December 27, 1999

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 RESPONSE TO STATE OF UTAH'S MOTION TO COMPEL APPLICANT TO RESPOND TO STATE'S FIFTH SET OF DISCOVERY REQUESTS

Applicant Private Fuel Storage L.L.C. ("PFS") files this response to the "State of Utah's Motion to Compel Applicant to Respond to State's Fifth Set of Discovery Requests" ("State's Motion") regarding Utah GG. The State filed its Motion in response to "Applicant's Objections and Responses to State of Utah's Fifth Set of Discovery Requests," (PFS's Objections") filed on December 13, 1999. In the State's Motion motion, the State claims that its discovery requests are "directly relevant or could lead to admissible evidence." State's Motion at 4. However, as discussed below, the State's Motion seeks to impermissibly expand the scope of its contention and circumvent the clear limitations established by the Board in its admission of Contention Utah GG.

I. THE STATE'S DISCOVERY REQUESTS SEEK INFORMATION OUTSIDE THE SCOPE OF THE CONTENTION.

A. Discovery Is Limited To The Scope Of The Admitted Contention

Pursuant to 10 C.F.R. § 2.740(b)(1), discovery is allowed into "any matter, not privileged, which is relevant to the subject matter involved in the proceeding." 10 C.F.R.

§ 2.740(b)(1). The information sought must be, at a minimum, "reasonably calculated" to lead to the discovery of admissible evidence. Id. (emphasis added). The scope of discovery is not, however, infinite, and it is well established that "the NRC Rules of Practice limit discovery to the boundaries of admitted contentions."[1] These boundaries are defined by "the scope of a contention [which] is determined by the 'literal terms' of the contention, coupled with its stated bases."[2] As stated in PFS's Objections, the State's discovery requests are not relevant to Contention Utah GG because they are beyond the literal terms of Utah GG as admitted by the Board and are not reasonably calculated to lead to the discovery of admissible evidence.

As admitted by the Board, Utah GG asserts that:

> The Applicant has failed to demonstrate that the TranStor storage casks and the pads will remain stable during a seismic event, and thus, the application does not satisfy 10 C.F.R. §§ 72.122(b)(2) and 72.128(a), in that Sierra Nuclear's consultant, Advent Engineering Services, Inc., used a nonconservative "nonsliding cask" tipover analysis that did not consider that the coefficient of friction may vary over the surface of the pad and did not consider the shift from the static case to the kinetic case when considering momentum of the moving casks.

Private Fuel Storage, L.L.C. (Independent Spent Fuel Storage Installation), LBP-98-7, 47 NRC 142, 257 (1998) (emphasis added). The basis for Utah GG similarly asserts that:

> [A] factor not considered by . . . Advent Engineering Services, Inc., who evaluated the tipover analysis using the horizontal seismic forces, is that the coefficient of friction may vary over the surface of the pad. . . . . However, the coefficient of friction, which is larger when the casks are

[1] Vermont Yankee Nuclear Power Corp. (Vermont Yankee Nuclear Power Station), LBP-88-25, 28 NRC 394, 396 (1988).

[2] Id. (citing Public Service Co. of New Hampshire (Seabrook Station, Units 1 and 2), ALAB-899, 28 NRC 93, 97 (1988)).

> static, may also reduce under dynamic conditions of an earthquake. Advent Engineering did not consider the shift from the static case to the kinetic case when considering the momentum of the moving casks.

State of Utah's Request for Consideration of Late-Filed Contention GG, at 7-8 (emphasis added) (footnote omitted). The Board refused to admit any other bases for the State's Contention, which sought to raise a broad based challenge to the cask stability analysis for the TranStor spent fuel storage cask. LBP-98-7, 47 NRC at 210-11 (1998).

Thus, as the "literal terms" of the contention and its bases clearly reflect, Utah GG is limited solely to coefficient of friction issues, namely whether proper consideration was given to the coefficient of friction values used in the TranStor cask stability analysis, including the potential shift from a static value for the coefficient of friction to a dynamic value. Soler Dec. at ¶ 6. Specifically, the scope of the contention is limited to whether the stability analysis "consider[ed] that the coefficient of friction may vary over the surface of the pad" and considered that the value of the coefficient of friction may be reduced under the dynamic conditions of an earthquake by virtue of having "shift[ed] from the static case to the kinetic case."[3] Id.

