



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D. C. 20555

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MEMORANDUM FOR: Joseph Holonich, Director  
Repository Licensing and Quality Assurance  
Project Directorate  
Division of High-Level Waste Management

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

SUBJECT: PHASE I REVIEW OF STUDY PLAN -  
CHARACTERIZATION OF THE VERTICAL AND LATERAL  
DISTRIBUTION OF STRATIGRAPHIC UNITS WITHIN  
THE SITE AREA (STUDY PLAN 8.3.1.4.2.1,  
REVISION 0)

As requested (C. Abrams to K. McConnell note of July 9, 1992), we have completed the Phase I review of the study plan - Characterization of the Vertical and Lateral Distribution of Stratigraphic Units Within the Site Area. This review (see Enclosures A, B and C) was conducted using the Review Plan for NRC Staff Review of DOE Study Plans, Revision 1 (December 6, 1990). No objections to the activities described in the study plan have been identified. However, for the reasons described below, we recommend that a detailed review of the study plan be initiated.

We also suggest that the letter transmitting the results of our Phase I review include a recommendation that DOE consider increasing the scope of the geophysical studies in an attempt to gain a better understanding of the source (geologic structure) of the Little Skull Mountain earthquake of June 29, 1992. The basis for this recommendation is presented below.

REVIEW FINDINGS

The five principal findings of this review are: (1) the study plan should be considered as a candidate for a detailed technical review, (2) the activities as described are not expected to have an adverse effect on site characterization, (3) the activities as described are not expected to have an adverse effect on repository performance, (4) the activities as described are not expected to have an adverse effect on characterization schedules, and (5) there are no inadequacies in the QA program which must be resolved before work begins.

The first principal finding (i.e., the study plan should be considered as a candidate for a detailed technical review) is

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based upon this study plan's relationship to a number of key site-related issues, its pertinence to a number of NRC open items, and its critical relationship to a potential licensing concern (see Enclosure A, Need for Detailed Technical Review, Criteria 1, 2, and 5, pp. 5-7).

The second principal finding (i.e., the activities as described are not expected to have an adverse effect on site characterization) is based upon the staff's review (see Enclosure A, Identification of Objections, Criterion 2, page 4).

With respect to the third principal finding (i.e., the activities as described are not expected to have an adverse effect on repository performance), DOE indicates (page 2-17) that the drilling and coring operations described under Activity 8.3.1.4.2.1.1 may have some potential impact on the site area, but are being conducted independently under the auspices of another investigation. DOE also (SCP, pp. 8.4.3-38 through 8.4.3-43) indicates that the impacts will be remedied because the boreholes will be sealed. In the detailed technical review of this study plan, borehole sealing will be addressed in greater detail. For the multiple bases underlying the third principal finding see Enclosure A (Identification of Concerns, Criterion 1, page 3 and Need for Detailed Technical Review, Criterion 5, page 7) and Enclosure B, Item 4, page 2.

The fourth principal finding (i.e., the study is not expected to have an adverse effect on characterization schedules) is considered to be similar to other study plans in that the completion of the activities in this study plan relies heavily upon input from other studies. However, the study does not (as required by NRC/DOE Level of Detail for Study Plans agreement of May 7-8, 1986) present any information describing the relative timing either between information provided by this study to other studies or, more importantly, the timing existing between this study and other studies that provide it with information critical to its accomplishment. Consistent with the Level of Detail agreement, we recommend that DOE incorporate this type of information as a part of its submittal of all future study plans. For the bases underlying the fourth principal finding see Enclosure A (Identification of Objections, Criterion 3, page 4) and Enclosure B (Item 9, page 3; Item 3, page 6 and Items 4 and 5, page 8).

The bases underlying the staffs' fifth principal finding (i.e., there are no inadequacies in the QA program which must be resolved before work begins) are included in Enclosure A, Evaluation of Study Plans, Item 3, p. 2 and in Enclosure B, Items 5 and 6, p. 4.

We also found the study plan, as submitted, to be somewhat deficient because three references cited within the study plan text were not identified as study plan References (see Enclosure D, pp. 1-3, 3-14 and 3-15). Insufficient detail of the three

references is provided in the study plan text to enable the staff to determine the availability of these documents. The staff therefore requests that DOE either (1) provide the NRC with a copy of each of the references or (2) provide the full description of the subject references as they would appear in the References section of the study plan. The staff would then make its determination of the availability of the documents. In addition, three documents (see Enclosure D, pp. R-1 and R-2) cited in the References were not identified within the study plan text. The staff requests that DOE clarify the status of these three documents.

A separate concern related to the scope of the activity describing the geophysical aspects of this study has been identified in our Phase I review. Specifically, in light of the June 29, 1992, Magnitude 5.6 Little Skull Mountain earthquake, it appears that the areal extent of the geophysical surveys (and other studies as appropriate) shown on study plan Figure 2.2-1 is insufficient to encompass the Little Skull Mountain aftershock region. We recommend that DOE consider expanding the area of investigation in order to gain a better understanding of the source (geologic structure) of this event as well as that of the aftershocks.

The review was conducted by Harold Lefevre (504-3464) of the Geology and Geophysics Section, HLGE with Dr. Virginia Colten-Bradley (504-3728) of the Hydrologic Transport Section, HLHP providing input to Enclosure B from the geochemical perspective. Ken Kalman provided input to Enclosure B from the quality assurance perspective. Dr. A. K. Ibrahim (504-2523) of HLGE provided comments relative to geophysical/seismological matters. Dr. W. Boyle (504-2547) of HLGE contributed to the section dealing with borehole sealing.

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 Management

Enclosures:

- A (Phase I Reviewer Report)
- B (Review Plan Considerations)
- C (References)
- D (Specific References)

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