RAS 4092 **RELATED CORRESPONDENCE** March 13, 2002
DOCKETED 03/14/02

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of	)	
	)	
PRIVATE FUEL STORAGE, L.L.C.	)	Docket No. 72-22-ISFSI
	)	
(Independent Spent Fuel Storage Installation)	)	

NRC STAFF'S FIRST SUPPLEMENTAL RESPONSE TO THE STATE OF UTAH'S TWENTIETH SET OF DISCOVERY REQUESTS DIRECTED TO THE NRC STAFF

INTRODUCTION

On February 15, 2002, the State of Utah ("State") filed the "State of Utah's Twentieth Set of Discovery Requests Directed to the NRC Staff" ("Twentieth Request"), concerning the application for an Independent Spent Fuel Storage Installation ("ISFSI") filed by Private Fuel Storage, L.L.C. ("PFS" or "Applicant"). In its Twentieth Request, the State, among other requests, filed five general interrogatories, three of which sought to discover information concerning the identity and qualifications of the persons whom the NRC Staff ("Staff") expects to call as witnesses at the hearings on each admitted Utah contention, including without limitation Unified Contention Utah L/QQ, and the subject matter and nature of their anticipated testimony. On February 27, 2002, the Staff filed its initial objections and responses to the State's Twentieth Request.[1]

[1] *See* "NRC Staff's Objections and Responses to 'The State of Utah's Twentieth Set of Discovery Requests Directed to the NRC Staff'" ("Twentieth Response"), dated February 27, 2002. As set forth therein, the Staff objected to the State's Twentieth Request, in part, on the grounds that the general interrogatories and documents requests contained therein duplicated the general interrogatories and document requests contained in the "State of Utah's First Set of Discovery Requests Directed to the NRC Staff" ("First Request"), dated June 10, 1999. *See* Twentieth Response at 7-8. As a result of such duplication by the State, these Supplemental Responses may also supplement the Staff's responses to the State's First Request, as appropriate.

The Staff hereby supplements its responses to the general interrogatories contained in the State's Twentieth Request, as follows.[2]

OBJECTIONS

The Staff hereby reiterates and renews each of its objections to the State's Twentieth Request, set forth in the Staff's Twentieth Response of February 27, 2002, as if set forth at length herein. Notwithstanding these objections to the State's Twentieth Request, and without waiving these objections or its right to interpose these or other objections in the future, the Staff hereby provides the following supplemental responses to the State's Twentieth Request.

RESPONSES TO DISCOVERY REQUESTS

I. GENERAL DISCOVERY

A. GENERAL INTERROGATORIES [3]

> GENERAL INTERROGATORY NO. 3. For each admitted Utah contention, give the name, address, profession, employer, area of professional expertise, and educational and scientific experience of each person whom NRC expects to call as a witness at the hearing. For the purposes of answering this interrogatory, the educational and scientific experience of expected witnesses may be provided by a resume of the person attached to the response.
>
> GENERAL INTERROGATORY NO. 4. For each admitted Utah contention, identify the qualifications of each expert witness whom NRC expects to call at the hearing, including but not limited to a list of all publications authored by the witness within the preceding ten years and a listing of any other cases in which the witness has testified as an expert at a trial, hearing, or by deposition within the preceding four years.
>
> GENERAL INTERROGATORY NO. 5. For each admitted Utah contention, describe the subject matter on which each of the witnesses is expected to testify at the hearing, describe the facts

[2] The supplemental responses set forth herein are supported by the Affidavit of Mark S. Delligatti, attached hereto.

[3] General Interrogatories 3, 4 and 5 in the State's Twentieth Request duplicate, respectively, General Interrogatories 3, 4 and 5 in the State's First Request, dated June 10, 1999.

> and opinions to which each witness is expected to testify, including a summary of the grounds for each opinion, and identify the documents (including all pertinent pages or parts thereof), data or other information which each witness has reviewed and considered, or is expected to consider or to rely on for his or her testimony.

STAFF RESPONSE. The Staff supplements its response to these interrogatories as follows.

Unified Contention Utah L/QQ (Combined Geotechnical Issues)

1. **Dr. Rui Chen**

Independent Consultant in Geological Engineering/Geosciences
11 Burney Drive
Chico, CA 95928

The Staff has previously identified Dr. Chen as a witness on Contention Utah L, Part B, and provided a copy of her statement of professional qualifications. *See* Letter from Sherwin Turk to Connie Nakahara (and attached statement of qualifications), dated November 9, 2001. A list of Dr. Chen's publications is included in her statement of professional qualifications. Based on information and belief, Dr. Chen has not testified in any other case or proceeding within the past four years.

