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January 7, 2000

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
	)	
(Private Fuel Storage Facility)	)	

APPLICANT'S RESPONSES TO
STATE OF UTAH'S SIXTH SET OF DISCOVERY REQUESTS

Applicant Private Fuel Storage L.L.C. ("Applicant" or "PFS") files these substantive responses to the December 20, 1999 "State of Utah's Sixth Set of Discovery Requests Directed to the Applicant and Skull Valley Band of Goshutes" ("State's Sixth Discovery Requests"). Per agreement with the State, PFS is filing these substantive responses today due to the unavailability of technical personnel during the holiday season. PFS does not waive or withdraw any objections raised in the "Applicant's Objections to State of Utah's Sixth Set of Discovery Requests" ("Applicant's Objections"), dated January 3, 2000. Rather, such objections are to be considered to be incorporated herein.

I. GENERAL INTERROGATORIES

GENERAL INTERROGATORY NO. 1. State the name, business address, and job title of each person who was consulted and/or who supplied information for responding to interrogatories, requests for admissions and requests for the production of documents. Specifically note for which interrogatories, requests for admissions and requests for production each such person was consulted and/or supplied information.

If the information or opinions of anyone who was consulted in connection with your response to an interrogatory or request for admission differs from your written answer to the discovery request, please describe in detail the differing information or opinions, and indicate why such differing information or opinions are not your official

position as expressed in your written answer to the request.

APPLICANT'S RESPONSE: In addition to counsel for PFS, the following persons were consulted and/or supplied information in responding to the discovery requests for the contentions in the State's Sixth Discovery Requests:

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Utah Contention L

Paul Trudeau
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Contention L

In response to whether the information or opinions of anyone who was consulted in connection with PFS's response to a request for admission differs from the PFS's

written answer to the discovery request, PFS is unaware of any such difference among those consulted.

II. UTAH CONTENTION L (Geotechnical)

A. REQUEST FOR ADMISSIONS – Utah Contention L

REQUEST FOR ADMISSION NO. 1. Do you admit that the upper soil layer at the PFS site is a soft thin layer over a competent soil layer? *See, e. g.*, Geomatrix Calculation: Soil and Foundation Parameters for Dynamic Soil Structure Interaction Analyses [05996.02-G(PO18)-1 (Rev. 1)], at § 2 (Subsurface Conditions).

APPLICANT'S RESPONSE: As stated in Applicant's Objections, the term "soft thin layer" is vague. If "soft thin layer" in the request refers to the second sentence in § 2 (Subsurface Conditions) in Geomatrix Calculation: Soil and Foundation Parameters for Dynamic Soil Structure Interaction Analyses [05996.02-G(PO18)-1 (Rev. 1)], which states "[t]*he upper few feet consists of eolian silty soil deposits*," then PFS admits. In the original design, these soils were to have been excavated and the cask storage pads were to be founded on the underlying, competent, silty clay/clayey silt layer. However, as stated in Section 2.6.4.1, Amendment 8 of the SAR, dated December 16, 1999,

> *"based on evaluation of the earthwork associated with site grading requirements for flood protection and the environmental impacts of truck trips required to import fill to replace [the upper few feet of eolian silty soil deposits], PFS will stabilize this soil with cement and use it as base material beneath the storage pads and adjacent driveways."*

Therefore, the "soft thin layer," i.e., the upper few feet of eolian silty soil deposits, will be replaced by a soil-cement layer that will be designed to be stronger than the underlying, competent, silty clay/clayey silt layer.

REQUEST FOR ADMISSION NO. 2. Do you admit that for dynamic analysis NUREG 0800, Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants, SRP No. 3.7.2, *Seismic System Analysis*, requires that when a thin soft soil layer is present at the site, the input motion should be specified at the top of the competent soil layer?

APPLICANT'S RESPONSE: Admitted, based on Sentence 3 of § II.4.c on Page 3.7.2-10 of Rev 2 of NUREG-0800. However, this sentence of the SRP is not applicable for the PFSF site. As stated in the response to Request for Admission No. 1, the upper soil layer at the PFS site, comprised of eolian silt, will not be used to found the structures at the site. As indicated in SAR Section 2.6.1.6, *Relationship of Major Foundations to Subsurface Materials*:

> *"The eolian silt, in its in situ loose state, is not suitable for founding the cask storage pads."*

The eolian silt will be mixed with cement to construct a strong, soil-cement base material for founding the cask storage pads, and it will be removed before constructing the foundations of the Canister Transfer Building and the other structures. Therefore, instead of Sentence 3 of § II.4.c on Page 3.7.2-10 of Rev 2 of NUREG-0800, Sentence 2 applies for the PFSF site. Sentence 2 states:

> *"For profiles consisting of competent soil or rock, with relatively uniform variation of properties with depth, the control motion should be located at the soil surface at the top of finished grade."*

This is what was done in Geomatrix Consultants (1999) to account for the characteristics of the subsurface materials.

REQUEST FOR ADMISSION NO. 6. Do you admit that (a) impinging seismic waves will approach the foundation in an angle because of the proximity of the site to a major active fault; (b) such wave motion would result in an unbalanced rocking and torsional motion of the pad contributing to the displacement results; and (c) PFS has not considered the effects of such wave motion in its overall design?

