



OFFICE OF THE
GENERAL COUNSEL

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

Adams

April 24, 2002

Denise Chancellor, Esq.
Utah Attorney General's Office
160 East 300 South, 5th Floor
P.O. Box 140873
Salt Lake City, Utah 84114-0873

In the Matter of
Private Fuel Storage, L.L.C.
(Independent Spent Fuel Storage Installation)
Docket No. 72-22-ISFSI

Dear Ms. Chancellor:

By letter dated April 22, 2002, the NRC Staff ("Staff") identified and/or produced various documents to the State of Utah ("State") related to the March 31, 2002 report by Dr. Vincent Luk, concerning the potential for cask tipover or sliding at the proposed PFS Facility. The Staff has attempted to transmit to you and Counsel for PFS, by E-mail, a number of the documents listed therein. Unfortunately, technical difficulties (with both your server and mine), and the large size of some of the electronic files, have interfered with the Staff's ability to forward those documents to you electronically.

Accordingly, the referenced documents are enclosed herewith, in the form of paper copies and/or electronic files copied onto a CD Rom disc, as indicated in the attachment hereto.

Finally, I have received, from Dr. Luk, the inputs for the 15 cases used in his ABAQUS computer runs. These 15 sets of case files were listed in Part C of the attachment to my letter of April 22, 2002, as "computer files available in electronic format, upon request." These items are in ZIP format, and would require about 2,250 pages to print out. Please let me know if you want me to transmit these items to you electronically; if you do not want them, I will delete them from my server, as they take up a good deal of memory.

Sincerely,

Sherwin E. Turk
Sherwin E. Turk
Counsel for NRC Staff

By: Federal Express
Enclosures: As stated
cc w/Encl.: Jay Silberg, Esq.
cc w/out CD: Service List

April 24, 2002

**Documents Produced on April 24, 2002
Related to the Report by Dr. Vincent Luk
Concerning Unified Contention Utah L/QQ**

A. Documents Being Produced in Electronic Format (CD Rom Disc)

1. Luk, V. K., et al., "NRC Project on Seismic Behavior of Spent Fuel Storage Cask Systems - Final Report on Seismic Analysis of Three-Module Rectangular Transnuclear West Module/Cask," dated December 21, 2001, listed as Item B.1 in the list attached to the Staff's letter of April 22, 2002. On the CD Rom disc, this appears as two files, labeled "SONGS Cask Report" and Appendix D - SONGS Report.

2. Luk, V. K., et al., "NRC Project on Seismic Behavior of Spent Fuel Storage Cask Systems - Final Report on Seismic Analysis of HI-STORM 100 Casks at Hatch Nuclear Power Plant," dated June 28, 2001, listed as Item B.2 in the list attached to the Staff's letter of April 22, 2002. On the CD Rom disc, this appears as two files, labeled "Hatch Cask Report" and Appendix III - Hatch."

3. Seven files that were attached to the E-mail message from Mahendra Shah (NRC) to Vincent Luk (SNL), June 14, 2001, listed as Item B.4 in the list attached to the Staff's letter of April 22, 2002. These files are labeled as follows in the enclosed CD Rom disc:

FN2000 Target Spectra east-west.xls
FN2000 Target Spectra north-south.xls
FN2000 Target Spectra vertical.xls
PFS - east-west (fault normal) acc time history in g.wls
PFS - north-south (fault normal) acc time history in g.wls
PFS - vertical acceleration time history in g.wls
PFS soil properties.xls

4. Six files that were attached to the E-mail message from Mahendra Shah (NRC) to Vincent Luk (SNL), November 28, 2001, providing the PFS data on strain vs. shear modulus and damping for soil layers used in the seismic analysis for the site-specific seismic event based on a 10,000-year return period. This was listed as Item B.5 in the list attached to the Staff's letter of April 22, 2002. These files are labeled as follows in the enclosed CD Rom disc:

Soil Profile.wpd
PFS1.raw
PFS2.raw
PFS3.raw
PFS4.raw
PFS5.raw

B. Documents Being Produced in Paper Format

1. E-mail from Khalid Shaukat (NRC) to Vincent Luk (SNL), May 30, 2001, providing design information on the HI-STORM 100 cask. This was listed as Item B.3 in the list attached to the Staff's letter of April 22, 2002.

2. E-mail from Mahendra Shah (NRC) to Vincent Luk (SNL), June 14, 2001. This was listed as Item B.4 in the list attached to the Staff's letter of April 22, 2002. The electronic files which were attached to this E-mail message are contained in the CD Rom disc, and are identified above.

