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)	)	

AFFIDAVIT OF HENRY W. LEE
CONCERNING UTAH CONTENTION GG

I, Henry W. Lee, having first been duly sworn, do hereby state as follows:

1. My name is Henry W. Lee. I am employed as a senior structural engineer in the Technical Review Section A, Spent Fuel Project Office, Office of Nuclear Materials Safety and Safeguards, U.S. Nuclear Regulatory Commission (NRC) in Washington, D.C. A statement of my professional qualifications is attached hereto.

2. This Affidavit is prepared in response to the "Applicant's Motion for Summary Disposition of Utah Contention GG -- Failure to Demonstrate Cask-Pad Stability During Seismic Event For TranStor Casks" (Motion), filed on December 30, 1999, by Private Fuel Storage L.L.C. (Applicant or PFS).

3. I have reviewed the Applicant's Motion and the attachments thereto, in which PFS seeks summary disposition of Utah Contention GG. On the basis of my review of the Applicant's Motion and the documents attached to the Applicant's Motion, I am satisfied that the Statement of Material Facts attached to the Applicant's Motion is correct.

4. The contention asserts a single basis that was admitted for litigation in this proceeding. The contention states:

> 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.

5. I am satisfied that the Applicant's revised analysis "TranStor Dynamic Response to 2000 Year Return Seismic Event," HI-992295, adequately resolves the issues set forth in the State's contention.

6. The "coefficient of friction" is a measure of the resistance to movement between two contacting surfaces. The value of the coefficient of friction depends on the materials sliding over each other and on the finished condition of the two contacting surfaces. It is customary to prescribe the static coefficient of friction between contacting materials in a "range of values" to bound the possible variations.

7. A typical range of static coefficient of friction values between a metal surface on concrete, masonry, or stone surfaces is 0.3 to 0.7, as given by the various design handbooks stated in paragraph 10 of the Declaration of Dr. Alan Soler, attached to the Applicant's Motion.

8. The value for kinetic coefficient of friction is generally slightly less than the value for static coefficient of friction. The value of kinetic coefficient of friction is taken to be about 25 percent smaller than the value of static coefficient of friction. *See, e.g.*, Ferdinand Beer and E. Russell Johnston, Jr., *Vector Mechanics for Engineers Statics and Dynamics,* McGraw-Hill Book Company, 1962. The lower bound static coefficient of friction reduced by 25% is 0.225 (e.g. 0.3 x 0.75 = 0.225).

9. The Applicant's revised analysis, HI-992295, used two different coefficients of friction, 0.2 and 0.8. The lower coefficient of friction 0.2 emphasizes the potential of the cask to slide, and the higher coefficient of friction 0.8 emphasizes the possibility of cask tip-over.

10. The lower coefficient of friction of 0.2 used in the analysis is less than the lower bound static coefficient of friction reduced by 25 percent. Thus, the HI-992295 analysis has used a coefficient of friction less then the expected lower bound kinetic coefficient of friction between steel and concrete surfaces. The higher coefficient of friction of 0.8 used in the analysis is about 14 percent higher than the upper bound static coefficient of friction of 0.7 between steel and concrete surfaces (e.g., $0.8/0.7 \approx 1.14$). Therefore, the two coefficients of friction used by Holtec in the revised analysis bound expected variations in the coefficient of friction over the surface of the concrete pad.

11. The Applicant's revised analysis also took into account the effect of the reduction of the coefficient of friction due to the "shift from static case to the kinetic case." The shift from the static case to the kinetic case when considering momentum of the moving casks is considered in the HI-992295 analysis by determining the maximum displacements of the Transtor cask relative to the ISFSI pad based on the lower coefficient of friction 0.2. The lower coefficient of friction of 0.2 used in the analysis is less than the expected lower bound kinetic coefficient of friction of 0.225 between steel and concrete surfaces.

12. Based on the above considerations, I conclude that the revised analysis, HI-992295, has considered the effects of the coefficient of friction varying over the concrete pad and the shift from static case to the kinetic case. Any variation in the coefficient of friction is within the range analyzed. Therefore the issues raised in Utah Contention GG have been adequately addressed.

13. I hereby certify that the foregoing is true and correct to the best of my knowledge, information and belief.

Henry W. Lee

Subscribed and sworn to before me this 24th day of January, 2000.

Melinda L McDonald
Notary public

My commission expires: 12/1/2001