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AUG 27 2002

OVERNIGHT MAIL

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CLOSURE OF COMMITMENT TO PERFORM A DETERMINISTIC SEISMIC HAZARD ASSESSMENT

Reference: (1) *Methodology to Assess Fault Displacement and Vibratory Ground Motion Hazards at Yucca Mountain*, YMP/TR-002-NP, Revision 1, MOL.1998106.0777
(2) Ltr, Brocoum to Bell, dtd 3/16/95, with enclosure, *Methodology to Assess Fault Displacement and Vibratory Ground Motion Hazards at Yucca Mountain,* MOL.19951931.0160

As a condition for U.S. Nuclear Regulatory Commission (NRC) acceptance of Seismic Topical Report 1 (Reference 1) prepared pursuant to 10 CFR 60, *Disposal of High-Level Radioactive Wastes in Geologic Repositories,* the U.S. Department of Energy (DOE) agreed to perform a deterministic evaluation of the seismic hazard for Type 1 faults within 5 kilometers of the Yucca Mountain, Nevada, site. In Reference 2, DOE committed to include the results of a deterministic seismic hazard evaluation in Seismic Topical Report 3 (STR3).

Since the commitment was made, several developments have occurred, including:

- *Probabilistic Seismic Hazard Assessment for Fault Displacement and Vibratory Ground Motion at Yucca Mountain* (PSHA) has been completed.
- Final 10 CFR Part 63, *Disposal of High-Level Radioactive Wastes in a Geologic Repository at Yucca Mountain, Nevada*, was issued establishing a risk-informed, performance-based regulatory framework for the licensing of the Yucca Mountain repository.
- Probabilistic seismic hazard analysis has become generally accepted practice for the safety assessment of nuclear facilities.

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Consequently, because DOE has completed a PSHA, performance of a deterministic analysis would not provide useful information regarding repository safety. In addition, the final regulations do not require a deterministic seismic hazard analysis. Therefore, DOE no longer intends to include a deterministic seismic hazard analysis in STR3, and DOE considers the previous commitment closed. The enclosure provides additional discussion of the basis to close the commitment.

This approach has been discussed with Philip S. Justus of your staff. Please contact Timothy C. Gunter at (702) 794-1343 or J. Timothy Sullivan at (702) 794-5589 for any additional information.

William Boyle for

Joseph D. Ziegler
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OL&RC:TCG-1506

Enclosure:
Basis for Closure of the U.S. Department of Energy (DOE) Commitment to Perform a Deterministic Seismic Hazard Assessment at Yucca Mountain

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ENCLOSURE

Basis for Closure of the U.S. Department of Energy (DOE) Commitment to Perform a Deterministic Seismic Hazard Assessment at Yucca Mountain

Background

On June 30, 1994, the DOE submitted Seismic Topical Report 1 (STR1), *Methodology to Assess Fault Displacement and Vibratory Ground Motion Hazards at Yucca Mountain*, to the U.S. Nuclear Regulatory Commission (NRC) for review (Reference 1). On September 7, 1994, the NRC replied by letter (Reference 2) that they found the report insufficiently complete and not acceptable for detailed review. One of the principal reasons that the NRC gave to support this position was that the staff expected to see both deterministic and probabilistic analyses addressed in the methodology. More specifically, the topical report did not describe how the results of a deterministic analysis would be considered if the results were found to be different from the results of the probabilistic assessment.

The NRC concerns were discussed at a U.S. Department of Energy (DOE)/NRC meeting on October 7, 1994, during which the DOE provided an overview of the probabilistic seismic hazard assessment methodology described in STR1 and stated its intent to obtain early NRC review of seismic design input parameters by submitting a series of three seismic topical reports. The DOE stated that most of the concerns raised by the NRC in its acceptance review of STR1 would be more appropriately addressed in planned STR2 and STR3. The DOE followed the October 7 meeting with a formal response by letter dated November 9, 1994, which requested that the NRC resume its review of STR1 (Reference 3).

As a condition for obtaining NRC acceptance of STR1, the DOE, in a letter (Reference 4), committed to perform a deterministic evaluation of seismic hazard for Type I faults within 5 kilometers of the Yucca Mountain site, in addition to a probabilistic seismic hazard analysis (PSHA). This condition was considered necessary at the time in order to address the staff's concern that some significant faults near the proposed repository might be overlooked in the probabilistic seismic hazard assessment. However, all faults near the proposed repository were included in the PSHA (Reference 5), and following issuance of Reference 5, the cognizant NRC staff have not questioned the characterization of faults near the proposed repository. The PSHA can be used to fully understand the significance and contribution of each seismic source including all the faults near the proposed repository.