Dr. Chen will testify as part of a panel including Dr. John Stamatakos and Dr. Martin W. McCann, Jr. (*infra*), with respect to the issues raised in Part E of Unified Contention Utah L/QQ concerning the seismic exemption, including the bases for the Staff's determination to accept the PFS probabilistic seismic hazard analysis with a 2,000-year return period. Her views concerning those issues are generally set forth in the NRC Staff's Consolidated Safety Evaluation Report Concerning the Private Fuel Storage Facility ("Consolidated SER"), issued in March 2002.

2. **Jack Guttmann**

Chief, Technical Review Section
Spent Fuel Project Office
Office of Nuclear Material Safety and Safeguards
U. S. Nuclear Regulatory Commission
Washington, D.C. 20555

Mr. Guttmann's professional qualifications have previously been served in this proceeding; an updated statement of his professional qualifications is attached hereto. Based on information and belief, Mr. Guttman has not testified in any other case or proceeding within the past four years.

The Staff has not yet decided whether Mr. Guttman will testify as a Staff witness concerning Unified Contention Utah L/QQ. However, in the event that he does testify, he would join a panel with Dr. Vincent Luk (*infra*), with respect to the confirmatory analysis which was conducted at the Staff's request, to evaluate the behavior and stability of free-standing casks at the PFS Facility under various seismic conditions, including the potential for cask sliding and tipover. That analysis is described in documents listed with respect to the testimony of Dr. Luk.

3. **Dr. Vincent K. Luk**

Principal Member of Technical Staff
Nuclear Technology Programs Department, 6420
Sandia National Laboratories
P.O. Box 5800
Albuquerque, New Mexico 87185

The Staff has previously stated its intention to call Dr. Luk as a witness in this proceeding. *See* Letter from Sherwin Turk to Denise Chancellor, dated February 25, 2002. A statement of Dr. Luk's professional qualifications was produced to the State, as a attachment to the Staff's letter of February 25, 2002. A list of Dr. Luk's publications is included in his statement of professional qualifications. Based on information and belief, Dr. Luk has not testified in any other case or proceeding within the past four years.

Dr. Luk will testify with respect to the confirmatory analysis which was conducted at the Staff's request, to evaluate the behavior and stability of free-standing casks at the PFS Facility under seismic conditions, including the potential for cask sliding and tipover. That analysis is described in (1) "Summary Report on Seismic Analysis of HI-STORM 100 Casks at Private Fuel Storage (PFS) Facility" ("Summary Report"), dated February 22, 2002; and (2) "Seismic Analysis Report on HI-STORM 100 Casks at Private Fuel Storage (PFS) Facility" ("Final Report") dated

March 8, 2002. Both the Summary Report and the Final Report have been produced to the State. *See* Letters from Sherwin E. Turk to Denise Chancellor, dated February 25 and March 8, 2002.

4. **Dr. Martin W. McCann, Jr.**

President, Jack R. Benjamin & Associates, Inc.
530 Oak Grove Avenue, Suite 101
Menlo Park, CA 94025

The Staff has previously stated its intention to call Dr. McCann as a witness in this proceeding. *See, e.g.,* Letter from Sherwin Turk to Connie Nakahara, dated November 9, 2001. A statement of Dr. McCann's professional qualifications is attached hereto. A list of Dr. McCann's publications is included in his statement of professional qualifications. Based on information and belief, Dr. McCann has not testified in any other case or proceeding within the past four years.

Dr. McCann will testify as part of a panel including Dr. Rui Chen (*supra*) and Dr. John Stamatakos (*infra*), with respect to the issues raised in Part E of Unified Contention Utah L/QQ concerning the seismic exemption, including the bases for the Staff's determination to accept the PFS probabilistic seismic hazard analysis with a 2,000-year return period. His views concerning those issues are generally set forth in the NRC Staff's Consolidated SER, issued in March 2002.

In addition, Dr. McCann is expected to testify with Dr. Stamatakos and Mr. Pomerening concerning certain issues raised in sections D.1.a and D.2.d of Unified Contention L/QQ, with respect to the angle at which in-phase waves will strike the storage pads, casks, and associated foundations, and the CTB and its foundations. They will present their view that non-vertical waves do not contribute significantly to the variability and amplitude of the seismic waves; and that the Applicant considered "in-phase waves" in a conservative fashion in the directivity component of the ground motion assessment. The Staff's views with respect to directivity and in-phase motion are described in the NRC Staff's Consolidated SER, issued in March 2002.

