



Department of Energy

Washington, DC 20585

February 14, 1994

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

Reference: Ltr, Roberts to Holonich, dtd 10/14/92

Dear Mr. Holonich:

Enclosed is the U.S. Department of Energy's (DOE) response to one comment from the U.S. Nuclear Regulatory Commission's (NRC) review of study plan 8.3.1.17.3.5, "Ground Motion at the Site from Controlling Seismic Events," (enclosure 1). DOE's response to that comment is Enclosure 2 to this letter.

The NRC's comment suggests that planned work does not include sufficient emphasis on empirical methods of ground motion analysis. This study will employ some empirical ground motion analysis, and more information will be discussed in Activity 8.3.1.17.3.3.1 (Select or Develop Empirical Models for Earthquake Ground Motion). We hope to send the NRC Study Plan 8.3.1.17.3.3 (Ground Motion from Regional Earthquakes and Underground Nuclear Explosions) early in fiscal year (FY) 1995.

The NRC also drew DOE's attention (enclosure 1) to a Site Characterization Analysis (SCA) open item (Comment 66) related to the 10,000-year cumulative slip earthquake (CSE) concept. DOE had already informed NRC that the 10,000-year CSE concept was under reevaluation (reference) and verbally informed NRC staff that the 10,000-year CSE was being dropped at the technical exchange to explain DOE's proposed seismic hazard methodology on November 17, 1993. DOE will provide additional information relative to SCA Comment 66 when the Seismic Hazards Methodology Topical Report is transmitted to the NRC (mid-FY 1994).

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If you have any questions, please contact Ms. Sheila Long at 202-586-1447.

Sincerely,

A handwritten signature in dark ink, appearing to read "Dwight E. Shelor". The signature is fluid and cursive, with the first name "Dwight" and last name "Shelor" clearly distinguishable.

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

Enclosures:

1. Ltr, 11/2/93, Holonich to
Shelor, w/encl
2. Responses to NRC Comment

cc: w\enclosure

R. Nelson, YMPO
R. Loux, State of Nevada
T. Hickey, Nevada Legislative Commission
D. Bechtel, Las Vegas, NV
Eureka County, NV
Lander County, Battle Mountain, NV
P. Niedzielski-Eichner, Nye County, NV
W. Offutt, Nye County, NV
L. Bradshaw, 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

Study Plan 8.3.1.47.3.5

**Ground Motion at the Site from Controlling
Seismic Events**

COMMENT 1

The five approaches identified on Pages 2-2 and 2-3 as being potential methods for calculating ground motion are considered to be necessary, but do not include the full range of methods that should be considered.

BASIS

The study plan does not mention the evaluation of ground motion by empirical analysis. The empirical ground motion analysis is based on up-to-date strong motion data applicable to the seismicity and site conditions at Yucca Mountain.

RECOMMENDATION

The five approaches for calculating ground motion mentioned in the study plan should be supplemented and reinforced by using the empirical analysis approach. Consideration should be given to integrating the results from the empirical analysis with seismic modeling studies.

ENCLOSURE

U.S. DEPARTMENT OF ENERGY RESPONSE TO
U.S. NUCLEAR REGULATORY COMMISSION (NRC) COMMENT 1
ON STUDY PLAN 8.3.1.17.3.5
(GROUND MOTION AT THE SITE FROM CONTROLLING SEISMIC EVENTS)

NRC Comment 1

The five approaches identified on Pages 2-2 and 2-3 as being potential methods for calculating ground motion are considered to be necessary, but do not include the full range of methods that should be considered.

DOE Response to Comment 1

Contrary to NRC's Comment, Study 8.3.1.17.3.5 will apply an empirical approach as one of the potential methods for calculating ground motion. This approach is identified in the study plan as Methods 1 and 4 (pages 2-2 and 2-3). A difficulty arises, however, in applying the empirical method because of the paucity of data regarding earthquakes with $M > 5.9$ (Little Skull Mountain) as well as near-field data in the immediate vicinity of the site. Study objectives require that the smaller magnitude events be summed to provide estimates of ground motion resulting from larger magnitude (> 6.0) event, which is discussed as Method 4 in Study Plan 8.3.1.17.3.5. An empirical approach is also being detailed in a forthcoming study plan for Activity 8.3.1.17.3.3.1 (Select or Develop Empirical Models for Earthquake Ground Motions), in which models will be developed from larger and more comprehensive data bases that exist for tectonically similar areas, and a selection made as to which one(s) best fit the conditions at Yucca Mountain.