

July 12, 2000

UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

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

NRC STAFF'S FIRST SUPPLEMENTAL RESPONSES  
TO THE "STATE OF UTAH'S SIXTH SET OF  
DISCOVERY REQUESTS DIRECTED TO THE  
NRC STAFF (UTAH CONTENTION L)"

INTRODUCTION

On February 4, 2000, the State of Utah ("State") filed the "State of Utah's Sixth Set of Discovery Requests Directed to the NRC Staff (Utah Contention L)" ("Sixth 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 Request, the State filed (a) five general interrogatories concerning all of its admitted contentions, and (b) 16 requests for admission and four interrogatories concerning Contention Utah L (geotechnical). On February 14, 2000, the NRC Staff ("Staff") filed its initial objections and responses to the State's Request.<sup>1</sup>

On June 12, 2000, in response to a motion to compel filed by the State pertaining to many of the requests for admission and interrogatories contained in its Sixth Request, the Licensing Board directed the Staff to provide further responses "to Admission Nos. 15

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<sup>1</sup> See "NRC Staff's Objections and Responses to the 'State of Utah's Sixth Set of Discovery Requests Directed to the NRC Staff (Utah Contention L),' " dated February 14, 2000 ("Initial Response").

and 16, and any corresponding responses to Interrogatory Nos. 3 and 4, as they involve a deterministic analysis, but is denied as to Admission Nos. 13, 14, and 16 as they seek an answer based on a probabilistic analysis."<sup>2</sup> In accordance with the Licensing Board's Order, the Staff herewith supplements its responses to the State's Sixth Request.<sup>3</sup>

#### GENERAL OBJECTIONS

The Staff hereby incorporates by reference each of the general objections set forth in its Initial Response to the State's Sixth Request, as if fully set forth herein. and 2.790.

#### RESPONSES TO DISCOVERY REQUESTS

Notwithstanding the above objections to the State's Request, in accordance with the Licensing Board's Order of June 12, 2000, the Staff hereby provides the following responses to the State's Sixth Request.

#### **1. Requests for Admission - Utah Contention L**

REQUEST FOR ADMISSION NO. 15 - UTAH L. Do you admit that the occurrence of vibratory ground motions exceeding design basis ground motions developed from 84th percentile deterministic ground motions should be considered a credible event?

INITIAL RESPONSE. The Staff objects to this request on the grounds that it (a) is vague and ambiguous, and (b) constitutes an impermissible compound question.

SUPPLEMENTAL RESPONSE. No. First, there is no well-established regulatory definition of the term "credible" for seismic ground motion analyses. In practice (and in the literature) the term "credible" is occasionally used in the context of a "credible earthquake"

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<sup>2</sup> "Memorandum and Order (Ruling on Discovery Requests Relating to Contention Utah L)," dated June 12, 2000, at 3.

<sup>3</sup> The instant response is being filed at this time pursuant to an agreement by Counsel. See Tr. 2683-84.

or "maximum credible earthquake." In that context, a "credible" earthquake is assumed to be the largest possible earthquake that could occur (independent of its probability of occurrence within any particular time period), based on an expert's interpretation of the applicable geological, geophysical, tectonic, and seismotectonic conditions.

Second, the term "credible" is generally not utilized in characterizing potential vibratory ground motions. In a traditional deterministic seismic hazard assessment (DSHA), all input earthquake parameters except ground motion attenuation (but including the maximum credible earthquake) are fixed to a single value (often the most conservative value), without regard to occurrence within any particular time period. Because of randomness in earthquake properties (i.e., no two earthquakes are alike) and variability in the attenuation of earthquake energy along its transmission path from fault rupture to the site, estimates of vibratory ground shaking from an earthquake are inherently uncertain; this uncertainty is incorporated in a DSHA by including estimates of the scatter of ground motion amplitude about the estimated mean values. Statistically, the 84<sup>th</sup> percentile of the DSHA represents two standard deviations about the mean ground motion amplitudes; in effect, the 84<sup>th</sup> percentile deterministic ground motion has a 16 percent probability of being exceeded (or an 84 percent probability of not being exceeded), assuming the maximum earthquake occurs (again, without regard to the probability of occurrence within any particular time period).

Finally, the term "credible" is not relevant in the context of a probabilistic seismic hazard assessment (PSHA). Within the context of a PSHA, the question of whether or not an earthquake is deemed "credible" is replaced by a determination of the quantitative likelihood that an earthquake or an associated level of vibratory ground motion will occur within a specified period of time.

REQUEST FOR ADMISSION NO. 16 - UTAH L. Do you admit that tipover of spent fuel storage casks at the proposed PFS ISFSI should be considered a credible event?

INITIAL RESPONSE. The Staff objects to this request on the grounds that it (a) is vague and ambiguous, and (b) constitutes an impermissible compound question.

SUPPLEMENTAL RESPONSE. No. As set forth in response to Request for Admission No. 15 *supra*, there is no well-established regulatory definition of the term "credible" for seismic ground motion analyses. Further, the Staff does not consider use of the term "credible" to be relevant or appropriate in the context of a PSHA. The Staff notes, however, that it is currently evaluating the potential for cask tipover at the PFS site, but has not yet reached a conclusion in this regard.

