

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

Dear Mr. Shelor:

MAY 12 1994

SUBJECT: PROPOSED INTERACTIONS FOR THE PERIOD OF JULY-
DECEMBER 1994

Enclosed is the list of non-routine interactions that the staff of the Nuclear Regulatory Commission is proposing for the second half of 1994. Because the staff considered the bi-monthly Experimental Studies Facility (ESF) meetings to be routine, these were not included. However, recognizing the amount of time necessary for the Department of Energy to prepare for the ESF meetings, the NRC staff is willing to consider discussing the focus and scope of these meetings and to discuss the possibility of scheduling these, where appropriate as half-day meetings which can be coupled with another interaction.

The NRC staff will be prepared to discuss the scheduling of interactions for the second half of 1994 during the Interactions Scheduling Meeting which will be held on May 17, 1994.

Sincerely,

Joseph J. Holonich, Chief
High-Level Waste and Uranium
Recovery Projects Branch
Division of Waste Management
Office of Nuclear Material Safety
and Safeguards

Enclosure: As stated

cc: See attached list

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PROPOSED INTERACTIONS FOR JULY-DECEMBER 1994

ENCLOSURE 1

Topic: Field Heater Experiments Associated with Coupled Thermal-Hydrologic-Mechanical-Chemical (THMC) Processes

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

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 the SCP; and 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 plans being developed primarily by SNL and LLNL (other DOE contractors?). The discussion will include how numerical analyses and laboratory-scale experiments will compliment 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 the DOE and NRC as being necessary to support a license application.

The NRC staff has indicated that the DOE is expected to demonstrate a comprehensive, systematic, and logical understanding of coupled THMC processes in order to demonstrate compliance with design and/or performance objectives of the proposed repository (Nataraja and Brandshaug, 1992). The development of this understanding will necessarily require the careful design, execution and analysis of laboratory, field, and in-situ (e.g., ESF) heater experiments. The DOE has developed plans to establish this understanding (DOE, 1988), and detailed pre-experimental analyses are currently being performed in order to effectively implement these plans (Buscheck, et al., 1993; Lin, 1993). In addition, the selection and development of experimental instruments is being pursued (Pott and Brechtel, 1993). The NRC has also devoted attention to the study of coupled processes in order to assess the most important coupling mechanisms and identify the state-of-knowledge (Manteufel, et al., 1993). Hence, it appears prudent that an exchange be conducted to facilitate agreement on the detailed technical issues needing experimental resolution, and the adequacy of current DOE plans to successfully resolve these issues.

Date: August, 1994
Location: Washington, D.C.

Topic: Groundwater Flow Through Unsaturated, Fractured Rock

Objective: Acquaint DOE and NRC with the results and ongoing research efforts to characterize groundwater flow through the unsaturated zone at Yucca Mountain, Nevada

Scope: Areas to be considered could include the following:

- Techniques available to obtain fracture hydrologic parameters describing resistance as a function of water content, fracture porosity, or means of water moving between fracture and matrix.
- Experimental confirmation of concepts of unsaturated groundwater flow in fractured rock. Verification of laboratory or field experiments either by the continuum (single or dual), discrete fracture network, or the stochastic approaches.
- Investigations of hydrologic processes to determine their importance to Yucca Mountain geologic repository performance.
- Prototype testing work conducted to support hydrologic tests in the Exploratory Studies Facility.

Date: September, 1994

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

Topic: Key Design and Materials Issues for the MPC and their Implication on Disposal (DOE-MPC Topical Report on Disposal, September, 1995)

Objective: To discuss and provide input to the DOE on an annotated outline for the planned MPC topical report.

Scope: This technical exchange should focus on the short-term and long-term plans for testing and evaluation of the proposed designs and materials selection. It should identify the key disposal issues to be addressed in the topical report, and also provide the NRC opportunities for review of intermediate progress reports on the MPC.

Date: October, 1994

Location: Washington, D.C.

Topic: The results of initial tunnel boring activities along the north ramp of the Exploratory Studies Facility (Technical Exchange)

- Objectives:**
1. To apprise the NRC staff of the results of the initial phase of tunnel boring along the north ramp including characterization data collected along the path of the ESF and in alcoves associated with the north ramp.
 2. To facilitate staff reviews of DOE ESF design documents and study plans and address concerns raised in reviews of the SCP and related study plans.

Scope: During the late Fall and Winter of 1994, initial tunnel boring will be conducted along the north ramp, including transit of the poorly lithified pre Ranier Mesa tuffs. This technical exchange would focus on the results of these initial tunnel boring activities. Specific topics to be addressed would include efforts to characterize the stratigraphy, structure, rock properties, hydrology, and geochemistry along the path of the north ramp construction and in alcoves associated with the north ramp. The scope of the exchange would include discussions of the results of drilling and testing of NRG 7 and other drillholes along the North Ramp-Geologic Holes and Systematic Drilling hole SD-12. Discussions would also address any ESF design issues raised by the initial tunnel boring activities. Anticipated encounters with fault zones and testing activities associated with those faults would also be discussed.

Date: November, 1994

Location: Nevada Test Site (FOC), Nevada

Topic: Groundwater Travel Time

Objective: To discuss technical issues related to site characterization and the assessment of groundwater travel time.

Scope: This technical exchange will focus on discussing site characterization issues related to the determination of groundwater travel time and approaches to calculating and modelling groundwater travel time.

Date: December, 1994

Location: Washington, D.C.