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)	)	ASLBP No. 97-732-02-ISFSI

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.

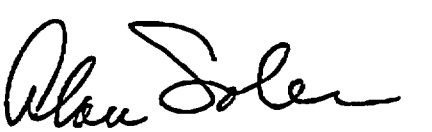
10. The coefficient of friction is independent of the friction force. The local compressive pressure at any point on the interface between two contacting surfaces multiplied by the coefficient of friction gives a lateral shear resistance at the local point. The friction force is the integrated value 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