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DOCKETED  
USNRC

March 20, 2003 (11:39AM)

OFFICE OF SECRETARY  
RULEMAKINGS AND  
ADJUDICATIONS STAFF

March 14, 2003

The Honorable Thomas S. Moore, Chairman  
Atomic Safety and Licensing Board  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555-0001

Re: MOX Fuel Fabrication Facility Construction Authorization  
Request Proceeding, Docket No. 70-3098-ML

Dear Judge Moore:

On May 17, 2002, DCS provided the Atomic Safety and Licensing Board and the parties with a list of experts who Duke Cogema Stone & Webster expected to provide testimony in the above-captioned proceeding, in accordance with paragraph 10 of the Atomic Safety and Licensing Board's April 30, 2002 Memorandum and Order. This letter is to inform the Board and the parties of two modifications to that listing of experts.

First, Mr. Mike Golden will not provide testimony regarding GANE Contention 2, "Lack of Physical Protection in Facility Design."

The Honorable Thomas S. Moore, Chairman  
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Second, Dr. J. Carl Stepp has been retained by DCS and will testify regarding GANE  
Contention 3, "Inadequate Seismic Design." Relevant biographical information for Dr. Stepp is  
attached.

Sincerely,

A handwritten signature in black ink, appearing to read "Marjan Mashhadi", with a long horizontal line extending to the right.

Marjan Mashhadi

**J. CARL STEPP, Ph. D.**  
871 Chimney Valley Road  
Blanco, TX 78606-4643  
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Fax: 830 833 5724  
cstepp@moment.net

**Earthquake Hazards  
Seismic Regulation  
Engineering Seismology**

## **EDUCATION**

Pennsylvania State University, University Park: Ph.D., Geophysics, 1971  
University of Utah, Salt Lake City: M. S., Geophysics, 1961  
Oklahoma State University, Stillwater: B. S., Geology, 1959

## **REPRESENTATIVE EXPERIENCE**

1993 – Present: Owner and Principle, EHS - providing consulting services in engineering seismology, earthquake hazards, and seismic regulation.

### Relevant Current Projects

- Chairman, Peer Review Panel: Clinton Early Site Permit Application for a next generation nuclear generating plant; CH2M Hill.
- Chairman, Peer Review Panel: CEUS Ground Motion Project; Jack R. Benjamin & Associates.
- Chairman, Peer Review Panel: “Probabilistic Seismic Hazard Assessment of Swiss Nuclear Plants”, for Swiss Federal Nuclear Safety Inspectorate. (Level 4 PSHA for Swiss Nuclear Plants).
- International Atomic Energy Agency:
  - Instructor, short courses on implementing IAEA Seismic Safety Guidelines,
  - Member of drafting panel for revision of IAEA Seismic Safety Guidelines,
  - Expert reviewer: Safety Guidelines for Korea Advanced Nuclear Reactor
- Executive Director, Consortium of Organizations for Strong Motion Observation Systems.
- Consultant, Yucca Mountain High-Level Waste Repository Project for seismic design basis development and licensing.

### Recently Completed Projects (past 5 years)

- Chairman, United States Committee for Advancement of Strong Motion Programs.
- Consultant, Westinghouse Savannah River Project.
- Chairman, Peer Review Panel, “Technical Assistance for Proposed NRC Rulemaking – Geological and Seismological Characteristics for Siting and Design of Dry Cask Independent Spent Fuel Storage Installations – Changes to 10 CFR Part 72”, ICF Consulting.
- Chairman, Peer Review Panel, USNRC Project to revise standard ground motion response spectra for design of nuclear power plants and develop a design ground motion library for nuclear power plants in the United States.

- Consultant: "Probabilistic Seismic Hazard Evaluation of Korea Nuclear Plants", Korean Electric Power Research Institute.
- Project Director: Probabilistic Seismic Hazard Analyses for Ground Motion and Fault Displacement at Yucca Mountain, Nevada, US Department of Energy.
- Pre-closure Seismic Design Methodology for a Geologic Repository at Yucca Mountain, Topical Report YMP/TR-003-NP, US Department of Energy.
- Member Review Panel, Canadian Atomic Energy Control Board Probabilistic Seismic Hazard Evaluation for the Darlington and Peckering Nuclear plants.

