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MEMORANDUM FOR:

David J. Brooks, Section Leader  
Geochemistry Section  
Technical Review Branch

Distribution:

FROM:

Paul J. Bemia  
Geochemistry Section  
Technical Review Branch

(Return to WM, 623-SS)

SUBJECT:

TRIP REPORT FOR NEVADA VISIT, SEPTEMBER 21 - 25, 1987

The purpose of this trip to Nevada was two-fold. First, I was to participate in the Seismic/Tectonic Briefing presented for the NRC by the DOE, gathering as much information as possible concerning the DOE's treatment of seismic/tectonic effects on site geochemistry (SCP Section 8.3.1.8.4., "Studies to Provide Information Required on Changes in Rock Geochemical Properties Resulting From Tectonic Processes), and on the treatment of other geochemical investigations as presented in the SCP. The second part of this trip was a one-day site visit to the Nevada Test Site and Yucca Mountain.

The Seismic/Tectonic Strategies Briefing consisted of two full days of formal presentations by personnel from DOE/WMPD, SAIC, and the USGS. These presentations described the strategies for the seismic/tectonic investigations presented in the SCP, using examples from the Yucca Mountain consultation draft. The NRC staff and State of Nevada personnel were regularly given the opportunity to ask questions of clarification concerning the material presented during the briefing.

I feel that the Seismic/Tectonic meeting was a useful information session. Although the briefing was not, and was not intended to be, a detailed technical discussion of Yucca Mountain issues, I feel that the information presented will be helpful in my review of the SCP. The DOE's "walk through" of various SCP seismic/tectonic sections helped me to gain an understanding of how this complicated document is supposed to work, even though the examples used during the presentations did not specifically treat tectonic effects on site geochemistry. I also felt that this meeting was good preparation for the Issues Hierarchy Meeting held at DOE Forrestal on October 8 and 9.

An interesting point was brought up during the meeting concerning proposed geochemical investigations at Yucca Mountain. During a Site Characterization Overview presentation, Jerry Frazier of SAIC commented that the DOE will not rely upon natural system retardation processes (both chemical and mechanical) as primary radionuclide barriers in postclosure performance assessment. I spoke with him after his presentation to confirm this statement, since I had not previously heard this position from the DOE. He introduced me to Jean Younker of SAIC, who confirmed that the DOE did not need to rely upon natural system retardation as a primary barrier. This is important since the degree the DOE will rely upon natural system retardation as a primary radionuclide

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barrier will affect the level of confidence required in values of various geochemical parameters. This may then affect the level of detail of the DOE's characterization of Yucca Mountain site geochemistry. At the Issues Hierarchy Meeting on October 8 and 9, I pursued this point again because a view graph presented during the meeting showed that natural system retardation would be relied upon as a primary radionuclide barrier. I spoke with Jean Younker, and after finding the appropriate section of the SCP, Jean determined that natural system retardation will indeed be relied upon as a primary radionuclide barrier. The barrier assessment is presented in SCP Section 8.3.5.13, which addresses total system performance.

A summary of the Seismic/Tectonic Strategies Briefing is presented in Attachment 1. This document was prepared jointly by personnel from the NRC, DOE and the State of Nevada at the conclusion of the Seismic/Tectonic Strategies Briefing.

The second part of the trip to Nevada was a visit to the Nevada Test Site and Yucca Mountain. Larry McKague of Lawrence Livermore National Laboratory led the trip, and Charlotte Abrams, Keith McConnell, King Stablein and I participated. The Yucca Mountain Site visit was especially rewarding for me, as it was my first visit to the site. I was given the opportunity to see, first-hand, important site features such as the Trench 14 calcite-silica deposits, the Lathrop Wells basaltic cone, and outcrops of some of the key geologic units of the Yucca Mountain area. Attachment 2, which was prepared by Charlotte Abrams, describes the locations of the various stops made during the Yucca Mountain site visit.

I have a copy of the view graphs from the Seismic/Tectonics Briefing as well as a list of attendees. If you would like to see any of this material or have any questions about either part of this trip, please contact me.

**ORIGINAL SIGNED BY**

Paul J. Bembia  
Geochemistry Section Technical Review  
Branch

Enclosure:  
As stated

Summary of the September 22 & 23, 1987 Briefing  
on the NNWSI Project Seismic/Tectonic Site Characterization Plan Strategies

Background:

Both NRC and DOE have expressed a desire to meet and discuss the approach for addressing seismic/tectonic issues as contained in the SCP, including the application of the performance allocation process. The last seismic/ tectonic meeting was held in December, 1985. The draft SCP was completed in August and this seismic/tectonic meeting was then scheduled (August 28, 1987 letter from James Knight (DOE) to Robert Browning (NRC)) for September 22-23, 1987.