5. **Dr. Goodluck I. Ofoegbu**

Senior Research Engineer
Center for Nuclear Waste Regulatory Analyses
Southwest Research Institute
6220 Culebra Rd.
San Antonio, TX 78238

A statement of Dr. Ofoegbu's professional qualifications was previously produced to the State, as an attachment to the Staff's response to the State's Eighteenth and Twentieth sets of discovery requests directed to the NRC Staff.[4] A list of Dr. Ofoegbu's publications is included in his statement of professional qualifications. Based on information and belief, Dr. Ofoegbu has not testified in any other case or proceeding within the past four years.

Dr. Ofoegbu will testify concerning various issues raised in Parts C and D of Unified Contention Utah L/QQ. These include all issues in Part C of the contention ("Characterization of Subsurface Soils"); and certain limited issues raised in Part D of the contention, to the extent that such issues involve geotechnical stability of the foundation (*i.e.*, soil-structure interaction issues). His views concerning those issues are generally set forth in the NRC Staff's Consolidated SER, issued in March 2002.

6. **Daniel J. Pomerening**

Principal Engineer
Mechanical and Materials Engineering Division
6220 Culebra Rd.
San Antonio, TX 78238

A statement of Mr. Pomerening's professional qualifications was previously produced to the State, as an attachment to the Staff's responses to the State's Eighteenth and Twentieth sets of discovery requests directed to the NRC Staff. *See* n.4, *supra*. A list of Mr. Pomerening's

[4] *See* (1) NRC Staff's Twentieth Response, dated February 27, 2002; and (2) "NRC Staff's Objections and Responses to 'The State of Utah's Eighteenth Set of Discovery Requests Directed to the NRC Staff,'" dated February 1, 2002.

publications is included in his statement of professional qualifications. Based on information and belief, Mr. Pomerening has not testified in any other case or proceeding within the past four years.

Mr. Pomerening will testify concerning the issues raised in Part D of Unified Contention Utah L/QQ ("Seismic Design and Foundation Stability"). His views concerning those issues are generally set forth in the NRC Staff's Consolidated SER, issued in March 2002.

7. **Dr. John Stamatakos**

Principal Scientist
Center for Nuclear Waste Regulatory Analyses
Southwest Research Institute
6220 Culebra Rd.
San Antonio, TX 78238

The Staff has previously identified Dr. Stamatakos as a witness on Contention Utah L, Part B, and provided a copy of his statement of professional qualifications. *See* Letter from Sherwin Turk to Connie Nakahara (and attached statement of qualifications), dated November 9, 2001. An updated statement of his professional qualifications is provided herewith. A list of Dr. Stamatakos' publications is included in his statement of professional qualifications. Based on information and belief, Dr. Stamatakos has not testified in any other case or proceeding within the past four years.

Dr. Stamatakos will testify as part of a panel including Dr. Rui Chen and Dr. Martin W. McCann, Jr. (*supra*), with respect to the issues raised in Part E of Unified Contention Utah L/QQ concerning the seismic exemption, including the bases for the Staff's determination to accept the PFS probabilistic seismic hazard analysis with a 2,000-year return period. His views concerning those issues are generally set forth in the NRC Staff's Consolidated SER, issued in March 2002.

In addition, Dr. Stamatakos is expected to testify with Dr. McCann and Mr. Pomerening concerning certain issues raised in sections D.1.a and D.2.d of Unified Contention L/QQ, with respect to the angle at which in-phase waves will strike the storage pads, casks, and associated foundations, and the CTB and its foundations. They will present their view that non-vertical waves

do not contribute significantly to the variability and amplitude of the seismic waves; and that the Applicant considered "in-phase waves" in a conservative fashion in the directivity component of the ground motion assessment. The Staff's views with respect to directivity and in-phase motion are described in the NRC Staff's Consolidated SER, issued in March 2002.

8. **Michael D. Waters**

Project Engineer
Spent Fuel Project Office
Office of Nuclear Material Safety and Safeguards
U. S. Nuclear Regulatory Commission
Washington, D.C. 20555

A statement of Mr. Waters' professional qualifications was previously produced to the State, as an attachment to the Staff's response to the State's Twelfth set of discovery requests directed to the NRC Staff.[5] A list of Mr. Waters' publications is included in his statement of professional qualifications. Based on information and belief, Mr. Waters has not testified in any other case or proceeding within the past four years.

To the extent that dose consequences may arguably be within the scope of Unified Contention Utah L/QQ , Mr. Waters will testify with respect to a portion of Part E of the contention concerning potential dose consequences in the event of a beyond-design-basis hypothetical cask tipover. Specifically, Mr. Waters evaluated various confinement and shielding scenarios regarding postulated cask tip-over events, and considered the potential changes in estimated direct radiation dose rates from hypothetical scenarios in which one or more casks at the PFS facility were assumed to tip-over during a beyond-design-basis event. Mr. Waters will provide his conclusion that in the event of a hypothetical cask tipover, any dose consequences would not exceed (and, indeed, would be far below) the design basis accident dose consequence limits specified in 10 C.F.R. § 72.106(b). This view was also expressed in the "NRC Staff's Response to Applicant's

[5] *See* "NRC Staff's Objections and Responses to 'The State of Utah's Twelfth Set of Discovery Requests Directed to the NRC Staff,'" dated October 3, 2001.