APPLICANT'S RESPONSE: In response to part (a), deny. The controlling seismic source for the ground motion hazard at the PFS site is the Stansbury fault, located 9 km east of the site (Geomatrix Consultants, 1999). The fault dips toward the site at an estimated angle between 45° and 65°, placing the zone of major release of seismic energy at depth beneath Skull Valley. The presence of a velocity gradient in Skull Valley will result in refraction of the shear waves towards a vertical angle of incidence.

The shear wave velocity at the depth of rupture is estimated to be 3.39 km/sec and the shear wave velocity in the upper Tertiary sediments beneath Skull Valley is estimated to be 1.375 km/sec (Geomatrix Consultants, 1999). Snell's law for refraction in wave-propagation states that the ratio of the propagation velocities in the materials on either side of a boundary is equal to the ratio of the sines of the incidence angles for the propagating wave at the boundary. Assuming a fault dip of 55°, the waves leaving the closest approach of the fault will be refracted from an incident angle of 55° at depth to an incident angle of 19° off vertical near the surface of the Tertiary deposits. The lower velocity Quaternary soils in the shallowest portion of the Skull Valley sediments will produce further refraction of the shear waves towards vertical propagation. Therefore, impinging seismic waves will not approach the foundation in an angle significantly different from vertical because of the proximity of the site to a major active fault. See Geomatrix Consultants, Fault Evaluation Study and Seismic Hazard Assessment, Private Fuel Storage Facility, Skull Valley Utah, dated February 1999.

As stated in Applicant's Objections, PFS objects to parts (b) and (c).

REQUEST FOR ADMISSION NO. 8. Do you admit that in a layered system the foundation springs and damping coefficients are highly frequency dependent?

APPLICANT'S RESPONSE: Admit that the foundation springs and damping coefficients are frequency dependent in a layered system analyzed using frequency domain approaches, but deny that the frequency has a significant effect on the coefficients. However, the analyses described in the Holtec Report on TranStor Dynamic Response were performed using time domain analysis approaches, which necessitate the use of frequency independent properties. In the design of the storage pads [Calculation 05996.02 G(PO17)-2 Rev 1, Dec. 6, 1999], the dynamic response of the storage pads on soil was analyzed using both a frequency domain approach that used frequency dependent properties and a time domain approach that used the frequency independent properties employed in the Holtec Report on TranStor Dynamic Response. The two types of analyses gave consistent results, indicating that the properties of the layered system are adequately modeled by the frequency independent properties used in the Holtec Report on TranStor Dynamic Response.

Respectfully submitted,

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Dated: January 7, 2000

Counsel for Private Fuel Storage L.L.C.

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In the Matter of	)	
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(Private Fuel Storage Facility)	)	ASLBP No. 97-732-02-ISFSI

CERTIFICATE OF SERVICE

I hereby certify that copies of "Applicant's Responses to State of Utah's Sixth Set of Discovery Requests" and the Supporting Declarations of Paul Gaukler, Paul Trudeau, and Robert Youngs were served on the persons listed below (unless otherwise noted) by e-mail with conforming copies by U.S. mail, first class, postage prepaid, this 7th day of January, 2000.

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* By U.S. mail only

Paul A. Gaukler

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DECLARATION OF PAUL A. GAUKLER

Paul A. Gaukler states as follows under penalties of perjury:

1. I am with Shaw Pittman in Washington, D.C.

2. I am duly authorized to verify Applicant's Response to State's Sixth Set of Discovery Requests; specifically, the response to General Interrogatory No. 1.

3. I certify that the statements in this response are true and correct to the best of my personal knowledge and belief.

I declare under penalty and perjury that the foregoing is true and correct.

Executed on January 7, 2000.

Paul Gaukler

Paul A. Gaukler

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DECLARATION OF ROBERT YOUNGS

Robert Youngs states as follows under penalties of perjury:

1. I am a Geotechnical Consultant with Geomatrix Consulting, Inc., supporting Stone and Webster Engineering Corporation (Stone & Webster) on the Private Fuel Storage Facility ("PFSF") project. As a Geotechnical Consultant on the PFSF, I am responsible for development of ground motion models and assessment of earthquake ground shaking and fault displacement hazards.

2. I am duly authorized to verify Applicant's Response to State's Sixth Set of Discovery Requests; specifically, Request for Admission Nos. 1, 2, 6(a) and 8.

3. I certify that the statements and opinions in such responses are true and correct to the best of my personal knowledge and belief.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on January 7, 2000.

Robert Youngs

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DECLARATION OF PAUL TRUDEAU

Paul Trudeau states as follows under penalties of perjury:

1. I am the Lead Geotechnical Engineer with Stone & Webster Engineering Corporation (Stone & Webster) for the Private Fuel Storage Facility ("PFSF") project.

2. I am duly authorized to verify Applicant's Response to State's Sixth Set of Discovery Requests; specifically, Request for Admission Nos. 1 and 2.

3. I certify that the statements and opinions in such responses are true and correct to the best of my personal knowledge and belief.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on January 7, 2000.

Paul Trudeau

Paul Trudeau