



Department of Energy

Washington, DC 20585

MAR 22 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 are the U.S. Department of Energy's (DOE) responses to three comments from the U.S. Nuclear Regulatory Commission's (NRC) 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," (enclosure 1). Enclosure 2 contains the response to these comments.

The NRC's first comment concerns six references cited either in the study plan text or the reference list. Potential changes have been identified, as stated in enclosure 2, to correct these omissions and needed clarifications. The second comment concerns the sealing of boreholes. No aspect of borehole sealing is covered by this study plan. Important aspects of the borehole sealing program will be discussed in Study Plan 8.3.3.2.2.1, "Seal Materials Property Development," which has yet to be developed. The third comment is concerned with whether the areal extent of the surface-based geophysical survey is extensive enough to include the area of Little Skull Mountain. This study does not extend to include the area of Little Skull Mountain, and DOE is not planning to expand the studied area for this study plan. However, other studies under preclosure tectonics (SCP Section 8.3.1.17) will cover the area of Little Skull Mountain. DOE awaits NRC's Phase II comments and plans no revision of the study plan to be undertaken at this time.

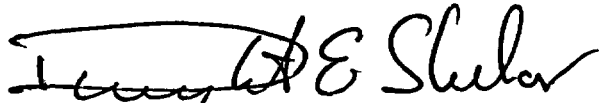
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If you have any questions, please contact Mr. Chris Einberg of my office at 202-586-8869.

Sincerely,



Dwight E. Shelor
Associate Director for
Systems and Compliance
Office of Civilian Radioactive
Waste Management

Enclosures:

1. Ltr, 12/14/92, Holonich to Roberts,
w/encl
2. Responses to NRC Comments

cc w/enclosures:

- C. Gertz, YMPO
- T. J. Hickey, Nevada Legislative Committee
- R. Loux, State of Nevada
- D. Bechtel, Las Vegas, NV
- Eureka County, NV
- Lander County, Battle Mountain, NV
- P. Niedzielski-Eichner, Nye County, NV
- W. Offutt, Nye County, NV
- C. Schank, Churchill County, NV
- F. Mariani, White Pine County, NV
- V. Poe, Mineral County, NV
- J. Pitts, Lincoln County, NV
- J. Hayes, Esmeralda County, NV
- B. Mettam, Inyo County, CA
- C. Abrams, NRC



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

DEC 14 1992

Mr. John P. Roberts, Acting Associate Director
for Systems and Compliance
Office of Civilian Radioactive Waste Management
U.S. Department of Energy, RW 30
Washington, DC 20585

Dear Mr. Roberts:

SUBJECT: PHASE I REVIEW OF U.S. DEPARTMENT OF ENERGY (DOE) STUDY PLAN
"CHARACTERIZATION OF VERTICAL AND LATERAL DISTRIBUTION OF
STRATIGRAPHIC UNITS WITHIN THE SITE AREA"

On July 6, 1992, DOE transmitted the study plan, "Characterization of Vertical and Lateral Distribution of Stratigraphic Units within the Site Area" (Study Plan 8.3.1.4.2.1) to the U.S. Nuclear Regulatory Commission for review and comment. NRC has completed its Phase I Review of this document using the Review Plan for NRC Staff Review of DOE Study Plans, Revision 1 (December 6, 1990). The material submitted in the study plan was considered to be consistent, to the extent possible at this time, with the NRC-DOE agreement on content of study plans made at the May 7-8, 1986, meeting on Level of Detail for Site Characterization Plans and Study Plans.

Among the references listed for this study plan are three which are cited within the study plan text, but are not listed in the study plan References section, and three which are cited in the References section, but do not appear in the text (See Enclosure). Due to insufficient information on the three references not listed in the References section of the study plan, the NRC staff is unable to determine whether or not they are readily obtainable. We therefore request that DOE either 1) provide the NRC with copies of the references listed in the Enclosure or 2) provide the full reference citation if the references are considered to be readily available.

A major purpose of the Phase I Review is to identify concerns with studies, tests, or analyses that, if started, could cause significant and irreparable adverse effects on the site, the site characterization program, or the eventual usability of the data for licensing. Such concerns would constitute objections, as that term has been used in earlier NRC staff reviews of DOE's documents related to site characterization (Consultation Draft Site Characterization Plan and the Site Characterization Plan for the Yucca Mountain site).