#### Other Experience (20 years)

1983 - 1993: Manager of the Seismic Center, Electric Power Research Institute, Inc. (EPRI).

- Key products developed by the Seismic Center and used by the NRC supporting resolution of nuclear plant seismic regulatory issues:
  - Validated SSI analysis models supporting resolution of USI A-40;
  - Methodology for Probabilistic Seismic Hazard Assessment and resolution of seismic issues for NPPs in the central and eastern United States (This product was adopted in large part as the SSHAC recommended PSHA methodology);
  - Seismic Margin Methodology for resolution of NPP seismic design margin;
- Other relevant key products
  - Technical basis (through NEI) for revision of the NRC's 10 CFR Part 50 and 10 CFR Part 100 rulemaking and technical basis for Regulatory Guide 1.165.
  - Engineering procedures for estimating earthquake ground motion, accounting for local geology and soil effects.
- Supervised the development of more than 60 technical reports on a range of ground motion evaluation and seismic analysis and design methods and two large-scale model soil-structure interaction experiments that had multi-national participation.

#### **PROFESSIONAL ACTIVITIES**

- Chairman, Board of Advisers, Mid-America Earthquake Center, 1997 - 2002
- Chairman, Coalition of Professional Associations for Support of NEHRP, 1996 -
- Co-Chairman, International Advisory Committee, 5<sup>th</sup> International Conference on Seismic Zonation, 1995.
- Member, Oversight Committee, FEMA Project: Earthquake Risk Reduction in the United States, An assessment of Selected User Needs and Recommendations for the National Earthquake Hazards Reduction Program, 1994.
- Member, Oversight Committee, National Institute of Building Sciences/FEMA, Assessment of the State of the Art Earthquake Loss Estimation Methodologies, 1993 - 95
- Member, NCEER/FHA Highway Seismic Research Council Technical Group, 1992 - 98
- Member, NCEER Scientific Advisory Committee, 1991 - 1996.
- Co-Chairman, ASCE Specialty Conference on Seismic Design of High Level Nuclear Waste Repositories, San Francisco, CA, August 19, 20, 1992.
- Co-Founder, Coalition of Professional Associations for Support of National Earthquake Hazard Reduction Program, 1991.
- Member, ASCE Working Group on Seismic Design of High Level Nuclear Waste Repository Facilities, 1990 - 95
- President, Earthquake Engineering Research Institute, 1990 - 1992.

- Co-Chairman, International Advisory Committee, 4th International Conference on Seismic Zonation, 1991.
- Member, National Research Counsel Subcommittee on Earthquake Engineering Research, 1988-1990.
- Member, American Nuclear Society, Waste Management Committee - Subcommittee on Standards Review, 1981-1984.
- Board of Directors, Earthquake Engineering Research Institute, 1982-1984 and 1989-1993.
- Editorial Board, Earthquake Spectra, 1985-1992.

## PROFESSIONAL ASSOCIATIONS AFFILIATION

American Geophysical Union  
 Earthquake Engineering Research Institute  
 Society of Exploration Geophysicists  
 Seismological Society of America  
 Honor Societies:  
     Phi Kappa Phi (1959)  
     Sigma Xi (1961)

## PUBLICATIONS (Past 15 years)

### Monograph

**Seismic and Dynamic Analysis and Design Considerations for High Level Nuclear Waste Repositories.** (J. Carl Stepp, editor) ASCE Special Report, American Society of Civil Engineers, 1996.

### Safety Guides and Guidelines

**Guidelines for Installation of Advanced National Seismic System Strong-Motion Reference Stations.** R. L. Nigbor, J. C. Stepp, and A. F. Shakal, COSMOS Publication No. CP-2001/02, July 2001.

