condition 'Evidence of Extreme Erosion during the Quaternary Period' at Yucca Mountain, Nevada" (Erosion Topical Report, March 1993) (Technical Exchange)

Objective: To discuss preliminary staff concerns developed during the review of the subject topical report and to visit, in the field, specific locations/features relevant to the staff's preliminary concerns. The purpose of the technical exchange is to better understand the field relations used to support the analyses presented in the topical report, thereby possibly expediting the review process. This technical exchange would be a precursor to facilitate development of the safety evaluation.

Scope: This technical exchange would focus on concerns and questions resulting from the staff's review of the subject topical report. The scope should include discussion of the staff's concerns as well as field visits to key exposures and sample localities that form the basis for analyses made in the DOE report.

Date: February 1994

Location: Las Vegas, NV/Yucca Mountain, NV

Topic: DOE Research and Site Characterization of Unsaturated Zone Hydrology (Technical Exchange)

Objective: To discuss technical issues related to the characterization of unsaturated zone hydrology

Scope: This technical exchange will focus on discussions of DOE's unsaturated zone hydrologic research (prototype testing) and how it is being coordinated with site characterization data collection activities. In addition, the discussion should include an update of the need and methods for characterizing the Calico Hills formation. The technical exchange should address any hydrologic testing that is being done to collect site data, results to date, problems encountered in both laboratory and field testing such as studies of fracture and matrix properties, problems encountered in modelling the unsaturated zone, and discussion of both research and site characterization priorities.

Date: March 1994

Location: Las Vegas, NV or Denver, CO

Topic: Field Heater Experiments to Resolve Issues Associated With Coupled Thermal-Hydrologic-Mechanical-Chemical (THMC) Processes (Technical Exchange)

Objective: To discuss technical issues needing experimental resolution for coupled THMC processes, and the adequacy of current DOE plans to resolve these issues.

Scope: This technical exchange will focus on current DOE plans to resolve technical issues associated with coupled THMC processes through field heater experiments (Fran Ridge large block test by LLNL which is outlined in Section 8.3.4.2.4.4 of DOE's SCP; and the ESF heated block test, canister-scale heater test, thermal stress test, and heated room test by SNL which is outlined in Section 8.3.1.15.1.6 of the SCP). The discussion will include the definition and assessment of thermally-driven coupled THMC processes which need experimental resolution, and the assessment of the feasibility of successful resolution based on

current experimental plans being developed primarily by SNL and LLNL. The discussion will include how numerical analyses and laboratory-scale experiments will complement and support planned field heater tests. Discussion will focus on technical issues effectively resolved by previous heater tests (SNL G-Tunnel, LLNL G-Tunnel, and Climax) and specific technical issues remaining to be resolved. The discussion will address the ability of planned tests to develop new information which has been identified by both DOE and NRC as being necessary to support a license application.

Date: April 1994

Location: Las Vegas, NV or Washington, D.C.

Topic: DOE's Approach to the Characterization of Faults and Fractures at the Yucca Mountain Site (Technical Exchange)

Objective: To discuss DOE's progress in the characterization of faults and fracture networks at Yucca Mountain as described in the Site Characterization Plan (SCP) and Study Plan 8.3.1.4.2.2.

Scope: This technical exchange would focus on DOE's efforts to characterize faults and fracture networks at the Yucca Mountain site. In its review of Study Plan 8.3.1.4.2.2 (Rev. 2), the staff notes that there are several activities still in the testing phase in which DOE will assess the adequacy of data collection methodologies. The purpose of this technical exchange would be to update the staff on the progress made in the characterization of faulting and fracture networks, including the final results of photogrammetric mapping of the Exploratory Studies Facilities (ESF) starter tunnel, the results of testing the seismic tomography/vertical seismic profiling methods, and the results of surface fracture network studies performed on Fran Ridge. The scope of the exchange would include discussion

on characterization of faults and fractures, and how these data are being incorporated into models used for geohydrology, geology, thermomechanical testing, and engineering design.

Date: May 1994

Location: Las Vegas, NV

Topic: Stratigraphy, Structure, and Rock Properties Along the North Ramp of the ESF (Technical Exchange)

Objective: To apprise the NRC staff of the current understanding of stratigraphic and structural data collected along the path of the ESF prior to initiation of large-scale tunnel boring activities. To facilitate staff reviews of DOE ESF documents and study plans and address concerns raised in reviews of the SCP and related study plans.