Motion for Summary Disposition of Contention Utah L, Part B," dated December 7, 2001 (*see, e.g.*, Statement of Material Fact No. 46).

Respectfully submitted,

/RA/

Sherwin E. Turk
Martin J. O'Neill
Counsel for NRC Staff

Dated at Rockville, Maryland
this 13th day of March, 2002

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of	)	
	)	
PRIVATE FUEL STORAGE, L.L.C.	)	Docket No. 72-22-ISFSI
	)	
(Independent Spent Fuel Storage Installation)	)	

AFFIDAVIT OF MARK S. DELLIGATTI

COUNTY OF MONTGOMERY	)	
	)	SS:
STATE OF MARYLAND	)	

Mark S. Delligatti, having first been duly sworn, does hereby state as follows:

1. I am employed as a Senior Project Manager in the Spent Fuel Project Office (SFPO), Office of Nuclear Material Safety and Safeguards (NMSS), U.S. Nuclear Regulatory Commission (NRC), in Washington, D.C.

2. I have reviewed the foregoing answers in the "NRC Staff's First Supplemental Response to the State of Utah's Twentieth Set of Discovery Requests Directed to the NRC Staff," and verify that they are true and correct to the best of my knowledge, information and belief.

/RA/

_____
Mark S. Delligatti

Sworn to before me this
13th day of March, 2002

_____
Notary Public

My commission expires: _____

Mark Stephen Delligatti

Senior Project Manager
Spent Fuel Licensing Section
Spent Fuel Project Office
Licensing and Inspection Directorate
Office of Nuclear Material Safety and Safeguards
U.S. Nuclear Regulatory Commission

Education:

B.A., Political Science, State University of New York, College at Oneonta, 1975
M.P.A., Public Administration, The American University, 1977

Experience:

1996-Present — Senior Project Manager, Spent Fuel Project Office, NMSS
Project manager for safety evaluation of applications for licenses for independent spent fuel storage installations (ISFSIs), certificates of compliance for casks and cask systems for the transportation and storage of spent nuclear fuel, and NRC regulation of licensed ISFSIs.

1994-1996 — Senior Project Manager (Yucca Mountain Project Manager), Division of Waste Management, NMSS
Project manager for the NRC staff's pre-licensing review of activities associated with the Department of Energy's characterization of Yucca Mountain as a potential site for deep geologic repository for high-level nuclear waste.

1987-1994 — Project Manager, Division of High-Level Waste Management, NMSS
Responsible for the development of guidance documents, project management of pre-licensing review activities in various areas, including quality assurance and performance assessment, policy development, contract management for the high-level waste program.

1983-1987 — Project Manager, Division of Waste Management, NMSS
Assisted in the development of policy and regulatory guidance for various waste management activities. Served on the team that developed the procurement plan for NRC's federally funded research and development center (FFRDC), and served on the Source Evaluation Panel for the FFRDC.

1975-1983 — Positions Prior to NRC

Information Spectrum, Inc.	Logistics Analyst for development of naval aircraft weapons systems.
May Company	Training Coordinator.
Lulejian and Associates, Inc.	Systems Analyst providing support to NRC safeguards program.
Board of Supervisors, Fairfax County, VA	Staff Assistant to Board of Supervisors

Jack Guttmann

Chief, Technical Review Section
Spent Fuel Project Office
Office of Nuclear Material Safety and Safeguards (NMSS)
U. S. Nuclear Regulatory Commission

Education:

B.S. in Mechanical Engineering, Michigan Technological University, 1973
M.S. Nuclear Engineering, University of Michigan, 1974

Experience:

Mr. Guttmann has experience in nuclear engineering related to thermal-hydraulic and mechanical engineering analysis. Mr. Guttmann worked at the Idaho National Engineering Laboratory as a contractor to the NRC in the area of thermal-hydraulic computer code validation and analysis. He performed analyses that quantified the conservatism between the accident analysis requirements for licensing nuclear power plants (10 C.F.R. Part 50, Appendix K), validated the computer code RELAP for regulatory application by the NRC, and performed independent confirmatory transient and accident analyses of operating reactor events and safety issues defined by the NRC.

