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UNITED STATES
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PDR: per C. Lui

November 21, 1996

MEMORANDUM TO: John H. Austin, Chief
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SUBJECT: TRIP REPORT FOR PROBABILISTIC SEISMIC HAZARD ANALYSIS -
SEISMIC SOURCE CHARACTERIZATION WORKSHOP #2, SALT LAKE CITY,
UTAH, OCTOBER 16-18, 1996

DOE held a second workshop on seismic source characterization (SSC) for the proposed high-level waste repository at Yucca Mountain (YM), Nevada, on October 16-18, 1996. SSC is part of the probabilistic seismic hazard analysis (PSHA) study being conducted by DOE. The objective of this PSHA study is to provide the annual probability with which various levels of vibratory ground motion and fault displacement may be exceeded at the YM site. These results will be used as a basis for developing seismic design inputs and in assessing the pre- and post-closure performance of the YM site and facilities.

The main goals of this second SSC workshop were to review the data that are available for the YM region, and to identify available methodologies for characterizing seismic sources for the YM site. Philip Justus and Christiana Lui attended this workshop as observers from NRC. John Stamatakos (CNWRA) also attended and was invited to present relevant and new data from studies conducted by the CNWRA.

The workshop started with an introductory session. Tim Sullivan (DOE) gave a brief update of the related YM programs since the first workshop which was held in April 1995. Carl Stepp (Woodward-Clyde) followed. He presented the schedule and related milestones for PSHA, and introduced members of the PSHA peer review panel. He also stated that a participatory peer review process where the reviewers attend each workshop and provide their informal inputs to Carl Stepp after each workshop has been adopted for this study.

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Kevin Coppersmith (Geomatrix) wrapped up this introductory session by providing a process overview, guidelines for the workshop, a list of SSC subject-matter experts and facilitation team members, and the goals for the upcoming SSC workshops. The agenda, list of attendees and reprints of presentations by Tim Sullivan, Carl Stepp and Kevin Coppersmith are included as Attachment 1, Attachment 2, Attachment 3, Attachment 4 and Attachment 5, respectively. The remainder of this workshop was devoted to the presentation and discussion of relevant data and methodologies. Attachment 6 contains reprints of these technical presentations as enumerated in the workshop agenda and other relevant technical articles that were available to the NRC staff during the workshop.

DOE has chosen to implement a formal expert elicitation process for the performance of PSHA. For SSC, six subject-matter experts were selected from each of three disciplines: seismology/geophysics, tectonics/regional geology and Quaternary geology/paleoseismology. Tim Sullivan provided a copy of biographical sketch of each of the subject-matter experts to the NRC. Note that due to the long lag time between the first and second SSC workshops, Anthony J. Crone is no longer on the panel. He has been replaced by Peter L.K. Knuepfer. All biographical sketches are included as Attachment 7. During this SSC workshop, six three-member expert teams were formed by random drawing. Each team contains one subject-matter expert from each of the three disciplines. The membership of these expert teams is listed in Attachment 8. Members of individual teams are expected to collaborate such that only one assessment will be elicited from each team during the elicitation session.

Prior to the conclusion of this workshop, a copy of the Management Procedures Manual on "Scientific Expert Elicitation" (YMP-USGS-QMP-3.16, RO) was distributed. All subject-matter experts were asked to sign a statement certifying that they have received and read the procedure during the workshop. A copy of this procedure is included as Attachment 9.

During the feedback sessions at the end of each day, the NRC and CNWRA provided technical inputs to the group as appropriate. Philip Justus clarified aspects of QA as required to support a license application, and emphasized distinctions between Type I faults in NUREG-1451 and faults as a Type I seismic source in "Recommendations for Probabilistic Seismic Hazard Analysis: Guidance on Uncertainty and Use of Experts" (also known as the "SSHAC" report). John Stamatakos announced the impending availability of CNWRA's list of Type I faults.

DOE and NRC also met to discuss issues related to the implementation of an expert judgment elicitation process outside the main workshop. Issues discussed were: (1) status of DOE's decision criteria and procedure for updating the elicited judgments; (2) the need to document changes made to the elicited judgments based on the feedback; (3) status of the SSHAC report; (4) the various expert roles as delineated in the SSHAC report (i.e., proponent, evaluator and technical facilitator/integrator); (5) robustness of the final results with regard to the use of individual experts versus expert teams; and (6) documenting and disclosing potential conflict of interest (COI). Christiana Lui and Tim Sullivan exchanged view points regarding the first five issues. For the last issue, DOE is seeking input on acceptable

approaches to disclosing and documenting potential COIs because, by design, NRC's "Branch Technical Position on the Use of Expert Elicitation in the High-Level Waste Program" does not recommend any specific means for accomplishing this goal.

The third SSC workshop will be held at Amargosa Valley, Nevada, on November 18-21, 1996. The main goal of this third workshop will be to discuss alternative models, hypotheses, and interpretations that are important to the characterization of seismic sources for vibratory ground motion hazard and fault displacement hazard. Several field trips to the YM region will be included as part of this third workshop. The elicitations are currently scheduled to take place during February and March 1997, followed by a feedback workshop in April 1997. The final PSHA report is due to DOE from its contractor at the end of August 1997.

Attachments: As stated

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per. C. Lui