Notwithstanding the narrow, limited issues admitted by the Board with respect to Utah GG, the State filed far-ranging discovery requests with respect to Utah GG.[4] These

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[3] Contrary to any potential assertion by the State, the second aspect of Utah GG ("the shift from the static case to the kinetic case") only concerns the coefficient of friction. Like the first issue, the second issue is taken directly from the bases paragraph of the contention, quoted in substantive part above, which focuses solely on the coefficient of friction used in the cask stability analysis. Late-Filed Contention GG at 7-8. In addition, the language is part of a discussion of how "the coefficient of friction . . . may also reduce under dynamic conditions of an earthquake." Id. at 8 (emphasis added). Given the context of the supporting basis, there can be no doubt that both issues are limited to the coefficient of friction.

[4] State of Utah's Fifth Set of Discovery Requests Directed to the Applicant and Skull Valley Band of Goshutes," December 1, 1999 ("State's Fifth Disc. Req.").

requests encompassed in large part the same broad issues that the Board had rejected in its admission of Utah GG as set forth above. They included, for example, questions going to the adequacy of the consideration of site specific soil characteristics[5] and sufficiency of the input to the model of the PFS site soil characteristics[6] – both of which directly relate to portions of Utah GG (bases 1 and 2) dismissed by the Board.[7] Other requests were broad ranging inquiries on the modeling used by in the cask stability analysis with no tie to the coefficient of friction issues admitted by the Board in Utah GG.[8] Accordingly, PFS properly objected the great majority of the discovery going beyond the scope of Utah GG as admitted by the Board.

Although the State has refiled most of the discovery to which PFS has objected under Utah L,[9] it has moved to compel PFS to answer Requests for Admissions Nos. 10, 11, 12, 19 and 20(b) of its Fifth Discovery Request. These remaining five requests are, for the most part, still broad ranging requests with no tie on their face to the coefficient of

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[5] See Request for Admission Nos. 1, 2 and 3. Id. at 9-10.

[6] See Request for Admission Nos. 2, 3, 8, 9, 11, 14, and 15. Id. at 9-10, 11-12.

[7] Basis 1 (dismissed by the Board) claimed that "[t]he Sierra Nuclear site-specific analysis gives inadequate consideration to site-specific soil characteristics." Basis 2 (also dismissed by the Board) claimed that "[i]nsufficient information is provided about the input to the model of the PFS site soil characteristics to support the credibility of the analysis." LBP-98-7, 47 NRC at 210.

[8] Id.

[9] PFS is currently reviewing these discovery requests in the context of Utah L. PFS has agreed with the State that it will file any objections to the refiled discovery within eight business days of service of the refiled discovery (January 3, 2000), the standard time that PFS and the State have agreed to for discovery responses, and file its substantive answers on January 7, 2000 (because of the unavailability of key personnel during the holiday season).

friction issues raised in Utah GG.[10] The State nevertheless claims a link – wrongly as set forth below – to Utah GG for these five requests on which it moves to compel.

B. The State's Discovery Requests Do Not Seek Relevant Information

The five discovery requests that the State seeks to compel a response for do not seek relevant information. Specifically, the information sought is neither relevant nor likely to lead to admissible evidence about the value of the coefficient of friction between the storage cask and the pad analyzed in the cask stability analysis.

The "coefficient of friction" is a measure of the intensity of the resistance of movement between contacting surfaces. Its value is determined by the material that comprises the two contacting surfaces. Soler Dec. at ¶ 9. As Utah GG implies, the coefficient of friction will also depend on whether or not the two surfaces are in motion, as the kinetic coefficient of friction is slightly less than the static coefficient of friction. Id. Unlike the "friction force," which is a product of the coefficient of fiction and the normal force acting on the object, the coefficient of friction is independent of the magnitude of the force between the two surfaces (e.g., how much a cask weighs). Id.

The State's attempt to broaden the scope of the contention beyond that admitted by the Board is evidenced by the language used in its motion. The term "coefficient of friction" only appears once in the State's entire motion, and then only when the State

[10] See, e.g., Request for Admission No. 10, State's Fifth Disc. Req. at 11 ("Do you admit the concrete pad will behave as a flexible member when the stiffness of the concrete pad relative to the soil stiffness for all three cases is taken into consideration?"); see also, Request for Admission No. 19, id. at 13. ("Do you admit that PFS has not presented a quantification of the amount of lift off in its results of final displacements, such as the amplitude and duration of the separation between the pad and the casks and its subsequent impact.")

quotes the contention as admitted by the Board. Instead, throughout its arguments for why its requests are relevant, the State uses the confusing term "friction," without specifying whether it is referring to the "friction force" or the "coefficient of friction." However, by substituting each of these terms where the term "friction" is used, it is apparent that the State's justifications do not relate to the contention as admitted. The substitution of "coefficient of friction" results in nonsensical and factually incorrect statements, whereas the substitution of the term "friction force" results in factually accurate (albeit totally irrelevant) statements. Soler Dec. at ¶¶ 8-11.

