

RAS 4874

September 20, 2002

DOCKETED
USNRC

**UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION**

September 25, 2002 (2:28PM)

Before the Atomic Safety and Licensing Board

OFFICE OF SECRETARY
RULEMAKINGS AND
ADJUDICATIONS STAFF

In the Matter of)

PRIVATE FUEL STORAGE L.L.C.)

(Private Fuel Storage Facility))

Docket No. 72-22-ISFSI

**FILING OF APPENDICES A AND B AND ERRATA
TO APPLICANT'S PROPOSED FINDINGS OF FACT AND
CONCLUSIONS OF LAW ON UNIFIED CONTENTION UTAH L/QQ**

Applicant Private Fuel Storage, L.L.C. ("Applicant" or "PFS") submits herewith two appendices to its Proposed Findings of Fact and Conclusions of Law on Unified Contention Utah L/QQ. Appendix A identifies the location in the hearing transcript at which each of the items of pre-filed testimony was admitted into evidence, and Appendix B lists the parties' exhibits for contention Utah L/QQ and the transcript location of the Board's ruling on their admission into evidence. Although PFS did not commit to filing such appendices (as it had done in its Findings on Utah K), it is doing so for convenience of the Board and the ease of reviewing the evidentiary record.

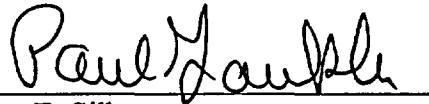
In addition, like the State, we have identified a number of typographical, grammatical and punctuation errors in the final document that escaped our notice in our effort to meet the September 5, 2002 deadline. Accordingly, PFS is also filing an errata to its Proposed Utah L/QQ Findings to correct those errors that affect the comprehension

Template = SECY-057

SECY-02

or readability of the document. It is not the intent of this errata sheet to identify every minor spelling or punctuation error.

Respectfully submitted,

A handwritten signature in cursive script, appearing to read "Paul Gaukler", is written over a horizontal line.

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September 20, 2002

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

CERTIFICATE OF SERVICE

I hereby certify that copies of the Filing of Appendices A and B and Errata to Applicant's Proposed Findings of Fact and Conclusions of Law on Unified Contention Utah L/QQ 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 20th day of September, 2002.

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Office of the Secretary
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Attention: Rulemakings and Adjudications
Staff
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Paul A. Gaukler

**Appendix A Pre-Filed Testimony
Unified Contention Utah L/QQ**

Witness	Testimony	Location in Transcript Where Admitted
Robert R. Youngs Wen Tseng	Joint Testimony of Robert Youngs and Wen Tseng on Unified Contention Utah L/QQ	Tr. 5529
Krishna P. Singh Alan I. Soler	Testimony of Krishna P. Singh and Alan I. Soler on Unified Contention Utah L/QQ	Tr. 5750
Paul J. Trudeau	Testimony of Paul J. Trudeau on Section D of Unified Contention Utah L/QQ	Tr. 6135
Bruce E. Ebbeson	Testimony of Bruce E. Ebbeson on Section D of Unified Contention Utah L/QQ	Tr. 6357
Daniel J. Pomerening Goodluck I. Ofoegbu	NRC Staff Testimony of Daniel J. Pomerening and Goodluck I. Ofoegbu Concerning Unified Contention Utah L/QQ, Part D (Seismic Design and Foundation Stability)	Tr. 6496
Vincent K. Luk Jack Guttman	NRC Staff Testimony of Vincent K. Luk and Jack Guttman Concerning Unified Contention Utah L/QQ (Geotechnical Issues)	Tr. 6760
Moshin R. Khan Farhang Ostadan	State Testimony of Dr. Moshin R. Khan and Dr. Farhang Ostadan on Unified Contention Utah L/QQ, Part D (Cask stability)	Tr. 7123
Steven F. Bartlett Farhang Ostadan	State of Utah Testimony of Dr. Steven F. Bartlett and Dr. Farhang Ostadan on Unified Contention Utah L/QQ (Dynamic Analyses)	Tr. 7268
C. Allin Cornell	Testimony of Dr. C. Allin Cornell	Tr. 7856