Objective:

The objective of the meeting was to communicate, to the NRC and State, information about plans in the NNWSI Project SCP for tectonics investigations. The presentations had multiple objectives, including 1) provide information to the NRC about organizing principles used to prepare Chapter 8 of the SCP, and 2) provide an overview of the tectonics field programs. The emphasis of the meeting was not a substantive technical discussion; rather, the meeting was designed to serve primarily to present background information to facilitate review of the NNWSI Project SCP by NRC and State staff. The presentations were designed to provide future reviewers information about how the performance allocation process, as applied to the design and performance issues, was used to identify the need for tectonics information.

The objective of the NRC and State was to make no formal presentation but rather to ask questions about the DOE presentations for the purpose of clarification, to raise some concerns, and to answer questions asked by the DOE to clarify those concerns.

Agenda:

(See enclosed viewgraphs)

DOE Presentation

(See enclosed viewgraphs)

NRC Response:

NRC concerns presented at the opening of the meeting were as follows:

- o Rationale behind numerical goals expressed in pre-meeting material.
- o DOE's use of probabilistic and deterministic methods.
- o Uncertainty regarding the qualification of existing data.

In addition, the NRC raised the following topics in the course of the meeting:

- o Operational "definition" of anticipated processes and events and unanticipated processes and events.
- o Use of non-standard terminology (e.g., exceptional earthquake).

- o Relationship of tentative parameter goals to EPA standard in reference to volcanism and potential canister rupture.
- o Use of pre-assigned probabilities to potentially limit the scope of investigations.
- o Relationship of selected goals vs. required criteria.
- o Availability of references (e.g., Meremonte and Rogers, 1987; Perkins et al, 1986; Rogers et al, 1987).
- o Possible use of and/or departure from Appendix A and interrelationship to Part 72.
- o Basis for 100 km radius limiting factor for relevant earthquake sources.
- o Relationship of SCP strategy to Part 60.122 and licensing strategy.
- o Relative importance of understanding the effects of tectonic processes vs. an understanding of the processes themselves.

No specific action or open items resulted from the meeting or the discussion of these topics. If, after further consideration of the pre-meeting material and the presentations and discussions that took place at the meeting, the NRC determines followup action is needed in these or other areas, the NRC will send the DOE a letter expressing those concerns and proposing appropriate followup activities related to those concerns.

State of Nevada Comments:

The objective of this briefing was for DOE to provide the basis for the NNWSI approach to resolving technical issues that require seismic/tectonic data. The purpose of the briefing was not to engage in substantive technical discussion on issues. The State would encourage subsequent meetings or workshops to pursue technical discussion of issues.

The DOE has proposed a number of new approaches to resolving issues: i.e., seismic hazard evaluation. There is a question whether such new approaches have received acceptance within the scientific community. These approaches appear to be less conservative than previously accepted approaches. The State has concern whether these new approaches provide adequate assurance of protection of public health and safety.

The DOE approach to resolving seismic/tectonic issues places emphasis on identifying the effects of seismic/tectonic processes. Such an approach appears to lead to a piecemeal technical program, which has potential to miss or minimize data important to understanding seismic/tectonic processes. The State's view is that first the seismic/tectonic processes must be completely understood before effects of the processes can be evaluated. This approach can provide additional assurance that technical processes and interactions are fully understood prior to evaluating effects.

DOE Comments:

DOE cautions that, as mentioned during the meeting, the briefing was intended to provide only a summary overview of the content of over 900 pages of SCP material as an aid to the NRC and State review process. DOE considers that

both NRC and the State should rely on detailed review of the complete SCP in order to obtain a comprehensive, detailed understanding.

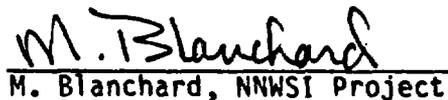
The DOE believes that the approaches to seismic hazard evaluation described in the SCP have ample conservatism and will be acceptable to the technical community.

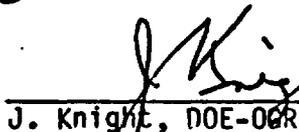
The DOE looks forward to further interactions with the NRC and State in the seismic/tectonic area following review of the SCP.

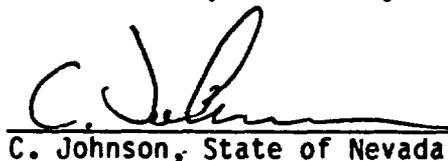
Acknowledgements:

The undersigned agree that this summary is a fair representation of the meeting. The signatures below do not necessarily indicate agreement with the comments or views expressed by other participants.

  
\_\_\_\_\_  
J. Linehan, NRC

  
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M. Blanchard, NNWSI Project

  
\_\_\_\_\_  
J. Knight, DOE-OR

  
\_\_\_\_\_  
C. Johnson, State of Nevada