It does not appear that the conduct of the activities described in this study plan will have significant adverse impacts on repository performance and the Phase I Review of this study plan identified no objections with any of the activities proposed. This decision was based on the following considerations: 1) the information from this study plan is important to site characterization; 2) there does not appear to be a noninvasive method of collecting the data; and 3) the study plan commits to sealing each borehole within the Conceptual Perimeter Drift Boundary. The NRC staff expects that proper sealing of boreholes will be performed consistent with 10 CFR 60.134(a) which states,

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Enclosure 1

Mr. John P. Roberts

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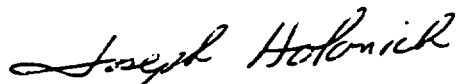
"Seals for shafts and boreholes shall be designed so that following permanent closure they do not become pathways that compromise the geologic repository's ability to meet the performance objectives for the period following permanent closure." These conclusions regarding boreholes described in this study plan should not be construed to mean that the NRC has reached the same conclusions with respect to additional or other boreholes not identified in this study plan.

After completion of the Phase I Review, selected study plans are to receive a second level of review, called a Detailed Technical Review, based on the relationship of a given study plan to key site-specific issues or NRC open items, or its reliance on unique, state-of-the-art test or analysis methods. Based on these criteria, we have decided to proceed with a Detailed Technical Review of this study plan and will provide DOE with staff comments as soon as that review is completed.

During the Phase I review the staff identified a concern related to the scope of Activity 8.3.1.4.2.1.2, "Surface-Based Geophysical Studies." In light of the June 29, 1992, Little Skull Mountain earthquake, the areal extent of the geophysical surveys shown on Figure 2.2-1 appears to be insufficient to encompass the Little Skull Mountain aftershock region. We recommend that DOE consider expanding the area of investigation to gain a better understanding of the source (geologic structure) of this event as well as the aftershocks. This comment will be included in the Detailed Technical Review of the study plan. We include it as part of this letter, because DOE plans to initiate activities related to this study plan in the near future.

If you have any questions concerning this letter, please contact Charlotte Abrams (301) 504-3403 of my staff.

Sincerely,



Joseph Holonich, Director
Repository Licensing and Quality
Assurance Directorate
Division of High-Level Waste Management
Office of Nuclear Material Safety
Safeguards

Enclosure: As stated

cc's: See next page

CC's for letter to John P. Roberts from Joseph J. Holonich, subject:
PHASE I REVIEW OF U.S. DEPARTMENT OF ENERGY (DOE) STUDY PLAN "CHARACTERIZATION
OF VERTICAL AND LATERAL DISTRIBUTION OF STRATIGRAPHIC UNITS WITHIN THE SITE
AREA" dated _____

cc: R. Loux, State of Nevada
T. J. Hickey, Nevada Legislative Committee
C. Gertz, DOE/NV
M. Murphy, Nye County, NV
M. Baughman, Lincoln County, NV
D. Bechtel, Clark County, NV
D. Weigel, GAO
P. Niedzielski-Eichner, Nye County, NV
B. Mettam, Inyo County, CA
V. Pce, Mineral County, NV
F. Sperry, White Pine County, NV
R. Williams, Lander County, NV
P. Goicoechea, Eureka County, NV
L. Vaughan II, Esmeralda County, NV
C. Shank, Churchill County, NV
E. Holstein, Nye County, NV.

ENCLOSURE

REFERENCES CITED IN STUDY PLAN TEXT AND NOT LISTED IN REFERENCES SECTION

Barbier, 1983 - Pages 2-10 and 3-15

Brocher, et al, 1990 - Page 3-14

Howard, et al, 1990 - Page 1-3

REFERENCES NOT CITED IN STUDY PLAN

Longman, I.M., 1959, Formulas for computing the tidal accelerations due to the moon and sun: Journal of Geophysical Research, v. 64, p. 2351-2355.

U.S. Department of Energy, 1990, Review Record Memorandum: Geologic and geophysical evidence pertaining to structural geology in the vicinity of the proposed exploratory shaft, Rev. 0, YMP/90-2, Nevada Operations Office, Yucca Mountain Project Office, Las Vegas, Nevada.

