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NUCLEAR WASTE PROJECT OFFICE

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January 4, 1993

John W. Bartlett, Director
Office of Civilian Radioactive
Waste Management
U.S. Department of Energy
Washington, D.C. 20585

Dear Dr. Bartlett:

The State of Nevada has reviewed the DOE Study Plan "Quaternary Faulting Within the Site Area", Rev. 0, (Study Plan 8.3.1.17.4.6) and is providing its comments in this letter and attachment. The State's comments address the adequacy, completeness, and technical accuracy of the Study Plan to meet the Department's purpose in site characterization.

The State has three general comments regarding the subject Study Plan:

1. The Study Plan describes plans to use a scale of 1:24,000 for the final map of Quaternary faults. The State considers this scale to be inadequate to show the necessary detail of the faulting. For example, at the scale of 1:24,000, fault segments and possible interconnections between faults would be extremely difficult to adequately illustrate. The Study Plan also states that locations of well-exposed faults would be plotted to within a few tenths of a millimeter (5 meters on the ground). At the proposed scale, these measurements would be about the width of a pencil point. We suggest that a scale of 1:6,000 as used by the USGS be the mapping scale with supplemental compilations on 1:12,000 or 1:24,000-scale for illustrative purposes, if necessary.

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ADD: Mr. Youngblood *W.R. End.*

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2. In the Purpose and Objectives of the Study section, the site area for this study is defined as an area of about 240 km² that "encompasses the controlled area". What are the dimensions of this controlled area? To our knowledge, there has never been a consistent definition of the controlled area by the Department. Furthermore, the proposed area to be mapped does not include portions of, or, in some cases, entire Quaternary faults. For example, the Stagecoach Road fault, the northern end of the Paintbrush Canyon fault, and the southern portion of the Windy Wash fault are not included in the site area. The study area should be enlarged to include the entire tectonic package of faults at or near Yucca Mountain in order to get an accurate picture of the paleoseismic history of the site.

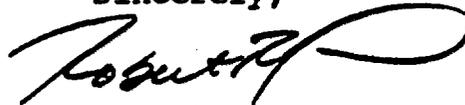
In fact, the studies of the paleoseismic histories of the Quaternary faults at and near Yucca Mountain are fragmented to such a degree that it is nearly impossible to determine which study will be specifically responsible for the comprehensive characterization of the total tectonic package at Yucca Mountain. For instance, the Midway Valley Study Plan (8.3.1.17.4.2) indicates that the characterization of the Midway Valley fault will be completed by this study (8.3.1.17.4.6), yet the fault is not discussed in this study. It would be more logical to expand this study to include a comprehensive assessment of all faults at and near Yucca Mountain.

3. Given the recent seismic event at Little Skull Mountain, the Department should revise the Study Plan to include investigations into other possible blind seismic sources.

Specific comments are listed in the attachment.

We look forward to your response to the State's comments. Should you have any questions, this Office is available to meet with the Department at any time.

Sincerely,



Robert R. Loux
Executive Director

RRL:cs
Attachment

cc: Carl Gertz, YMPO
Joe Youngblood, NRC
Dade Moeller, NRC-ACNW
Steve Kraft, EEI
Dwayne Weigel, GAO
John Cantlon, NWTRB

ATTACHMENT

1. On page 1-2, the statement is made that the study will identify faults within the repository block that have more than 1 meter of Quaternary offset and faults that would intersect the underground facilities that have inferred slip rates of more than 0.005 mm/yr. How were these criteria determined for selecting faults for study? The study plan fails to recognize the post-closure performance issue that would come with displacement on any fault, regardless of length, that in effect changes the hydrologic model.
2. On page 1-3, there is the statement that "information is needed to reduce the likelihood that the underground facilities will be located in areas of potentially active faults...so that the repository and its engineered barriers will comply with 10 CFR 60 and 10 CFR 960". The DOE criteria in 10 CFR 960 for siting in areas of active faulting are exclusionary. How does this statement in the Study Plan correlate to the criteria in 10 CFR 960?
3. On page 2.1-1, paragraph 1, it is suggested that, in addition to the phrase "information on faults along which Quaternary movement is known or suspected...", the words "or cannot be demonstrated not to have occurred" be added.
4. On page 2.1-1, paragraph 2, the study plan states that as relevant (emphasis added) information becomes available, it will be updated and incorporated. What is the DOE definition of "relevant information" and how will the determination of "relevance" be made?
5. On page 2.1-2, paragraph 2, the study plan indicates that DOE will identify and characterize major known potentially significant Quaternary faults only within 5 km of the FITS (Facilities Important to Safety). Will this area be sufficient to sufficiently characterize the potential for seismic movement that could affect the repository? Also, please define the phrase "major known potentially significant" as used in this paragraph.
6. On page 3.1-5, paragraph 3, the study plan states that the information obtained will be representative of faults that have offset of more than 1 meter and/or faults that have slip rates greater than 0.005 mm/yr. It seems logical to the State that any fault exhibiting Quaternary offset, if they intersect or could potentially intersect the repository block, should be investigated in considerable detail. According to Wells and Coppersmith, 1991, displacement of 1 meter would be the equivalent of a Mw 6.5 earthquake. Given the recent 5.6 magnitude earthquake at Little Skull Mountain and the public interest that this event generated, it would appear that faults with smaller offsets should also be investigated.

7. On page 3.1-5, paragraph 5, the study plan states that some data gaps and uncertainties are likely to occur that will impose limitations on the ability to recognize and characterize Quaternary faults in the site area. Given this statement, how does DOE intend to satisfy 10 CFR 60.122 regarding the extent to which a hazardous natural condition could be present and still be undetected?
8. On page 3.2-2, paragraph 2, the study plan discussed the numerical dating methods to be used in this study. Numerical age-dating of Quaternary stratigraphic datums is limited to the use of uranium-series, uranium-trend, and cation-ratio techniques and on page 2.2-1, it is stated that there are no reasonable alternatives. To the contrary, there are several additional techniques available and the study plan should incorporate as many of these as possible in order to cross-verify dating results, increase confidence, and reduce analytical uncertainty in probabilistic analyses.
9. On page 3.2-4, paragraph 1, mention is made of a "metric camera". Please explain what a metric camera is and its purpose.
10. On page 5-1 and Figure 5-1, the State supports the issuance of interim reports on each one of the major fault systems. One element missing from the schedule is the mapping and evaluation of "other suspected and possible fault zones", as indicated in test methods and procedures on page 3.2-3.
11. In the reference section, the references should include the 1:12,000 high and low angle photographic databases and the 1:6,000 high angle photos and topographic data of the USGS.