While working at the NRC, Mr. Guttmann was responsible for reviewing and approving the computer codes used by the nuclear industry for transient and accident analysis. He represented the Office of Nuclear Reactor Regulation (NRR) on the Advanced Code Review Committee, the Loss of Fluid Test Facility, and the Semiscale Test Facility. Mr. Guttmann performed independent analyses of plant operating events, including regulatory responses to the TMI-2 accident. He was a member of the BWR Bulletins and Orders Task Force that reviewed the ramifications of the TMI-2 events for boiling water reactors. He reviewed and approved emergency operator procedures for PWR designs and performed quality assurance inspections. Mr. Guttmann developed standard review plans for analyzing reactor transient and accident events, developed regulatory guidance and NUREG documents for implementing Risk-Informed In-Service Testing of Piping, and was on the task force and project manager for developing Risk-Informed regulatory guidance documents (i.e., RG-1.174, -1.175, - 1.176, -1.177, and 1.178).

With respect to policy development, Mr. Guttmann served as a technical assistant to Commissioner Forrest J. Remick. He advised Commissioner Remick on policy development of advanced nuclear power plants, operating reactor issues, research needs, international activities, and represented the Commission as an observer on INPO inspections.

Mr. Guttmann is currently Chief of the Technical Review Section at the Spent Fuel Project Office. His responsibilities include licensing and certification of storage (10 CFR Part 72) and transportation (10 CFR Part 71) packages of radioactive materials, including independent spent fuel storage installations. Mr. Guttmann is also responsible for assessing vulnerabilities of storage and transportation packages to terrorist events.

PROFESSIONAL CHRONOLOGY: Jr. Engineer, Detroit Edison Co., Enrico Fermi Atomic Power Plant-I, 1972-73; Research Engineer, Idaho National Engineering Laboratory, 1975-1976; Nuclear Engineer, Office of Nuclear Reactor Regulation, NRC, 1976-1985; Technical Coordinator, Office of the Secretary, NRC, 1985-1990; Technical Assistant, Office of the Commission, NRC, 1990-1994; Sr. Reliability and Risk Assessment Engineer, Office of Nuclear Regulatory Research, NRC, 1994-1999; Sr. Nuclear Engineer, Office of Nuclear Material Safety and Safeguards, NRC, 1999-2000; Chief, Technical Review Section, Spent Fuel Project Office, Nuclear Material Safety and Safeguards, 2000-2002.

MARTIN W. McCANN, Jr.

President, Jack R. Benjamin & Associates, Inc.
530 Oak Grove Avenue Suite 101
Menlo Park, CA 94025

Education

B.S. - Civil Engineering, Villanova University, 1975
M.S. - Structural Engineering, Stanford University, 1976
Ph.D. - Civil Engineering, Stanford University, 1980

Memberships

Association of State Dam Safety Officials
United States Committee on Large Dams
Earthquake Engineering Research Institute
Seismological Society of America

Committees

National Academy of Engineering, National Research Council - Committee on Risk-Based Analyses for Flood Damage Reduction
Association of State Dam Safety Officials Affiliate Member Advisory Committee
U.S. Society on Dams Dam Safety Subcommittee
American Nuclear Society - ANS-2.29 Subcommittee Chairman - Probabilistic Analysis of Natural Phenomena Hazards for Nuclear Materials Facilities

Awards

1994 Engineering News-Record - Newsmaker
1995 Association of State Dam Safety Officials - Presidents Award

Experience

Jack R. Benjamin & Associates, Inc., Mountain View, CA (since 1979)

Dr. Martin W. McCann, Jr. is President of Jack R. Benjamin & Associates, Inc. (JBA). From 1984 to 1989 he served as Vice President of the corporation. His professional experience includes probabilistic hazards analysis, including seismic and hydrologic events, reliability assessment, probabilistic risk analysis (PRA) for critical facilities, systems analysis, and seismic engineering.

Dr. McCann is currently a consultant to the Southwest Research Institute, Center for Nuclear Waste Regulatory Analyses, in San Antonio, TX, and is participating in the CNWRA review of the probabilistic seismic hazard analysis (PSHA) on behalf of the U.S. Nuclear Regulatory Commission (NRC) with respect to the high level waste repository site proposed by the U.S. Department of Energy (DOE) to be located at Yucca Mountain, Nevada.

Dr. McCann is a consultant to the Swiss nuclear regulatory authority (HSK) in the area of probabilistic seismic hazard assessment. He prepared comprehensive guidelines for conducting detailed probabilistic seismic hazard assessments in Switzerland for nuclear power plant sites.