**Earthquakes and Associated Topics in Relation to Nuclear Power Plant Siting (Rev. 2).** Safety Series No. 50-SG-S2, International Atomic Energy Agency, 2001 (Member of Drafting Team for revision 2)

### Refereed Journals

**Probabilistic Seismic Hazard Analyses for Fault Displacement and Ground Motions at Yucca Mountain, Nevada** (J. Carl Stepp, Ivan Wong, John Whitney, and others, *Earthquake Spectra*, Vol. 17, No. 1, February 2001.

**Lotung Downhole Array: Evaluation of Soil Nonlinear Properties.** (M. Aeghal, A-W. Elgamal, H. T. Tang and J. C. Stepp), *Geotechnical Engineering Journal*, Vol. 121, No. 4, 1993.

**Lotung Downhole Array: Evaluation of Site Dynamic Properties.** (A-W. Elgamal, M. Aeghal, H. T. Tang, and J. C. Stepp), *Geotechnical Engineering Journal*, Vol. 121, No. 4, 1993.

**Spatial Coherency of Shear Waves from the Lotung, Taiwan Large-Scale Seismic Test.** (Norman Abrahamson, John F. Schneider and J. Carl Stepp), *Structural Safety*, Vol. 10, 1991.

**Empirical Spatial Coherency Functions for Application to Soil-Structure Interaction Analyses.** (N. A. Abrahamson, J. F. Schneider and J. C. Stepp), *Earthquake Spectra*, Vol. 7, 1991.

**Assessment of the Potential for Tectonic Fault Rupture for High Level Nuclear Waste Repositories.** (F. H. Swan, J. Carl Stepp and Robin K. McGuire), *Quarterly Journal of Engineering Geology*, 1991.

**Seismic Hazard and Its Uncertainty in the Eastern US.** (R. K. McGuire, J. C. Stepp and G. R. Toro), *In New Risks, Issues and Management*, edited by L. A. Cox, Jr. and P. R. Ricci, Plenum Press, New York and London, 1990.

**A Wedging System for Downhole Accelerometers.** (T. L. Youd, Y. K. Tang, J. C. Stepp, T. L. Holzer, and G. O. Jackson), *Earthquake Spectra*, Vol. 5, 1989.

**A Dense Seismic Engineering Array at Parkfield, CA.** (J. C. Stepp, P. K. Spudich, J. F. Schneider, Y. B. Tsai and A. F. Shakal), *Seismological Research Letters*, Vol 59, 1988.

### **Proceedings**

**Workshop on Archiving and Web Dissemination of Geotechnical Data.** Eds. J. Swift, J. C. Stepp, C. Roblee, L. Turner, C. Real, W. U. Savage, COSMOS Publication No. CP-2001/03, October 2001.

**Workshop on Strong-Motion Instrumentation of Buildings.** Eds. J. C. Stepp, R. L. Nigbor, W. U. Savage, and C. A. Cornell, COSMOS Publication NO. CP-2002/04, November 2001.

**A Probabilistic Analysis of Fault Displacement and Vibratory Ground Motion and the Development of Seismic Design Criteria for Yucca Mountain, Nevada.** (Carl Stepp, and Others), *Proceedings, FOCUS'95*, American Nuclear Society, La Grange, IL.

**Criteria for Design of the Yucca Mountain Structures, Systems and Components for Fault Displacement.** (Carl Stepp and Others), *Proceedings, FOCUS'95*, American Nuclear Society, Lagrange, IL.

**Probabilistic Approaches for Nuclear Plant Siting and Determination of Seismic Design Loads.** (J. C. Stepp and M. W. McCann, Jr.), *Proceedings, International Conference on Design and Safety of Advanced Nuclear Power Plants*, Tokyo, Japan, October 25-29, 1992.

**Lessons Learned from the Loma Prieta Earthquake of October, 1989.** (Joseph Penzien and J. Carl Stepp), *Proceedings, 10WCEE*, Madrid, Spain, July, 1992.