3. E-mail message from Mahendra Shah (NRC) to Vincent Luk (SNL), November 28, 2001, providing the PFS data on strain vs. shear modulus and damping for soil layers used in the seismic analysis for the site-specific seismic event based on a 10,000-year return period. This was listed as Item B.5 in the list attached to the Staff's letter of April 22, 2002. The electronic files which were attached to this E-mail message are contained in the CD Rom disc, and are identified above.

Luk, Vincent

From: Syed Shaukat [SKS1@nrc.gov]
Sent: May 30, 2001 2:54 PM
To: vkluk@sandia.gov
Cc: Sher Bahadur
Subject: Re: PFSF Casks

I am trying to get the requested info from SFPO/NMSS people.
For Question 1, I can give you the following for HI-STORM 100 Cask
You can use the same figures for Hatch also.

Diameter of the overpack = 132.5"
Height of the overpack = 231.25"
Weight of the overpack (No MPC) = 270,000 lbs
Height of C.G. for Empty Overpack = 116.8"

Weight of the overpack with minimum wt of MPC = 303,000 lbs
Weight of the overpack with maximum weight of full MPC = 360,000 lbs
Height of the C.G. Overpack+MPC-24 with fuel = 118.39"
Height of the C.G. Overpack+MPC-68 with fuel = 118.38"

Ref: HI-STORM TSAR Report HI-951312 Pages 3.2-4 and 3.2-5

>>> "Luk, Vincent" <vkluk@sandia.gov> 05/10/01 07:40PM >>>
Khalid,

Last January, I received a package from L. C. Leu containing Private Fuel Storage Facility (PFSF) SAR, Rev. 3 and CDROM LA am. 19 WPD. I have completed reviewing the contents of this package. Unfortunately, it does not contain the information that we need to perform the seismic analyses of casks. (The complete SAR may contain some of the information that we need, but they were deleted in this package.)

We need the following technical details for the cask seismic analyses:

1. Design of Holtec HI-STORM 100 cask, including basic cask dimensions, weight and C.G. location.
2. Dimension and material properties of concrete pad.
3. Time histories of three components of design seismic accelerations and response spectra.
4. Material properties of soil foundation at the PFSF site. We need, as a minimum, the best-estimate strain-compatible soil profile data.

As a point of reference, we requested similar information on the Hatch cask.

Please let me know if I can be of any help to expedite this information request process.

Best regards,

Vincent Luk

From: "Luk, Vincent" <vkluk@sandia.gov>
To: "TURK, Sherwin (NRC)" <SET@nrc.gov>
Date: 4/22/02 5:39PM
Subject: FW: PFS seismic information for SNL

FYI

-----Original Message-----

From: Mahendra Shah [mailto:MJS3@nrc.gov]
Sent: June 14, 2001 11:40 AM
To: Syed Shaukat
Cc: Asadul Chowdhury; Jack Guttman; K.C. Leu; Michael Waters; Mark Delligatti
Subject: PFS seismic information for SNL

Khalid:

Please verify that the diskette I gave you this morning contains the information for itmes 2, 3 and 4, requested by Vincent Luk of SNL (memo dated 5/10/01), for performing PFS soil-structure interaction analysis. Please note that, even though the information is based on the latest PFS submittal, there is some possibility that the soil properties in the top layer may change. SNL may use the information, however, to set up the problem. We expect the changes to be of minor nature.

The diskette contains 3 seismic time-histories (2 horizontal and 1 Vertical), 3 design response spectra for a 2000 year return period earthquake, layered strain-compatible soil properties, and dimensions and properties of concrete pads.

If you have any questions, please call me. Thanks.

Mahendra

From: "Luk, Vincent" <vkluk@sandia.gov>
To: "TURK, Sherwin (NRC)" <SET@nrc.gov>
Date: 4/22/02 5:48PM
Subject: Disk Files (#4)

Sherwin,

The attached files are those in a computer disk from Mahendra Shah, 6/14/01.