As a consultant to Bechtel National Corporation, Dr. McCann is leading the effort to perform a PRA for the tank waste processing facility on the DOE Hanford site. As part of this project, the team led by Dr. McCann is developing seismic systems models for the facility, conducting seismic fragility assessments and quantifying the frequency of exceedance of radiological dose levels to facility workers, co-located workers and the public.

As part of seismic studies conducted for nuclear power plants as part of the NRC Individual Plant Examination for External Events, Dr. McCann supported the development of seismic systems models (event and fault trees) and performed seismic risk calculations. These plants included Pilgrim, Kewaunee, Point Beach, Palisades, and Fort Calhoun.

As part of an NRC, DOE and Electric Power Research Institute (EPRI) project, Dr. McCann provided technical support for the Senior Seismic Hazards Advisory Committee that developed improved methods to conduct probabilistic seismic hazard studies. As part of his participation, Dr. McCann contributed to the committee's final report.

As part of a study at the DOE Savannah River Site, Dr. McCann was the project manager of a program to evaluate the risk to nuclear reactor facilities due to seismic events. JBA provided the seismic hazard and fragility input to the risk assessment. In addition, JBA conducted the risk quantification calculations, using software developed at JBA. For the Savannah River Site, Dr. McCann conducted an extensive comparative evaluation of the EPRI and Lawrence Livermore National Laboratory (LLNL) seismic hazard assessments. This study, which involved extensive modification of the EPRI and LLNL seismic hazard software, identified the source of the differences between the two studies and developed a single, composite estimate of the site hazard.

As part of a DOE, industry and EPRI study to evaluate future advanced light water reactor designs, Dr. McCann performed an extensive hazard assessment for the eastern United States. In this analysis the seismic hazard was mapped for the entire eastern United States at a grid spacing of 25 km. These hazard results were used to map the risk of a future nuclear power plant located anywhere in this area.

Dr. McCann was the project manager of a program to conduct an independent review of the EPRI seismic hazard software package, EQHAZARD. Following completion of the software review, JBA maintains the codes for EPRI according to Quality Assurance Standards.

Dr. McCann served on an expert panel organized by the CNWRA that reviewed approaches for fault hazard assessment at high-level waste repository sites.

Dr. McCann was the project manager of a study to evaluate the risk of failure of three lock and dam structures on the Upper Ohio River. This study was concerned with a 25-year projection of the frequency of the loss of function of the navigation locks due to natural and man-made hazards.

Dr. McCann directed a preliminary probabilistic risk assessment for PAR Pond Dam at the DOE Savannah River Site. The study included an assessment of the frequency of dam failure due to seismic, hydrologic, and static load events.

As part of the DOE and LLNL natural phenomena hazards project, Dr. McCann prepared the flood design criteria in Design and Evaluation Guidelines For Department of Energy Facilities Subjected to Natural Phenomena Hazards, UCRL-15910. He was the course lecturer for the flood part of the DOE workshop on natural phenomena hazard. The workshop addresses the DOE flood design guidelines, probabilistic flood hazard assessment and flood design strategies.

Dr. McCann was the project manager of an effort supported by LLNL to review the potential flood hazards at DOE facilities in the United States. The principal objective of this work is to conduct a preliminary, cost-effective review in order to screen those sites that may require an in-depth probabilistic flood hazard analysis. The results of this preliminary effort are a series of recommendations to minimize the risk at each DOE site due to flood hazards. Preliminary flood hazard studies have been performed for nine DOE sites.

Under the direction of Dr. McCann, JBA performed a probabilistic flood hazard assessment for the DOE Hanford Reservation, located adjacent to the Columbia River. The flood hazard assessment considered the possibility of extreme flood events and upstream dam failure as potential causes of onsite flooding.

As a subcontractor to Sandia National Laboratories (SNL) for the NRC Unresolved Safety Issue on Decay Heat Removal, JBA performed probabilistic flood studies at a number of nuclear power plant sites. These studies involved an assessment of the frequency of extreme floods and the frequency of core damage.

Dr. McCann was the project manager of an EPRI-sponsored study to evaluate the engineering characteristics of small-magnitude earthquakes. As part of this study the threshold level of ground motion required to damage nuclear power plant structures and equipment was estimated.

Dr. McCann assisted EPRI in developing an industry position regarding the seismic design basis for future nuclear power plants. As part of this effort, Dr. McCann worked with industry representatives and the NRC to develop an effective, stable approach for seismic siting.

Dr. McCann participated in a project to develop an NRC external event PRA procedures guide and a review document for seismic and external flood hazards.

In the 1980's, Dr. McCann participated in the review of seismic probabilistic risk assessments conducted for the Zion, Indian Point, Limerick, Millstone, and Oconee nuclear power plants.