Specifically, the State claims that Request for Admissions Nos. 10, 11, and 12, which "relate to the flexible behavior of the pad," are relevant for two reasons. State's Motion at 4. The State claims that the pad's flexible behavior will cause non-uniform pressure points, impacting the "variation of friction" and that "the projected motion of the pad" might influence "the transition from static case to kinetic case." Id. Both of these reasons confuse the concepts of "friction force" and "coefficient of friction." Soler Dec at ¶¶ 8-11. The coefficient of friction is in no way impacted by the flexible behavior of the pad. To put it simply, regardless of any non-uniform pressure or projected motion of the pad, the pad will still be concrete and the cask will still have a steel bottom. Thus, the coefficients of friction will not change. Id.

Similarly, the topic of Request for Admission No. 19, "the amount of lift off between the pad and the cask," has no effect on the coefficient of friction and is thus not relevant. State's Motion at 4. Neither the "nonuniform pressure" nor any "additional

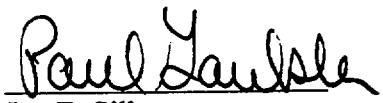
seismic loads" due to the "lift off of the pad" will change the materials of the pad and cask, and therefore the coefficients of friction. Soler Dec. at ¶¶ 8-11. Neither the value of the static or the kinetic case, nor the reduction in value upon shifting from the static coefficient of friction to the kinetic coefficient of friction would be affected. Id. at ¶ 11.

Finally, the State claims in support of Request for Admission No. 20(b) that whether PFS considered "cold bonding" is relevant because it "may directly and significantly impact transition from the static case to the kinetic case." State's Motion at 5. However, what the State fails to explains is, if bonding truly occurs, how will the cask even move. Because a cask truly cold-bonded to the pad cannot move, there can be no "transition between the static case and the kinetic case." Soler Dec. at ¶ 12. Thus, the State has not provided any valid reason for why cold bonding, which would increase the stability of the storage cask, is relevant to why the TranStor cask stability analysis is allegedly inadequate.

II. CONCLUSION

For the foregoing reasons, the Board should deny the State's Motion to Compel.

Respectfully submitted,



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Dated: December 27, 1999

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In the Matter of	)	
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PRIVATE FUEL STORAGE L.L.C.	)	Docket No. 72-22
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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 Response to State of Utah's Motion to Compel Applicant to Respond to State's Fifth Set of Discovery Requests" and the Declaration of Dr. Alan Soler 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 27th day of December, 1999.

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DECLARATION OF DR. ALAN SOLER

Dr. Alan Soler states as follows under penalties of perjury:

1. I am an Executive Vice-President with Holtec International ("Holtec"). Holtec is a vendor of storage casks for the Private Fuel Storage Facility ("PFSF"). My professional and educational experience is summarized in the resume attached as Exhibit 1 to this declaration.

2. In my capacity as Executive Vice-President for Holtec, I oversaw and am responsible for the revised analysis of the cask stability of the TranStor cask during the design basis seismic event entitled, "PFSF Site-Specific Cask Stability Analysis for the TranStor Storage Casks," HI-992295. This analysis was submitted to the NRC on September 23, 1999, and transmitted to the State on September 30, 1999. I am also familiar with Utah Contention GG raised by the State of Utah in the NRC licensing hearing for the PFSF.

3. Prior to my current employment with Holtec International, I was a Professor of Mechanical Engineering and Applied Mechanics at the University of Pennsylvania. As an Assistant, Associate, and full Professor over a 26 year period, I taught graduate and undergraduate courses in mechanical engineering, engaged in funded research, and was an active consultant to industry on various mechanical engineering

matters. In several of my consulting matters, I conducted experiments to determine the coefficient of friction between two contacting surfaces.

4. I have reviewed Contention Utah GG as well as the State's basis underlying the contention. In Utah GG, the State claims that PFS "used a non-conservative 'nonsliding cask' tipover analysis that did not consider that the coefficient of friction may vary over the surface of the pad, and did not consider the shift from the static case to the kinetic case when considering momentum of the moving casks."

5. In the basis for the contention, the State similarly claims that a "factor not considered by . . . Advent Engineering Services, Inc., who evaluated the tipover analysis using the horizontal seismic forces, is that the coefficient of friction may vary over the surface of the pad. . . . . However, the coefficient of friction, which is larger when the casks are static, may also reduce under dynamic conditions of an earthquake. Advent Engineering did not consider the shift from the static case to the kinetic case when considering the momentum of the moving casks." State of Utah's Request for Consideration of Late-Filed Contention GG, at 7-8 (footnote omitted).