**The Spatial Variation of Earthquake Ground Motion and Effects of Local Site Conditions.** (John F. Schneider, Norman A. Abrahamson, and J. Carl Stepp), *Proceedings, 10WCEE*, Madrid, Spain, July, 1992.

**Engineering Characterization of Strong Ground Motion at Rock Sites in North America.** (R. B. Darragh, W. J. Silva, C. Stark, J. Schneider and J. C. Stepp), *Proceedings Fourth International Conference on Seismic Zonation*, EERI, August 25-29, 1991.

**Ground Motion Model for the 1989 M 6.9 Loma Prieta Earthquake Including Crustal Path and Site Effects.** (J. F. Schneider, W. J. Silva and J. C. Stepp), *Proceedings, New Horizons in Strong Motion: Seismic Studies and Engineering Practice*, Santiago, Chile, June 4-7, 1991.

**Strong Motion Array Data - Applications for Blind Predictions and Nuclear Power Plant Seismic Response Studies.** (H. T. Tang, J. C. Stepp and Y. K. Tang), *Geotechnical News*, March, 1991.

**Site Response Evaluations Based Upon Generic Soil Profiles using Random Vibration Methodology.** (C. Stepp, W. Silva, H. B. Seed, I. M. Idriss, R. McGuire and J. Schneider), *Proceedings Fourth International Conference on Seismic Zonation*, EERI, August 25-29, 1991.

**Estimation of Ground Motion at Close Distances using the Band-Limited-White-Noise Model.** (J. F. Schneider, W. J. Silva, S. J. Chiou and J. C. Stepp), *Proceedings, Fourth International Conference on Seismic Zonation*, EERI, August 25-29, 1991.

**Selection of Review Method and Ground-Motion Input for Assessing Nuclear Power Plant Resistance to Potential Severe Seismic Accidents.** (Robert T. Sewell, Thomas F. O'Hara, C. Allin Cornell, and J. Carl Stepp), *3rd Symposium on Current Issues Related to Nuclear Plant Structures, Equipment and Piping*, North Carolina State University, December, 1990.

**Industry Perspective on Individual Plant Examination of External Events (IPEEE).** (O. Gurbuz, D. J. Modeen, J. C. Stepp, and R. P. Kassawara), *3rd Symposium on Current Issues Related to Nuclear Plant Structures, Equipment and piping*, North Carolina State University, December, 1990.

**The use of Multiple Experts in Risk-Based Approaches to Decision-Making.** (Robert A. Shaw, J. Carl Stepp, Robin McGuire and Robert F. Williams), *IAEA Technical Committee Meeting on "The Use of Decision-Aiding Techniques in Nuclear Safety and Radiation Protection,"* IAEA, Vienna, Austria, November 19-23, 1990.

**A Methodology to Estimate Design Response Spectra in the Near-source Region of Large Earthquakes using the Band-Limited-White-Noise Ground Motion Model.** (Walter Silva, Robert Darragh, Cathy Stark, Ivan Wong, J. Carl Stepp, John F. Schneider and Shayh-Jeng Chiou), *Proceedings, Fourth U. S. National Conference on Earthquake Engineering*, EERI, May 20-24, 1990.

**Maximum Spectral Amplification and High-Frequency Truncation Filters in the Band Limited White Noise Ground Motion Model at Rock Sites.** (Robert Darragh, Walter Silva, J. Carl Stepp and John F. Schneider), *Proceedings, Fourth U. S. National Conference on Earthquake Engineering*, EERI, May 20-24, 1990.

**Spatial Variation of Strong Ground Motion for use in Soil-Structure Interaction Analysis.** (N. A. Abrahamson, J. F. Schneider and J. C. Stepp), *Proceedings, Fourth U. S. National Conference on Earthquake Engineering*, Palm Springs, CA, EERI, May 20-24, 1990.

**Spatial Variation of Ground Motion from EPRI's Dense Accelerograph Array at Parkfield, California.** (J. F. Schneider, N. A. Abrahamson, P. G. Somerville and J. C. Stepp), *Proceedings, Fourth U. S. National Conference on Earthquake Engineering*, Palm Springs, CA, May 20-24, 1990.