Department of Civil Engineering, Stanford University (since 1981) - Consulting Professor

Currently, Dr. McCann is the chairman of the National Performance of Dams Program (NPDP) Executive Committee. The NPDP is headquartered at Stanford. The program operates and

maintains a library and database on dam incidents. The library contains over 10,000 documents, including the U.S. Committee on Large Dams incident files. Dr. McCann is directing the development of a web-based digital library system. The digital library and database will be an online resource on dams and their performance.

Dr. McCann was the director of a project to develop PRA procedures for the evaluation of dams. The project was supported under a contract with the Federal Emergency Management Agency (FEMA). The objectives of the project included the development of a probabilistic screening procedure to assign priorities to dams in a jurisdiction based on a cost-effectiveness criteria. A methodology to conduct a detailed PRA of existing dams due to all stimuli was also developed.

As part of the FEMA project, Dr. McCann has presented workshops on the probabilistic assessment of dams in the U.S. and in foreign countries.

Working with the Association of State Dam Safety Officials, Dr. McCann was a chairman of a committee to develop a national standard for reporting the performance of dams. The result of this work was the publication of the Guidelines for Reporting the Performance of Dams.

Dr. McCann is the Chairman of the National Dam Safety Information Technology Committee. The purpose of the committee is to develop a strategic plan for the collection, archiving and access to information on dams in the U.S. The committee is comprised of state, federal and private sector engineers.

Partial List of Technical Publications and Reports

McCann, Jr., M. W., and H. C. Shah, "Determining the Strong Motion Duration of Earthuakes," Bull. Seism. Soc. Am., 69, 1979.

Geller, R. J., G. A. Frazier and M. W. McCann, Jr., "Dynamic Finite Element Modeling of Dislocations in a Laterally Heterogeneous Crust," Journal of the Physics of the Earth, 27, 1979.

McCann, Jr., M. W., and H. C. Shah, "RMS Acceleration for Seismic Risk Analysis: An Overview," Proceedings, U.S. National Conference on Earthquake Engineering, Stanford University, 1979.

McCann, Jr., M. W., F. Sauter and H. C. Shah, "A Technical Note on PGA-Intensity Relations with Applications to Damage Estimation," Bull. Seism. Soc. Am., 70, 1980.

McCann, Jr., M. W., "RMS Acceleration and Duration of Strong Ground Motion," Technical Report No. 46, The John A. Blume Earthquake Engineering Center, Stanford University, 1980.

McCann, Jr., M. W., "A Bayesian Geophysical Model for Seismic Hazard," Technical Report No. 47, The John A. Blume Earthquake Engineering Center, Stanford University, 1980.

McCann, Jr., M. W., and D. M. Boore, "Variability in Ground Motions: Root Mean Square Acceleration and Peak Acceleration for the 1971 San Fernando, California Earthquake," Bull. Seism. Soc. Am., 73, 1983.

Reed, J. W., and M. W. McCann, Jr., "A Review of the Indian Point Probabilistic Safety Study, Seismic, Flooding and Wind," in Review and Evaluation of the Indian Point Probabilistic Safety Study, Kolb, G. J., et al., NUREG/CR-2934, SAND82-2929, 1982.

McCann, Jr., M. W., "Probabilistic Analysis of the Frequency of Random Dam Failure," JBA Technical Report 194-010-01, Mountain View, California, January, 1983.

Shah, H. C., and M. W. McCann, Jr., "Risk Analysis--It May Not Be Hazardous to Your Judgment," paper presented as a keynote lecturer at the Dam Safety Research Coordination Conference, Denver, Colorado, 1982.

Reed, J. W., and M. W. McCann, Jr., "A Review of the Zion Probabilistic Safety Study Seismic and Flooding," JBA Report 106-010-01 to Sandia National Laboratories, 1983.

Reed, J. W., M. W. McCann, Jr., and C. A. Kircher, "Insights Into Probabilistic Risk Assessment for External Hazards," Proceedings of the Fourth International Conference on Applications of Statistics and Probability in Soil and Structural Engineering, Florence, Italy, 1983.

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GENERAL QUALIFICATIONS:

Dr. Stamatakos is a structural geologist and geophysicist with international research experience in regional and global tectonics. Dr. Stamatakos has conducted research on a range of topics including paleomagnetism, neotectonics, kinematics of fault block rotations in strike-slip, normal, and thrust fault systems, effects of internal strain on the magnetic properties of deformed rocks, evolution of curvature in arcuate mountain belts, and age and sequence of deformation in folded and faulted mountain belts. This research has focused on the northern and central Appalachians in the eastern United States and Canada, the Hercynian mountains in Germany and northern Spain, the Rocky Mountains and Basin and Range in the western United States, and the northern Cordilleran Mountains in Alaska. Other strengths include numerical modeling of deformation, magnetostratigraphy, rock magnetism, and exploration geophysics.