Relevant Subsequent Developments

Subsequent to the letter of March 16, 1995 (Reference 4), there have been a number of important developments which, in the view of the DOE, make a deterministic seismic hazard assessment at Yucca Mountain unnecessary:

1. The DOE has completed a PSHA (Reference 5).
2. The NRC has accepted a probabilistic methodology for the evaluation of seismic hazards at the Private Fuel Storage facility in Utah. (Reference 6)

3. PSHAs have been completed for many DOE nuclear facilities in accordance with DOE Standard 1023. The NRC finalized 10 CFR Part 63, which establishes a risk-informed, performance-based regulatory framework for licensing the Yucca Mountain repository (e.g., a probabilistic safety assessment for preclosure and a probabilistic performance assessment for postclosure are required).
4. The NRC issued Regulatory Guide 1.165, *Identification and Characterization of Seismic Sources and Determination of Safe Shutdown Earthquake Ground Motion*, which provides guidance for identification and characterization of seismic sources and determination of safe shutdown earthquake ground motion using probabilistic methods.
5. The NRC provisionally accepted STR2, which stated that the DOE intends to follow a process similar to that in Regulatory Guide 1.165 for the purpose of deriving ground motion inputs for seismic design of the structures, systems, and components at Yucca Mountain.
6. The NRC Staff, in SECY-99-100, *Framework for Risk-Informed Regulation in the Office of Nuclear Material Safety and Safeguards*, described its proposed implementation of risk-informed and performance-based regulation, which subsequently was adopted by the NRC.
7. The NRC staff states in NUREG-1804, Revision 2, *Yucca Mountain Review Plan, Draft Report for Comment,* that its review of the Yucca Mountain license application will implement the Commission's policy regarding risk-informed regulation.

Considering the promulgation of Part 63 as a performance-based rule, the Commission's policy guidance on risk-informed regulatory review, and the broad application and now generally accepted practice of using probabilistic seismic hazard results as the basis for safety reviews of nuclear facilities, DOE's license application for the proposed Yucca Mountain repository will be based on probabilistic analyses and results. The DOE believes that performing a deterministic seismic hazard analysis for the Yucca Mountain site would be inconsistent with the requirements of the performance-based regulation, with NRC's current risk-informed review policy, and with current general practice for seismic safety reviews of nuclear facilities and, consequently, is no longer necessary.

References:

1. DOE (U.S. Department of Energy, Yucca Mountain Site Characterization Office) 1994. Request For Review and Comment Department of Energy Approved Topical Report Entitled, "Methodology to Assess Fault Displacement and Vibratory Ground Motion Hazards at Yucca Mountain." Letter from D. E. Shelor (DOE) to J. J. Holonich (NRC), June 30, 1994, Washington, D.C.
2. NRC (U.S. Nuclear Regulatory Commission) 1994. Topical Report on "Methodology to Assess Fault Displacement and Vibratory Ground Motion Hazards at Yucca Mountain." Letter from M. J. Bell (NRC) to R. A. Milner (DOE), September 7, 1994, Washington, D.C.

3. Brocoum, S. J. 1994. "Topical Report on 'Methodology to Assess Fault Displacement and Vibratory Ground Motion Hazards at Yucca Mountain.'" Letter from S. J. Brocoum (DOE/YMSCO) to M. J. Bell (NRC), November 9, 1994, AMSL:TWB-557, with enclosure. ACC: MOL.19950804.0312; MOL.19950804.0313.
4. Brocoum, S. J. 1995. "Topical Report 'Methodology to Assess Fault Displacement and Vibratory Ground Motion Hazards at Yucca Mountain'." Letter from S. J. Brocoum (DOE/YMSCO) to M. J. Bell (NRC), March 16, 1995, with enclosure. ACC: MOL.19951031.01660.
5. Wong, I.G. and Stepp, C. 1998. *Probabilistic Seismic Hazard Analyses for Fault Displacement and Vibratory Ground Motion at Yucca Mountain, Nevada.* Milestone SP32IM3, September 23, 1998. Three volumes. Oakland, California: U.S. Geological Survey. ACC: MOL.19981207.0393.
6. U.S. Nuclear Regulatory Commission, 2000, Safety Evaluation Report Concerning the Private Fuel Storage Facility, Docket No. 72-22, September 2000.