6. Based on the language of the Contention and its stated basis, the subject of Utah GG is the value of the coefficient of friction used, or not used, in the analysis, including the potential shift from a static value for the coefficient of friction to a dynamic value. Specifically, contention Utah GG was made with respect to the initial cask stability analysis performed for the TranStor cask by Advent Engineering. The analysis by Advent assumed that the cask was analytically pinned at one edge and therefore the coefficient of friction between steel and concrete was not considered. This approach conservatively favors the tendency of a cask to tipover because all of the applied force acts to tipover the cask and no force is expended to overcome the frictional force. Because the coefficient of friction was not considered in this analysis, variations in the coefficient of friction and the shift in the coefficient of friction from the static case to the kinetic case, i.e., sliding, were not relevant. Utah GG challenges the adequacy of the "nonsliding cask" tipover analysis performed by Advent. (As I will explain in a

subsequent declaration in support of a Motion for Summary Disposition of Utah GG, the revised Holtec cask stability analysis for the TranStor cask contained in HI-992295 addresses the coefficient of friction issues raised in Utah GG.)

7. I have reviewed Requests for Admissions Nos. 10, 11, 12, 19 and 20(b) contained in the State's Fifth Set of Discovery Requests directed to the Applicant, dated December 1, 1999. I have also reviewed the technical arguments in the State of Utah's Motion to Compel Applicant to Respond to State's Fifth Set of Discovery Requests, dated December 20, 1999 made in support of the State's motion to compel answers with respect to Requests for Admissions Nos. 10, 11, 12, 19 and 20(b). These requests do not address or seek information concerning the value of the coefficient of friction that should be used in the cask stability analysis for the TranStor cask, the subject of Utah GG.

8. The State in its motion claims that flexible behavior of the pad will affect the "friction" between the cask and the pad and that lift off between the pad and the cask will affect the application of "friction" on the pad. The State's use of the term "friction" in both contexts confuses the concepts of "coefficient of friction" and "friction force."

9. The "coefficient of friction" is a property associated with a contact point between two surfaces. The value of the coefficient of friction is dependent on the characteristics of the two materials at the interface contact point and also whether the materials are in motion, relative to each other, along a direction parallel to the interface surface. The coefficient of friction between two materials at rest at the interface contact point, i.e. the static case, may be slightly more than for the same materials in relative motion, i.e., the kinetic case. The coefficient of friction shifts from the static case to the kinetic case upon the initiation of relative movement. The value of the coefficient of friction is not influenced by the magnitude of the contact pressure at the interface contact point. Thus, the value of the "coefficient of friction" – which is the subject of Utah GG – will not be influenced by flexible behavior of the pad and any lift off between the pad and cask.

10. The coefficient of friction is independent of the friction force. The local compressive pressure at any point on the interface between two contacting surfaces multiplied by the coefficient of friction gives a lateral shear resistance at the local point. The friction force is the integrated value of this shear resistance over the area of contact of the two surfaces at any instant in time. Thus, the "friction force" can be influenced by flexible behavior of the pad and any lift off between the pad and cask, but is not the subject of Utah GG.

11. The State also claims that any lift off between the pad and the cask or flexible nature of the pad will affect the shift from the static case to the kinetic case. Again, the friction force would be affected, but neither the values of the coefficient of friction for the static and kinetic cases, nor the change in value from the static coefficient of friction to the kinetic coefficient of friction would be affected by any lift off between the pad and the cask or flexible nature of the pad.

12. The State also claims, with respect to Request for Admission No. 20, that over time cold bonding between the cask and the pad could occur which "may directly and significantly impact the transition from the static to the kinetic case." However, if a cask truly cold-bonded to the pad, it could not move and there would be no transition from the static to the kinetic case. Moreover, cold bonding would increase the stability of the storage cask, not decrease it.

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

Executed on December 24, 1999.

Dr. Alan Soler

FACSIMILE TRANSMISSION SHEET

Utah Attorney General's Office - Environment Division
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Date: January 21, 2000 **Total Pages (including cover):** 7

Attached is Exhibit A to Declaration of Dr. Farhang Ostadan, filed in support of State's January 21, 1999 Response to Applicant's Motion for Summary Disposition of Utah Contention GG - Failure to Demonstrate Cask-Pad Stability During Seismic Event for TranStor Casks

Please deliver to the following persons in your organization:

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John Cordes, Acting Director	Office of the Commission Appellate Adjudication	(301) 415-1600	(301) 415-3200
G. Paul Bollwerk, III, Esq., Chairman	Atomic Safety and Licensing Board	(301) 415-7454 gpb@nrc.gov	(301) 415-5599
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