As a Principal Scientist in the Center for Nuclear Waste Regulatory Analyses, Dr. Stamatakos is the Principal Investigator for structural deformation and seismicity, including tectonics and neotectonics research. Tectonics research at CNWRA currently includes compiling a tectonics Geographic Information System (GIS) database, field analyses of the structural and tectonic elements of the Basin and Range province in southwestern United States, evaluation of seismic and faulting hazards at nuclear facilities (including the proposed repository at Yucca Mountain, Nevada; the proposed storage facilities at Skull Valley, Utah; INEEL, Idaho; and Diablo Canyon, California; and the Fuel Fabrication Facilities at Paducah, Kentucky and Savannah River, South Carolina). These investigations, sponsored by the U.S. Nuclear Regulatory Commission, currently support development of the structural, seismological, and tectonic framework for evaluation of risk of earthquakes and volcanic activity, and the effects of structures and tectonic processes on groundwater flow in the region surrounding nuclear facilities.

Prior to coming to CNWRA, Dr. Stamatakos held positions as a visiting faculty at the University of Michigan and as a postdoctoral fellow at the Eidgenössische Technische Hochschule (ETH) in Zurich, Switzerland. At the University of Michigan, Dr. Stamatakos taught courses in field mapping, structural geology, geophysics, and tectonics. Dr. Stamatakos has written or collaborated on nearly 50 papers and reports on seismology, structural geology, tectonics, and geophysics. He has made presentations at international conferences in the U.S., Canada, Asia, and Europe and has won an outstanding paper award from the American Geophysical Union.

Dr. Stamatakos is associate editor of the Geological Society of America Bulletin, former GP Editor for EOS of the American Geophysical Union, and is a regular reviewer of papers for the Journal of Geophysical Research, Earth and Planetary Science Letters, Journal of Geophysics, Journal of

Structural Geology, Physics of the Earth and Planetary Sciences, Tectonophysics, Journal of Geology, Geophysical Journal International, Geological Society of America Bulletin, and Geophysical Research Letters as well as grant proposals for the National Science Foundation.

Acquired NSF and similar institutional grant support for research. Taught geology and geophysics at both undergraduate and graduate levels, including two summer field camp sessions. Co-developed and taught advanced field course for petroleum-industry geologists. Supervised undergraduate, master, and Ph.D. research, including service as external committee member on several masters theses and a Ph.D. dissertation.

Memberships: Seismological Society of America, Geological Society of America, American Geophysical Union, Sigma Xi.

PROFESSIONAL EXPERIENCE

2002: Principal Research Scientist, Center for Nuclear Waste Regulatory Analyses, Southwest Research Institute, San Antonio, Texas

1996-2002: Senior Research Scientist, Center for Nuclear Waste Regulatory Analyses, Southwest Research Institute, San Antonio, Texas.

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1995-2001: Adjunct Research Scientist, Department of Geological Sciences, University of Michigan, Ann Arbor, Michigan.

1999-2002: Adjunct Professor, Incarnate Word University, Palo Alto College, University of Texas at San Antonio, all in San Antonio, Texas.

1992-1994: Visiting Assistant Professor, Department of Geological Sciences, University of Michigan, Ann Arbor, Michigan.

1990-1992: Research Associate: Eidgenössische Technische Hochschule (ETH), Institut für Geophysik, Zürich, Switzerland.

1984-1990: Research and Teaching Assistant, Lehigh University, 1984–1990.

1981-1983: Petroleum Geologist, Analex Geosciences, 1981–1983.

RESEARCH INTERESTS:

Global and regional tectonics through the study of earthquake seismology, paleomagnetism, structural geology, neotectonics, magnetostratigraphy, potential-field geophysics (gravity and magnetics), fission-track thermochronology, and numerical modeling.

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UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of	)	
	)	
PRIVATE FUEL STORAGE L.L.C.	)	Docket No. 72-22-ISFSI
	)	
(Independent Spent Fuel Storage Installation)	)	

CERTIFICATE OF SERVICE

I hereby certify that copies of "NRC STAFF'S FIRST SUPPLEMENTAL RESPONSE TO THE STATE OF UTAH'S TWENTIETH SET OF DISCOVERY REQUESTS DIRECTED TO THE NRC STAFF," in the above captioned proceeding have been served on the following through deposit in the NRC's internal mail system, with copies by electronic mail, as indicated by an asterisk, or by deposit in the U.S. Postal Service, as indicated by double asterisk, with copies by electronic mail this 13th day of March, 2002:

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