**Need for Performance-Based Approach to Characterize and License the Yucca Mountain HLW Repository.** (J. Carl Stepp and Robert F. Williams), *Proceedings, Nuclear Waste Isolation in the Unsaturated Zone*, American Nuclear Society, September 17-21, 1989.

**Approaches that use Seismic Hazard Results to Address Topics of Nuclear Power Plant Seismic Safety, with Application to the Charleston Earthquake Issue.** (Robert T. Sewell, J. Carl Stepp, Robin K. McGuire, Gabriel R. Toro and C. Allin Cornell), *Proceedings, 2nd Symposium on Current Issues Related to Nuclear Power Plant Structures, Equipment and Piping, with Emphasis on Resolution of Seismic Issues in Low Seismicity Regions*, EPRI NP-6437-D, 1988.

**Probabilistic Seismic Hazard Assessment: EPRI Methodology.** (Gabriel R. Toro, Robin K. McGuire and J. Carl Stepp), *Proceedings 2nd Symposium on Current Issues Related to Nuclear Power Plant Structures, Equipment and Piping, with Emphasis on Resolution of Seismic Issues in Low Seismicity Regions*, EPRI NP-6437-D, 1988.

**A Decision Framework Using Seismic Hazard Results to Address Issues of Nuclear Power Plant Seismic Safety.** (Robert T. Sewell, Robin K. McGuire, Gabriel R. Toro, and J. Carl Stepp), *Proceedings 2nd Symposium on Current Issues Related to Nuclear Power Plant Structures, Equipment and Piping, with Emphasis on Resolution of Seismic Issues in Low Seismicity Regions*, EPRI NP-6437-D, 1988.

**Spatial Coherency of Shear Waves from the Lotung, Taiwan Large-Scale Seismic Test.** (N. A. Abrahamson, J. F. Schneider and J. C. Stepp), *Proceedings, International Workshop on Spatial Variation of Earthquake Ground Motion*, Princeton University, November 9-11, 1988.

**Liquefaction Instrumentation Arrays in California.** (T. L. Holzer, T. L. Youd, D. Anderson, and J. C. Stepp), *Joint IASPEI/IAEE Working Group Meeting on the Effects of Surface Geology on Seismic Motion*, Vancouver, Canada, August 12, 1987.

**EPRI's On-Site Soil-Structure Interaction Research and its Application to Design/Analysis Verification.** (J. C. Stepp and H. T. Tang), *Proceedings, International ENEA/ISMES/ENS*

*Specialist Meeting on On-Site Experimental Verification of the Seismic Behavior of Nuclear Reactor Structures and Components, Bologna-Brasemane, Italy, May 4-7, 1987.*

**Validation of Seismic Soil-Structure Interaction Analysis Techniques using Lotung Experiment Data -- EPRI Program.** (Y. K. Tang, H. T. Tang and J. C. Stepp), *Proceedings, Workshop on Lotung Large-Scale Seismic Experiment*, EPRI NP-6154, vol. 1, Palo Alto, CA, December, 1989.

**Seismic Hazard Methodology for Nuclear Facilities: Modeling Input Interpretations.** (J. Carl Stepp and R. K. McGuire), *Proceedings, 14th Water Reactor Safety Research Information Meeting*, USNRC, Washington, D. C., October 26-30, 1986.

**A Seismic Hazard Methodology for the Central and Eastern United States.** (J. Carl Stepp and Jerry L. King), *Proceedings, 14th Water Reactor Safety Research Information Meeting*, USNRC, Washington, D. C., October 26-30, 1986.

## CERTIFICATE OF SERVICE

I hereby certify that copies of the March 14, 2003 letter to the Honorable Thomas S. Moore, Chairman of the Atomic Safety and Licensing Board, U.S. Nuclear Regulatory Commission were served this day upon the persons listed below, by both e-mail and United States Postal Service, first class mail.

Secretary of the Commission\*  
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Marjan Mashhadi

3/14/03  
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Date