Department of Energy
Washington, DC 20585

FEB 5 1993

Mr. Joseph J. Holonich, Director
Repository Licensing & Quality Assurance
Project Directorate
Division of High-Level Waste Management
Office of Nuclear Material Safety
and Safeguards
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Mr. Holonich:

Enclosed with this letter is a controlled copy of Study Plan 8.3.1.17.4.3, Revision 0, prepared by the U.S. Department of Energy (DOE) for the Yucca Mountain site. The study plan numbers correspond to the same numbers used in the Site Characterization Plan (SCP) for the Yucca Mountain site.

| Number | Title |
|---|---|
| 8.3.1.17.4.3, R0 | "Quaternary Faulting within 100 KM of Yucca Mountain, Including the Walker Lane" |

DOE has reviewed the study plan for consistency with the content requirements for study plans, as given in Attachment B to the Summary of the DOE/U.S. Nuclear Regulatory Commission (NRC) meeting on the Level-of-Detail for the SCP (May 7-8, 1986). DOE is submitting this plan to NRC as agreed to in the meeting.

As discussed during the DOE/NRC meeting (December 15, 1988) on study plans, DOE has decided to control preparation and review of study plans as a quality activity. This study plan was reviewed under current Yucca Mountain Site Characterization Project Office (YMPO) quality assurance (QA) procedures.

It should be noted that there may be some inconsistencies in the milestone report titles and schedules given in this study plan and those in the SCP. Study plans, in general, represent a further evolution of the study in the areas related to schedules and milestones relative to the SCP, and as such, represent DOE's current plans.

Work on Activity 8.3.1.17.4.3.4, "Evaluate the Bare Mountain fault zone," of this study plan is currently planned to start as early as April 1993. Because this work will be conducted well outside the potential controlled area for the Yucca Mountain site, the DOE has decided not to request an expedited Phase I review for this study plan. Instead, when DOE is ready to start

this activity, DOE will proceed at its own risk even though the results of the Phase I review may not have been received from the NRC. Upon receipt of the Phase I review, DOE will respond to any concerns or questions that NRC may have on this activity or others that are described in this study plan.

DOE wishes to call to NRC's attention Site Characterization Analysis Comments 59, 60, and 69, which were directed to Study 8.3.1.17.4.3. Enclosure 2 provides a discussion of how these open items are addressed in this study plan.

The Document Transmittal/Acknowledgement Record for your controlled copy of the study plan should be signed and dated and returned to the Document Control Center in Las Vegas, Nevada.

If you have any questions, please contact Mr. Chris Einberg of my office at 202-586-8869.

Sincerely,

John P. Roberts
Acting Associate Director for
Systems and Compliance
Office of Civilian Radioactive
Waste Management

Enclosures: on the shelf
1. Study Plan 8.3.1.17.4.3, R0
2. Comments 59, 60 and 69

cc: w\enclosures
Alice Cortinas, CNWRA, San Antonio, TX

cc: w\o enclosures
C. Gertz, YMPO
R. Loux, State of Nevada
T. Hickey, Nevada Legislative Commission
M. Baughman, Lincoln County, NV
J. Bingham, Clark County, NV
B. Raper, Nye County, NV
P. Niedzielski-Eichner, Nye County, NV
G. Derby, Lander County, NV
P. Goicoechea, Eureka, NV
C. Schank, Churchill County, NV
F. Mariani, White Pine County, NV
V. Poe, Mineral County, NV
E. Wright, Lincoln County, NV
J. Pitts, Lincoln County, NV
R. Williams, Lander County, NV
J. Hayes, Esmeralda County, NV
B. Mettam, Inyo County, CA
C. Abrams, NRC

Comment 59

Discussions regarding types and location of tests are given in Sections 2.1, 2.2, 2.3, 2.4, 2.5, 2.6, 3.1, 3.2, 3.3, 3.4, 3.5, and 3.6 of Study Plan 8.3.1.17.4.3. Included in these sections are specific descriptions of the locations and types of regional and local fault studies and geophysical surveys that are being planned for this study, all involving standard procedures and techniques that are commonly and widely used for these kinds of investigations. Primary emphasis of the planned tests is on the delineation of all Quaternary faults within 100 Km of the site that have the potential for producing future ground motions and displacements that may disrupt the potential repository. No prototype testing is involved in the study.

An initial seismic reflection survey from Crater Flat eastward across Yucca Mountain is being conducted in Study 8.3.1.4.2.1. If the results of this survey are positive, additional profiles may be obtained (as part of Study 8.3.1.17.4.3) across the Walker Lane and the Furnace Creek fault zone west of Yucca Mountain as well as other features that are likely to provide valuable information on fault geometry in the region.

Refraction, gravity, magnetic, and magnetotelluric surveys will be conducted along the same traverses involved in the seismic reflection surveys, as detailed in Sections 2.1.2.2, 2.1.2.3, and 2.1.2.4 of the study plan. Additional traverses may also be conducted, depending on the favorability of results of the initial surveys.

The integration of all fault studies in the site characterization program is discussed in Section 2 of Study Plan 8.3.1.17.4.3 and shown graphically in Figures 1-1, 1-2, 1-3, 1-4, and 2-1. A detailed schedule of work elements is given in Figure 5-1, with inputs and outputs of data listed in Table 5-1. The present schedule calls for completion of Study 8.3.1.17.4.3 by mid-1995, so that the data can be used in the tectonic modeling and synthesis study (8.3.1.17.4.12).

Comment 60

The fundamental premise of Study 8.3.1.17.4.3, and in particular Activity 8.3.1.17.4.3.2 (Evaluate Quaternary Faults within 100 Km of Yucca Mountain), is that all known and suspected Quaternary faults within 100 Km of the site will be identified. Identification of the known and suspected Quaternary faults will rely on the tests described in Study Plan 8.3.1.17.4.3. Detailed, site-specific studies of individual Quaternary faults will focus primarily on those features within approximately 50 Km from Yucca Mountain that, because of their length, amount of displacement, distance from the site, or recency of displacement, could represent significant seismic sources at the site. Thus, faults such as the Death Valley-Furnace Creek fault zone (as close as 50 Km from the site and potentially capable of an $M_s$ 8 earthquake), the Bare Mountain fault (14 Km from Yucca Mountain), the Pahrump-Ash Meadows fault zone, and the Rock Valley fault zone, are slated for detailed study and evaluation as part of Study 8.3.1.17.4.3 and related fault studies.

Comment 69

As part of Activity 8.3.1.17.4.3.2 (Evaluate Quaternary faults within 100 Km of Yucca Mountain), a final map of Quaternary faults within 100 Km of Yucca Mountain will be prepared (see Sections 2.2 and 3.2 of Study Plan 8.3.1.17.4.3). This map and accompanying report will synthesize all available data on the age, distribution, recurrence interval of surface faulting events, and slip-rates of known and suspected Quaternary faults regardless of their orientation. Data relative to an analysis of the so-called Walker Lane (i.e., northwest-trending) faults is included in the information outlined above. In addition, Study 8.3.1.17.4.12 (Tectonic Models and Synthesis) will compile and synthesize data on all faults identified at and near the site as part of the tectonics program, whether such faults are strike-slip, detachment, thrusts, listric normal faults, etc., as well as their ages.