JUN 28 1993

NOTE FOR: Joseph J. Holonich, Director
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Project Directorate, HLWM
Division of High-Level Waste Management, NMSS

FROM: Ronald L. Ballard, Chief
Geology and Engineering Branch, HLWM
Division of High-Level Waste Management, NMSS

SUBJECT: REVIEW OF STUDY PLAN 8.3.1.17.4.3 - QUATERNARY FAULTING WITHIN 100KM OF YUCCA MOUNTAIN, INCLUDING THE WALKER LANE

As requested (C. Abrams to K. McConnell note of March 22, 1993), we have completed the review of the study plan - Quaternary Faulting Within 100KM of Yucca Mountain, Including the Walker Lane. This review was conducted under the guidance provided in the "Review Plan for NRC Staff Review of DOE Study Plans" (Rev. 2) dated March 10, 1993.

This review plan requires that the review determine whether the subject study plan conforms to the "1993 DOE/NRC Level of Detail Agreement and Review Process for Study Plans." Our review indicates that the subject study plan is reasonably consistent, as appropriate for the activities, tests, and analyses described, with the Agreement. The review plan also requires the identification of objections; no objections to the activities described in the study plan have been identified.

In the submission of this study plan (Roberts to Holonich, dated February 3, 1993), DOE identified three Site Characterization Analysis (SCA) comments as being addressed in the study plan. DOE did not request resolution of these comments, numbers 59, 60 and 69 and the information in the study plan was insufficient to resolve these comments, so the comments remain open.

One comment and two questions have been generated during our review of this study plan; they appear as enclosure 1. In addition, we have several minor observations that can be provided to DOE for their information:

- In the table of contents, under section 3.2.1, there are some inconsistencies between the section numbers and titles compared to those in the text.

- In the final paragraph of section 1.2, there is mention that facilities be designed such that damage due to ground shaking during earthquakes not be excessive. Some clarification on the definitions of "excessive damage" would be beneficial.

- In the reference list, two citations are incomplete: Bender and Perkins, 1987; and Evans and Oliver, 1987.

102.8

The lead reviewer was Steve McDuffie (504-3460) of the Geology and Geophysics Section, HLGE. Dr. A. K. Ibrahim (504-2523) assisted in the review.

Ronald L. Ballard, Chief
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Enclosure: As stated

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DATE	06/25/93		06/25/93		06/25/93		06/ /93	

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Study Plan 8.3.1.17.4.3 Quaternary Faulting Within 100 km of Yucca Mountain, Including Walker Lane

QUESTION 1

What are the criteria for identifying faults or lineaments which have the potential for producing significant ground motions at the site?

BASIS

- Section 3.2.1.3 states, "Detailed work will only be done on those faults or lineaments that have the potential for producing significant ground motions at the site or that have a direct bearing on the current tectonic framework of the Yucca Mountain region."

RECOMMENDATION

Provide the criteria that will be used to determine which faults meet the stated conditions.

ENCLOSURE 1

Study Plan 8.3.1.17.4.3 Quaternary Faulting Within 100 km of Yucca Mountain, Including Walker Lane

QUESTION 2

Why haven't previous shallow seismic reflection (mini-sosie) surveys been referenced, and how will the new lines be correlated with the old work?

BASIS

- Section 3.2.1.5 discusses shallow seismic reflection and seismic refraction surveys across the Beatty scarp.
- Harding (1988) conducted seismic reflection surveys across the Beatty and Crater Flat scarps.

RECOMMENDATION

Make reference to Harding (1988) and explain how the new seismic lines will be correlated with this older work.

REFERENCE

Harding, S.T., 1988, Preliminary results of high-resolution seismic-reflection surveys conducted across the Beatty and Crater Flat fault scaps, Nevada, in M.D. Carr and J.C. Yount, Geologic and Hydrologic Investigations of a Potential Nuclear Waste Disposal Site at Yucca Mountain, southern Nevada: U.S. Geological Survey Bulletin 1790, p. 121-128.

Study Plan 8.3.1.17.4.3 Quaternary Faulting Within 100 km of Yucca Mountain, Including Walker Lane

COMMENT 1

The June 29, 1992, Magnitude 5.6 Little Skull Mountain earthquake was approximately 20 km southeast of the center of the proposed perimeter drift outline. The areal extent of the geophysical surveys shown on Figure 2.2-1 does not appear to be sufficient to encompass the Little Skull Mountain region.

BASIS

- This comment was originally identified in the cover letter of the Phase I review of Study Plan 8.3.1.4.2.1, "Characterization of Vertical and Lateral Distribution of Stratigraphic Units Within the Site Area," dated December 14, 1992.
- Knowledge of the geologic structure responsible for the earthquake may be significant in assessing the seismic hazard of the site.
- Expansion of the geophysical surveys may provide a better understanding of the geologic structure which may have triggered the earthquake.
- In its March 22, 1993, letter (Shelor to Holonich) DOE indicated that the geographic area included within Study Plan 8.3.1.4.2.1 is not sufficiently large to encompass the Little Skull Mountain earthquake region.
- The March 22, 1993, letter further stated that the June 29, 1992, earthquake area would be covered in other preclosure tectonics studies such as Study Plan 8.3.1.17.4.1 (Historic and Current Seismicity) and Study Plan 8.3.1.17.4.3 (Quaternary Faulting Within 100 km of Yucca Mountain).
- It does not appear to the staff, during its re-evaluation of the above two preclosure tectonics study plans, that the areal extent of the geophysical surveys described within these study plans is sufficient to identify the geologic structure in the Little Skull Mountain earthquake area.

RECOMMENDATION

DOE should consider extending the areal extent of the geophysical surveys to cover the Little Skull Mountain area in order to identify the geologic structures in that region.

REFERENCE

U.S. Department of Energy, Letter from D. Shelor, DOE, to J. Holonich, NRC; Subject: U.S. Department of Energy's responses to three comments from the U.S. Nuclear Regulatory Commission's Phase I review of Study Plan 8.3.1.4.2.1, "Characterization of Vertical and Lateral Distribution of Stratigraphic Units within the Site Area," March 22, 1993, 2 pp. plus 2 enclosures.