Scope: Stratigraphic and structural factors play a key role in the configuration of the ESF. This technical exchange would focus on DOE's efforts to characterize the stratigraphy, structure, and rock properties in advance of the construction of the ESF. The scope of the exchange would include discussions of the results of drilling of the North Ramp-Geologic Holes and Systematic Drilling hole SD-12, as well as any trenching activities. Discussions would also address stratigraphic and structural modeling (including cross-sections and 3-point problems) and the analysis of rock characteristics used in support of ESF design activities. Anticipated revisions in stratigraphy of the site or stratigraphic nomenclature would also be discussed. Additionally, anticipated encounters with fault zones and testing activities associated with those faults would be discussed.

Date: May 1994

Location: Las Vegas, NV/Yucca Mountain, NV

Topic: Total System Performance Assessment (TSPA), Second Phase (Technical Exchange)

Objective: To discuss the most recently published NRC and DOE (and possibly other) performance assessments for the Yucca Mountain repository.

Scope: This technical exchange will cover all aspects of the NRC and DOE total system performance assessments. NRC will present Iterative Performance Assessment, Phase 2 and DOE will present TSPA, Phase 2. Both of these projects represent a significant improvement over the Phase 1 efforts, in the state-of-the-art of modeling of source term, flow of gas and liquid and transport of radionuclides from the repository to the accessible environment. The respective parties will discuss the results of their assessments, and plans to incorporate further improvements in subsequent iterations, including ways to use the results of TSPA to direct the collection of data in order to reduce uncertainty.

Date: June 1994

Location: Washington, D.C.

NRC'S PROPOSED FUTURE INTERACTIONS

- Topic:** Combination of Conditional Complementary Cumulative Distribution Functions (CCDFs) (Technical Exchange)
- Objective:** The objective of this technical exchange will be to discuss the generation of CCDFs to demonstrate compliance with the EPA Standard.
- Scope:** This technical exchange will address the NRC comments on SNL report, SAND 91-2795, "TSPA 1991: An Initial Total System Performance Assessment for Yucca Mountain." The TSPA describes and employs three approaches to constructing CCDF's. Although these approaches appear to be correct and suitable mathematical methods, the staff is sensitive to the use of the CCDF to evaluate compliance with the EPA standards for high-level waste disposal. Specifically, the NRC staff believes it would be beneficial to discuss the following topics:
- 1) The manner in which the performance models are run independently within the same realization (vector) and then combined into the CCDF may lead to unnecessary complications in interpretation of the results. For example, the assumption that each rock column is independent and not correlated with the other five is inconsistent with the conceptual model partitioning the flow equally among the six columns.
 - 2) TSPA 1991 uses a methodology which assumes that both the consequences and probability of one event or process (such as human intrusion) are unaffected by the occurrence or non-occurrence of another event or process (such as volcanism). This method combines the conditional CCDFs for each process or event using a "probabilistic sum" of the two

CCDFs. This may preclude consideration of important scenarios requiring the presence of two conditions.

- 3) The linear summation of CCDFs of two events such as gas and aqueous releases as used in the TSPA may not adequately reflect the CCDF of releases required by the EPA standard. Gaseous and aqueous releases are, in fact, coupled in a complex, nonlinear fashion. The linear summation may, therefore, not correctly characterize the performance of the repository.
- 4) The EPA Standard requires that all releases which occur during a 10,000 year period of performance be summed to determine compliance. The consequences calculated in the TSPA do not include the releases which could occur prior to, and after, the period of volcanic activity, and, therefore, do not include the complete 10,000 year period of performance. Consequences calculated in this way should not be combined with such things as the consequences from the weeps model for aqueous transport, as the weeps model covers a complete 10,000 year period of performance.

Date: TBD (Future Interaction)

Location: Washington, D.C.

Topic: Data Management (Technical Exchange)

Objective: To discuss the inventory of site related data and NRC computer access.

Scope: This technical exchange will focus on progress that has been made on the organization of data bases and computer access to these data bases and

data base indices by all DOE participants and the NRC. The discussion would include an update of the inventory of data in all DOE data bases and how much has been transferred to the Site Engineering Properties Data Base.

Date: TBD (Future Interaction)

Location: Washington, D.C.
