

CENTER FOR NUCLEAR WASTE REGULATORY ANALYSES

TRIP REPORT

SUBJECT: Joint meeting of the Nuclear Waste Technical Review Board (NWTRB)
Panels on Natural Systems and Engineered Systems on Seismic Issues
(20.06002.01.061)

DATE/PLACE: February 24, 2003

AUTHOR: H. Lawrence McKague

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TRIP REPORT

SUBJECT: Joint meeting of the Nuclear Waste Technical Review Board (NWTRB) Panels on Natural Systems and Engineered Systems on Seismic Issues (20.06002.01.061)

DATE/PLACE: February 17, 2003, Best Western Tuscany Suites, Las Vegas

AUTHOR: H. Lawrence McKague

PERSONS PRESENT: NWTRB Members, NWTRB staff, consultants to NWTRB, DOE staff, DOE subcontractors and consultants, and 30–40 in the audience

BACKGROUND AND PURPOSE OF TRIP:

On Monday and Tuesday, February 24 and 25, 2003, panels of the Nuclear Waste Technical Review Board met in Las Vegas, Nevada, to review matters associated with a potential Yucca Mountain repository. On February 24, the Board's Panel on the Repository and Panel on Site Characterization met jointly to discuss seismic issues. On February 25, the Board's Waste Management System Panel met to review plans for operating the waste management system associated with a Yucca Mountain repository including the DOE plans for waste acceptance at nuclear power plants and other points of origin, and for DOE to discuss its efforts to develop a transportation plan for transporting spent fuel and high-level radioactive wastes to the proposed Yucca Mountain repository. The author did not attend the February 25, 2003, panel session. The purpose of the trip was to attend the DOE presentation in light of outstanding seismic issues. The meetings were open to the public, and an opportunity for public comment was provided.

SUMMARY OF PERTINENT POINTS:

Both pre- and postclosure seismic issues were addressed in the course of the meeting. The meeting started with a short presentation by William Boyle. He was followed by Carl Stepp who reviewed the PSHA elicitation and took care to emphasize, several times, that only standard practices were followed with regards to methodology and guidance. A new seismic hazard curve for earthquakes with recurrences of 10^{-8} and greater was shown. The low probability earthquakes were associated with accelerations of 30 g. It was conceded by all present that such ground motions were unrealistic and resulted from the uncertainty developed in the elicitation process. Nevertheless, it was determined that such ground motions could not be rejected. Extensive discussion followed throughout the day on the low probability events and their associated high ground motions. The group discussed two options to reduce the estimated high ground motion. One was to truncate of the hazard curve at a recurrence rate greater than 10^{-8} . The second was to use one or more empirical approaches, such as reducing the ground motion by evaluating the physics of high ground motion and its effect on the rocks,

based on the fact that at some level of ground motion the rocks no longer behave in an elastic manner.

A second point that was raised several times with regards to both pre- and post closure seismicity was facility redesign. Several panel members, at various times, suggested alternative designs for both the surface and subsurface facilities to mitigate the effects of strong ground motion. DOE made it clear that they were not, at that time, going to modify either the surface facilities or subsurface design, as these designs were often driven by other considerations.

In conjunction with discussions on tunnel stability, the panel recommended that the history of rock fall in the Area 12 tunnels be examined. I believe that this will be a low payoff task as the tunnels are excavated in thinly bedded ash falls, ash flows and bedded tuffs that are not moderately or strongly welded as at Yucca Mountain and are commonly extensively zeolitized. In addition, their history of ground motion is complex, the tunnels were constructed with a variety of methods, and, I suspect, the history of rock fall was poorly documented.

An area of phenomenology from the nuclear tests that might be worth reviewing is the ground motion records from instrument holes associated with some of the nuclear tests on Pahute Mesa. This data may contain information that could bound maximum ground motion that rocks can sustain.

CONCLUSIONS:

The presentations by DOE and its contractor provided the NWTRB panel with an overview of the current status of the DOE seismic program. A number of suggestions were made on methods to determine the maximum ground motion that could be associated with the low probability earthquakes and the use of geologic and mineralogic features to bound the upper limit of previous ground motion at Yucca Mountain. DOE took these recommendations under advisement, and will start some of the studies related to physical stability of minerals in lithophyses.

PROBLEMS ENCOUNTERED:

None

PENDING ACTIONS:

None

RECOMMENDATIONS:

Suggest that NRC recommend to DOE to investigate the potential for data from ground motion records associated with nuclear tests on Pahute Mesa to constrain the upper limit of ground motions that volcanic rocks can sustain. For additional meeting details and clarification, the reader should review the transcript of the meeting. It has recently been added to the NWTRB website.

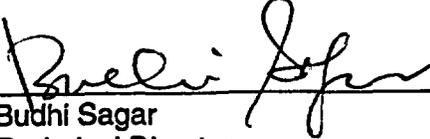
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