



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
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September 2, 1994

Ronald A. Milner, Acting Director  
Office of Program Management  
and Integration  
Office of Civilian Radioactive  
Waste Management  
U.S. Department of Energy, RW 30  
1000 Independence Avenue  
Washington, DC 20585

SUBJECT: TOPICAL REPORT ON "METHODOLOGY TO ASSESS FAULT DISPLACEMENT  
AND VIBRATORY GROUND MOTION HAZARDS AT YUCCA MOUNTAIN"

Dear Mr. Milner:

In a letter dated June 30, 1994, from D. Shelor to J. Holonich, DOE submitted the subject topical report and requested that the U.S. Nuclear Regulatory Commission review this methodology for acceptability, for use in a license application, for the potential geological repository at Yucca Mountain.

The staff has conducted an acceptance review of the Topical Report in accordance with NRC's Division of High-Level Waste Management Topical Report Review Plan, dated February 8, 1994. The staff finds that, contrary to Criterion 3 for Acceptance Reviews of the Review Plan, the report contains incomplete information on the subject matter.

The staff considers the methodology incomplete for the following reasons:

1. In past interactions with DOE, the staff has stated that it would expect to see both deterministic and probabilistic analyses addressed in the methodology for fault displacement and seismic hazard assessments. The DOE methodology described in the Report does not address deterministic hazard assessment and, as a result, does not address how the results of a deterministic analysis (e.g., maximum credible fault displacement) will be considered if they are different from the results of the probabilistic analysis.

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2. The methodology in the Topical Report does not address what approach will be taken with respect to the consideration of fault displacement in locating structures, systems, and components important to safety or important to waste isolation. In NUREG 1494<sup>1</sup> the staff took the position that Type I faults should be avoided concerns related to DOE's implementation of this process, which have been where this can reasonably be achieved. This consideration could be a significant component of a methodology to address fault displacement hazard. Although the Annotated Outline for the second Topical Report on Seismic Design Methodology indicates that it will discuss this issue, the staff is unable to judge the adequacy of the overall methodology without some indication as to how Type I faults will be considered in locating structures, systems, and components important to safety and waste isolation.
3. The expert judgement elicitation process, which is a significant part of the probabilistic approach, was not discussed in sufficient detail. Different elicitation processes can provide different hazard results. In addition, NRC concerns related to DOE's implementation of this process, which have been raised previously (Site Characterization analysis Comments 3, 7, 93, and 98), should be addressed. As a result of the above, the staff considers that incorporation of DOE's approach to expert elicitation is an important component of the hazard methodology.

Because the Topical Report does not address the topics noted above, the staff believes that the scope of the Report is incomplete and that our acceptance for review will not result in increased efficiency of the review process, and does, consequently, not satisfy Criterion 4 of the Topical Report Review Plan. We, therefore, consider the Topical Report unacceptable for detailed review.

Furthermore, the staff considers that the annotated outline part of the topical report process is not working effectively. Specifically, when the staff reviewed the Annotated Outline prior to DOE's preparation of the topical report, both deterministic and probabilistic approaches were to be included. Also, although the topical report departs from past NRC practice in seismic risk assessment by using a performance goal-based approach for seismic design, this fact was not clearly identified in the Annotated Outline. Had this issue

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<sup>1</sup> NUREG 1494 ("Consideration of Fault Displacement Hazards in Geologic Repository Design") has not been published in final form as of this date. However, the guidance provided by staff positions taken in the final draft of the NUREG have been presented in open meetings of the Advisory Committee on Nuclear Waste and the 1994 International High-Level Waste Management Conference, and DOE has commented on the draft NUREG.

R. Milner

- 4 -

been raised in the Annotated Outline, the staff could have provided early feedback on the potential to complicate and possibly delay our review of the Topical Report prior to receiving the report for review. Therefore, we are concerned that DOE is not appropriately implementing the procedure in the Topical Report Review Plan, which was developed to avoid DOE submittal of a Topical Report which does not meet regulatory needs.

We would be willing to meet with you to discuss these concerns, at a mutually convenient time in the near future. Please contact me at (301) 415-7286 or Dr. Abou-Bakr Ibrahim, of my staff, at (301) 415-6651 if you have questions concerning this acceptance review.

Sincerely,

*/s/*

Michael J. Bell, Chief  
Engineering and Geosciences Branch  
Division of Waste Management  
Office of Nuclear Material Safety  
and Safeguards

cc:

- R. Loux, State of Nevada
- T. J. Hickey, Nevada Legislative Committee
- J. Meder, Nevada Legislative Counsel Bureau
- R. Nelson, YMPO
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