2. Interrogatories - Utah Contention L

INTERROGATORY NO. 3 - UTAH L. If Requests for Admissions 13, 14, or 15 is admitted, please describe what the Staff would consider to be acceptable means for determining, in the aftermath of a seismic event, whether or not the design basis ground motions had been exceeded.

INITIAL RESPONSE. See Responses to Requests for Admission Nos. 13, 14 and 15, *supra*. The Staff objects to this request on the grounds that it (a) is vague and ambiguous, and (b) constitutes an impermissible compound question.

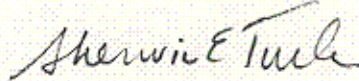
SUPPLEMENTAL RESPONSE. See Supplemental Response to Request for Admission No. 15, *supra*. No further response to Interrogatory No. 3 is required at this time.

INTERROGATORY NO. 4 - UTAH L. If Request for Admission No. 16 is admitted, please describe what the Staff would consider to be acceptable ways to mitigate the hazard of cask tipover.

INITIAL RESPONSE. See Response to Request for Admission No. 16, *supra*. The Staff objects to ~~this~~ request on the grounds that it (a) is vague and ambiguous, and (b) constitutes an impermissible compound question.

SUPPLEMENTAL RESPONSE. See Supplemental Response to Request for Admission No. 16, *supra*. No further response to Interrogatory No. 4 is required at this time.

Respectfully submitted,

A handwritten signature in cursive script that reads "Sherwin E. Turk".

Sherwin E. Turk  
Counsel for NRC Staff

Dated at Rockville, Maryland  
this 12<sup>th</sup> day of July 2000

UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSIONBEFORE 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 JOHN STAMATAKOS

COUNTY OF BEXAR )

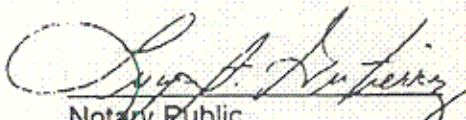
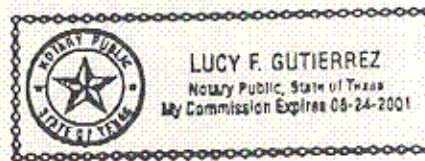
SS:

STATE OF TEXAS )

John Stamatakos, having first been duly sworn, does hereby state as follows:

1. I am employed as a Senior Research Scientist at the Center for Nuclear Waste Regulatory Analysis (CNWRA), which is division of the Southwest Research Institute (SwRI), in San Antonio, Texas. I am providing this affidavit under a technical assistance contract between the NRC Staff and SwRI. A statement of my professional qualifications is attached hereto.

2. I have reviewed the foregoing "NRC Staff's First Supplemental Responses to the 'State of Utah's Sixth Set of Discovery Requests Directed to the NRC Staff (Utah Contention L)," and verify that they are true and correct to the best of my knowledge, information and belief.

  
John StamatakosSworn to before me this  
12th day of July 2000  
Notary PublicMy commission expires: August 24, 2001

**JOHN STAMATAKOS**  
Senior Research Scientist  
Center for Nuclear Waste Regulatory Analyses  
Southwest Research Institute

B.S., Geology, Franklin and Marshall College, Lancaster, Pennsylvania, 1981

M.S., Geology, Lehigh University, Bethlehem, Pennsylvania, 1988

Ph.D., Geology, Lehigh University, Bethlehem, Pennsylvania, 1990

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 Research Scientist in the Center for Nuclear Waste Regulatory Analyses, Dr. Stamatakos is a 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, and the development of tectonic models for the region surrounding the proposed high-level nuclear waste repository at Yucca Mountain, Nevada. These investigations, sponsored by the U.S. Nuclear Regulatory Commission, currently support development of the 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 Yucca Mountain.

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 structural geology, tectonics, and geophysics. He has made presentations at international conferences in the U.S., Canada, 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, 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, Reviews of Geophysics, Journal of Structural Geology, Physics of the Earth and Planetary Sciences, and Geophysical Research Letters as well as grant proposals for the National Science Foundation.

**Professional Chronology:** Petroleum Geologist, Analex Geosciences, 1981–1983; Research and Teaching Assistant, Lehigh University, 1984–1990; Research Fellow, Eidgenössische Technische Hochschule, Switzerland, 1990–1992, Visiting Assistant Professor, University of Michigan, 1992–1995, Research Scientist, Southwest Research Institute, Center for Nuclear Waste Regulatory Analyses, 1995–Present.

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

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NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

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CERTIFICATE OF SERVICE

I hereby certify that copies of "NRC STAFF'S FIRST SUPPLEMENTAL RESPONSES TO THE "STATE OF UTAH'S SIXTH SET OF DISCOVERY REQUESTS DIRECTED TO THE NRC STAFF (UTAH CONTENTION L)" 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 12<sup>th</sup> day of July, 2000:

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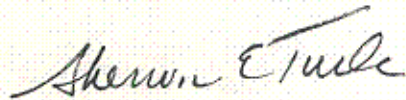
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