Zumberge, M.A., Harris, R.N., Oliver, H.W., Sasagawa, G.S., and Ponce, D.A., 1988, Preliminary results of absolute and high-precision gravity measurements at the Nevada Test Site and vicinity, Nevada: U.S. Geological Survey Open-File Report 88-242, 29 p.

**PHASE I COMMENTS ON STUDY PLAN 8.3.1.4.2.1
(CHARACTERIZATION OF VERTICAL AND LATERAL DISTRIBUTION
OF STRATIGRAPHIC UNITS WITHIN THE SITE AREA)**

NRC Comment 1: Among the references listed for this study plan are three which are cited within the study plan text, but are not listed in the study plan References section, and three which are cited in the References section, but do not appear in the text (See Enclosure). Due to insufficient information on the three references not listed in the References section of the study plan, the NRC staff is unable to determine whether or not they are readily obtainable. We therefore request that DOE either 1) provide the NRC with copies of the references listed in the Enclosure or 2) provide the full reference citation if the references are considered to be readily available.

DOE Response to NRC Comment 1:

The NRC is concerned with three references cited in the text but that are not listed in the study plan references. Two of the cited references are being added to the list of references for Study Plan 8.3.1.4.2.1:

Barbier, M. G., 1983, The Mini-Sosie Method: International Human Resources Development Corporation, Boston, Massachusetts, 90 p.

Brocher, T. M., Hart, P. E., and Carle, S. F., 1990, Feasibility Study of the Seismic Profile Method in Amargosa Desert, Nye County, Nevada: U.S. Geological Survey Open-File Report 89-133, 150 p.

The citation to "Howard, et al., 1990" (on pages 1-3) should read "Oliver, et al., 1990," which was correctly cited elsewhere in the study plan and correctly included in the list of references. These changes will be made in a future revision of the study plan. The Barbier reference is in the not-readily-available category. Please be advised that this is a copyrighted book (see attached copy of title page and copyright note) and should not be copied by NRC unless a specific waiver is acquired. DOE is currently seeking a copyright clearance to copy this document. If approval is given by the publisher, DOE will provide the NRC with a copy.

Three additional references are identified by the NRC which are listed in the study plan, but not cited in the text. Those references will be deleted from the reference list in any future revision of the study plan.

NRC Comment 2: The NRC staff expects that proper sealing of boreholes will be performed consistent with 10 CFR 60.134(a) which states, "Seals for shafts and boreholes shall be designed so that following permanent closure they do not become pathways that compromise the geologic repository's ability to meet the performance objectives for the period following permanent closure." These conclusions regarding boreholes described in this study plan should not be construed to mean that the NRC has reached the same conclusions with respect to additional or other boreholes not identified in this study plan.

DOE Response to NRC Comment 2:

DOE agrees with the NRC staff that proper sealing of boreholes must be performed consistent with 10 CFR 60.134 (a). The borehole sealing program is being developed by Sandia National Laboratories. Important aspects of this program will be discussed in Study Plan 8.3.3.2.2.1 Seal Material Properties Development, "Development of Strategy to Seal Boreholes" (SAND report expected in May 93) and other documents. Detailed information about the requirements for sealing boreholes will be presented in these documents.

NRC Comment 3: During the Phase I review the staff identified a concern related to the scope of Activity 8.3.1.4.2.1.2, "Surface-Based Geophysical Studies." In light of the June 29, 1992, Little Skull Mountain earthquake, the areal extent of the geophysical surveys shown on Figure 2.2-1 appears to be insufficient to encompass the Little Skull Mountain aftershock region. We recommend that DOE consider expanding the area of investigation to gain a better understanding of the source (geologic structure) of this event as well as the aftershocks. This comment will be included in the Detailed Technical Review of the study plan. We include it as part of this letter, because DOE plans to initiate activities related to this study plan in the near future.

DOE Response to Comment 3:

The area of this study plan is the site area only. Work under this study is not planned to be extended out to the Little Skull Mountain. However, several studies will cover the area of Little Skull Mountain. These include Study Plan 8.3.1.17.4.3 (Quaternary Faulting Within 100 km of Yucca Mountain, Including the Walker Lane) and 8.3.1.17.4.1 (Historic and Current Seismicity). In addition, DOE has prepared two reports on the Little Skull Mountain earthquake and has supplied the NRC with copies in transmittals on July 22, 1992, and August 31, 1992.