

FEB 14 1994

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

Dear Mr. Shelor:

**SUBJECT: NUCLEAR REGULATORY COMMISSION REVIEW OF THE DEPARTMENT OF ENERGY
RESPONSE TO CONCERNS RELATED TO STUDY PLAN 8.3.4.2.4.3 -
CHARACTERIZATION OF THE GEOMECHANICAL ATTRIBUTES OF THE WASTE
PACKAGE ENVIRONMENT**

This letter transmits the results of the U. S. Nuclear Regulatory Commission staff's evaluation of the U.S. Department of Energy's (DOE's) responses to four questions generated in the NRC staff's technical review of Study Plan (SP) 8.3.4.2.4.3, Revision 0. In a letter dated September 2, 1993 (D. Shelor to J. Holonich), DOE committed to address all four NRC questions in Revision 1 of SP 8.3.4.2.4.3. The staff considers that DOE's responses do not provide sufficient information to resolve any of the questions at this time; therefore, all four questions will remain open. The staff expects to evaluate DOE's responses in the revision of the subject SP.

The enclosure presents the staff's evaluation of DOE's responses. Should you have any questions regarding this review, please call Charlotte Abrams, of my staff, at (301) 504-3403.

Sincerely,

Original Signed by Kenneth R. Hooks

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

Enclosure: As stated

cc: See next page

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Question 1.

The DOE has recently described various alternative thermal loading strategies and waste package emplacement schemes. What alternative tests are being considered by DOE to correspond with those proposed thermal loading strategies and waste package emplacement schemes?

EVALUATION OF DOE RESPONSE

- DOE's response states that the SCP target of 57 Kw/acre thermal load is still the program baseline unless or until it is changed by the project's change control process.
- DOE's response also indicates that the DOE plans to revise SP 8.3.4.2.4.3 in fiscal year (FY) 95. At that time, this SP will be modified, as necessary, to conform to any changes in project thermal loading strategy and waste package emplacement mode.
- The DOE plans to adjust the temperature ranges for the experiments in the next revisions of this SP to reflect the relevant thermal scheme being evaluated, and additional activities will be added, as necessary.
- The DOE has committed to consider this question in the next revision of SP. The staff considers this question open until the DOE addresses it in the next revision of the SP.

ENCLOSURE

Question 2.

Will additional activities described in Section 1.4, Future studies (page 1-16) include the seismic loading study? Section 1.4 states that "additional activities are anticipated, which are still to be developed." What is the relationship between these additional, undeveloped ESF field studies and the planned ESF field thermal and mechanical testing activities described in the SCP?

EVALUATION OF DOE RESPONSE

- DOE's response indicates that studies under this SP are still being developed and are being designed in concert with planning for near-field geochemistry, hydrology, and man-made materials studies.
- The DOE agrees that a seismic loading task should be included.
- The DOE states that a more detailed description of thermal and mechanical field tests and how they will be integrated with other field studies will be added in the next revision of this SP.
- The DOE has committed to address this question in the next revision of SP. The staff considers this question open until the question is addressed in the next revision of the SP.

Question 3.

What potential impacts from non availability of data from other studies and ESF validation experiments have been considered? Would the data from this study be sufficient to validate the numerical codes?

EVALUATION OF DOE RESPONSE

- DOE's response indicates that the models to be used in this study plan cannot be verified and/or validated using data from this study plan alone.
- DOE recognizes NRC's recommendation to establish a minimum cut-off for the amount of data required from this SP activities and provide for alternative approaches to validation of models and verification of codes, if the data from other studies or additional activities stated in this SP are not available.
- DOE will consider NRC's recommendation at the time of revision of this SP in FY 95.
- The DOE has committed to address this question in the next revision of the SP. The staff considers this question open until the DOE addresses it in the next revision of the SP.

Question 4.

What method will be used to predict the long-term thermomechanical responses of field borehole damage and long-term radiation effects from laboratory scale rock samples and short-term radiation experiments?

EVALUATION OF DOE RESPONSE

- DOE's response states that the prediction of long term behavior of natural geologic system modified by engineered facilities must be based on modeling. It is the only tool capable of extending our knowledge from localized measurements over short periods of time to the long-term performance periods of thousands of years.
- Small core samples, larger samples, and in-situ testing results will be used to confirm the model calculations.
- The DOE agrees that the discussion in the SP on scale effects should include more information on the techniques that can be utilized to address this problem in the next revision of this SP.
- The DOE plans to revise the discussion in the SP to clarify how the effect of radiation will be assessed in the next revision to this SP.
- The DOE has committed to address this question in the next revision of SP. The staff considers this question open until the question is addressed in the next revision of the SP.