Vincent Luk

<<FN2000- TARGET spectra east-west.xls>> <<FP2000- TARGET spectra
north-south.xls>> <<PFS - east-west (fault-normal) acc time-history in
g.xls>> <<PFS - north-south (fault-parallel) acc time-history in g.xls>>
<<PFS - vertical acceleration time-history in g.xls>> <<PFS input for Item
2 - SNL.doc>> <<PFS soil properties.xls>> <<V2000 - TARGET spectra
vertical.xls>>

Denise - A
hard copy of
this item is
attached. The others are
on the CD Rom disc.
Sherwin
4/23/02

Item 2 of the memo from Vincent Luk to Khalid Shaukat, dated 5/10/01

2. Dimension and material properties of concrete pad

- a. Concrete pad dimension: 30 feet x 67 feet x 3 feet thick
- b. Compressive strength of concrete: 3000 psi
- c. Pads are placed as vertical rows with 35 feet clear spacing. There are 25 rows and each row has 10 pads with 5 feet clear spacing. Since each pad has 8 casks, this layout will accommodate 2000 casks. This layout is repeated to place additional 2000 casks. The distance between the two layouts is 90 feet. (Reference: PFS SAR Fig. 1.2-1 and Fig. 4.2-7)

From: "Luk, Vincent" <vkluk@sandia.gov>
To: "TURK, Sherwin (NRC)" <SET@nrc.gov>
Date: 4/22/02 5:41PM
Subject: FW: PFS Modulus/Damping Data

FYI

-----Original Message-----

From: Mahendra Shah [mailto:MJS3@nrc.gov]
Sent: November 28, 2001 1:24 PM
To: vkluk@sandia.gov
Cc: Jack Guttman; Mark Delligatti; Syed Shaukat
Subject: Fwd: PFS Modulus/Damping Data

Vincent:

I am forwarding the PFS data on strain vs. shear modulus and sampling for soil layers. Please review the data and let me know if you have any questions. Thanks.

Mahendra

From: "Goodluck Ofoegbu" <ofoegbu@cnwra.swri.edu>
To: "Mahendra Shah" <MJS3@nrc.gov>
Date: 11/27/01 6:40PM
Subject: PFS Modulus/Damping Data

The data are given in the attached files. The files PF[1,5].raw give the five sets of modulus and damping curves. The file soilProfile.wpd shows assigns the curves to the different soil layers. The info is self-explanatory, but you can call me if you have more questions.

The supplier of ProShake:

EduPro Civil Systems, Inc.
5141 189th Ave NE
Sammamish, WA 98074

Phone/Fax: (425) 836-4754
email: proshake@proshake.com
Website: www.proshake.com

Thanks.

Goodluck I Ofoegbu, Ph.D.
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Center For Nuclear Waste Regulatory Analyses
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6220 Culebra Road
San Antonio, TX 78238-5166
Phone: (210)-522-6641
Fax: (210)-522-6081
e-mail: gofoegbu@swri.org <mailto:gofoegbu@swri.org>

Soil Profile

Profile Name: PFS Skull Valley Soil Profile (Basecase Soil Properties)

Water Table: Not Applicable

Number of Layers: 10

Layer Number	Material Name	Thicknes s (ft)	Unit Weight (pcf)	Gmax (ksf)	Vs (ft/sec)	Modulus Curve	Damping Curve	Mod. Paramete r	Damp. Paramete r
1	Soil cement	5.00	100.00	6,993.2	1,500.0	PFS-1 2 Reduction	Modulus	PFS-1 Damping	
2	Lacustrine silt	5.00	80.00	693.19	528.00	PFS-1 Reduction	Modulus	PFS-1 Damping	
3	Lacustrine silt	2.00	80.00	1,314.1	727.00	PFS-1 8 Reduction	Modulus	PFS-1 Damping	
4	Lacustrine sand	6.00	100.00	2,266.7	854.00	PFS-2 9 Reduction	Modulus	PFS-2 Damping	
5	Lacustrine silt	8.00	94.00	2,216.4	871.00	PFS-2 6 Reduction	Modulus	PFS-2 Damping	
6	Lacustrine sands	9.00	115.00	3,733.3	1,022.0	PFS-3 1 Reduction	Modulus	PFS-3 Damping	
7	Lacustrine sands	15.00	115.00	5,061.5	1,190.0	PFS-3 9 Reduction	Modulus	PFS-3 Damping	
8	Dense sands and silty sands	20.00	120.00	12,084.	1,800.0	PFS-4 29 Reduction	Modulus	PFS-4 Damping	
9	Dense sands and silty sands	20.00	120.00	12,084.	1,800.0	PFS-4 29 Reduction	Modulus	PFS-4 Damping	
10	Tertiary Salt Lake Group	Infinite	135.00	35,287.	2,900.0	PFS-5 81 Rock-Linear	Modulus: Rock-Linear	PFS-5 Damping: Rock-Linear	