



UNITED STATES  
**NUCLEAR REGULATORY COMMISSION**  
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 JAN 03 1986

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NOTE FOR: Robert E. Browning, Director  
 DWM/NMSS

FROM: Karl R. Goller, Director *KRG*  
 DRPES/RES

SUBJECT: SEISMIC/TECTONIC PROGRAM FOR HLW REPOSITORY

Several RES/ESB seismology/geology professionals recently attended a DOE/NRC meeting on the annotated outline for DOE's Seismic/Tectonic Investigations for the HLW geologic repository sites. They reported back to me and other RES/DRPES management very favorably on the open discussion at the meeting, the clarifications and the positive agreements reached. They also made some other constructive observations which I would like to share with you.

DOE described its conceptual approach for implementation of the outline for seismic/tectonic assessments of the sites for licensing. This approach involves developing a generic catalog of all features or structures related to all tectonic processes and events throughout the world. They will then assess the consequences of these on a generic repository, and eliminate from further consideration those features unlikely to adversely impact compliance with repository performance objectives.

At the meeting, your staff objected to DOE's proposed elimination of processes or phenomena on a generic basis, and indicated that they would only accept elimination on a site specific basis. We agree with this decision, but are concerned that it may not go far enough, for the following reasons: (1) the dependence on features in a catalog that remain after a generic or site specific elimination process could lead to overlooking significant phenomena that occur at a site that are not in the catalog in the first place; (2) such an approach could possibly result in a large expenditure of NRC resources for review purposes, which, since all DOE projects are not required to use this approach, may not be advisable; (3) much of the information is already known to experienced field geoscientists and has been used extensively in the siting of critical facilities, which means they would be re-doing what has already been done; and (4) it would be of very limited use as only a small part would be relevant to specific sites because of their unique geologic character. Considering all of the above, we recommend that DOE be discouraged from using, for licensing purposes, the global catalog approach for identifying seismic/tectonic issues.

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Robert E. Browning

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In addition, my staff noted that it was not clear how seismic design criteria would be established for the HLW repository. Further, it was not clear whether adequate consideration for appropriately different seismic design criteria would be given for the pre- and post-closure periods. In their presentation, DOE regarded the pre-closure structures, systems, and components of relatively minor significance to safety. It is our judgment that it is important that adequate seismic design criteria be established for each of the two periods. Moreover, although the pre-closure period has a much shorter exposure time, it could present much greater vulnerability to seismic hazards and therefore be the more critical consideration.

The determination of seismic design criteria involves three major issues: the nature of seismic source structures or zones, the nature of the propagation of seismic energy to the site, and the characteristics of the specific response of the site. These issues will govern the types of seismic and tectonic investigations and probabilistic analyses required at each site. RES is preparing a program of seismic-tectonic research which focuses on these three issues to support the licensing review of a high level waste repository.

Finally, my staff learned that your staff has prepared a draft generic technical position, entitled Seismo-Tectonic Evaluation for HLW Repository Siting. This document is being readied for submission to the Federal Register for public comment. A DOE/NRC meeting to reach agreement on definitions and criteria relating to seismic design considerations is planned for January. The results from this meeting should be incorporated into this document. Additionally, based on our review of this document, which is summarized in an August 27, 1985 memo from Leon L. Beratan to Malcolm R. Knapp, it would seem prudent to delay its publication pending further revision.

These observations are offered in the spirit of support and cooperation. I and/or my staff are available to discuss these with you and/or your staff, as you might wish.

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