**Appendix A Pre-Filed Testimony
Unified Contention Utah L/QQ**

Witness	Testimony	Location in Transcript Where Admitted
John A. Stamatakos Martin W. McCann, Jr. Rui Chen	NRC Staff Testimony of John A. Stamatakos, Rui Chen and Martin W. McCann, Jr., Concerning Unified Contention Utah L/QQ, Part E (Seismic Exemption)	Admitted at Tr. 8050; bound into Record following Tr. 8128
Barry J. Solomon	State of Utah Testimony of Barry Solomon on Unified Contention L/QQ – Geotechnical (Geologic Setting)	Tr. 8965
Donald Wayne Lewis	Testimony of Donald Wayne Lewis on Section E of Utah L/QQ	Tr. 8968
Walter J. Arabasz	State of Utah Testimony of Dr. Walter J. Arabasz on Unified Contention Utah L/QQ (Seismic Exemption)	Tr. 9098
Robert R. Youngs	Rebuttal Testimony of Robert R. Youngs on Section D of Unified Contention Utah L/QQ	Tr. 10479
Alan I. Soler	Rebuttal Testimony of Alan I. Soler on Section D of Unified Contention Utah L/QQ	Tr. 10557
Wen S. Tseng	Rebuttal Testimony of Wen S. Tseng on Section D of Unified Contention Utah L/QQ	Tr. 10727
Bruce E. Ebbeson	Rebuttal Testimony of Bruce E. Ebbeson on Section D of Unified Contention Utah L/QQ	Tr. 10790
Paul J. Trudeau Anwar E. Z. Wissa	Joint Testimony of Paul J. Trudeau and Anwar E. Z. Wissa on Section C of Unified Contention Utah L/QQ	Tr. 10834

**Appendix A Pre-Filed Testimony
Unified Contention Utah L/QQ**

Witness	Testimony	Location in Transcript Where Admitted
Goodluck I. Ofoegbu	NRC Staff Testimony of Goodluck I. Ofoegbu Concerning Unified Contention Utah L/QQ, Part C	Tr. 11001
Steven F. Bartlett James K. Mitchell	State of Utah Testimony of Dr. Steven F. Bartlett and Dr. James K. Mitchell on Unified Contention Utah L/QQ (Soil Cement)	Tr. 11033
Paul J. Trudeau Anwar E. Z. Wissa	Rebuttal Testimony of Paul J. Trudeau and Anwar E. Z. Wissa to Direct Testimony of State of Utah Witnesses Dr. Steven F. Bartlett and James K. Mitchell on Section C of Unified Contention Utah L/QQ	Tr. 11232
Paul J. Trudeau	Rebuttal Testimony of Paul J. Trudeau on Section D of Unified Contention Utah L/QQ	Tr. 11275
Steven F. Bartlett	State of Utah Partial Surrebuttal Testimony of Dr. Steven F. Bartlett to Rebuttal Testimony of Paul J. Trudeau on Unified Contention L/QQ (Dynamic Analyses)	Tr. 11305-06
Steven F. Bartlett	State of Utah Testimony of Dr. Steven F. Bartlett on Unified Contention L/QQ (Soils Characterization)	Tr. 11822
Paul J. Trudeau	Rebuttal Testimony of Paul J. Trudeau to Testimony of State of Utah Witness Dr. Steven F. Bartlett on Section C of Unified Contention Utah L/QQ (Soils Characterization)	Tr. 11954

**Appendix A Pre-Filed Testimony
Unified Contention Utah L/QQ**

Witness	Testimony	Location in Transcript Where Admitted
Steven F. Bartlett	Surrebuttal of Dr. Steven F. Bartlett to PFS Witness Paul Trudeau's Rebuttal Testimony on Section C of Unified Contention L/QQ	Tr. 11982
Krishna P. Singh Alan I. Soler Everett L. Redmond, II	Testimony of Krishna P. Singh and Alan I. Soler, and Everett L. Redmond II on Radiological Dose Consequence Aspects of Basis 2 of Section E of Unified Contention Utah L/QQ	Tr. 12044
Michael D. Waters	NRC Staff Testimony of Michael D. Waters Concerning Unified Contention Utah L/QQ, Part E	Tr. 12215
Marvin Resnikoff	Amended State of Utah Testimony of Dr. Marvin Resnikoff Regarding Unified Contention Utah L/QQ (Seismic Exemption – Dose Exposure)	Tr. 12349*
John A. Stamatakos	NRC Staff Rebuttal Testimony of Dr. John A. Stamatakos Concerning Unified Contention Utah L/QQ, Part E (Seismic Exemption)	Tr. 12648
Steven F. Bartlett	State of Utah Testimony of Dr. Steven Bartlett on Unified Contention Utah L/QQ, Part E (Lack of Design Conservatism) (revised June 5, 2002)	Tr. 12776*
C. Allin Cornell	Rebuttal Testimony of C. Allin Cornell to the Testimony of State Witness Dr. Walter Arabasz on Section E of Unified Contention Utah L/QQ	Tr. 12951

* Indicates that the Testimony was offered and accepted but not bound into the Transcript.

Appendix B Exhibits
Unified Contention Utah L/QQ (Seismic)

Exhibit Number And Description	Transcript Location	
	Identification or Marking of Exhibit	Admission of Exhibit (Or Other Status if Noted)
PFS Exhibit LL Geomatrix Evaluation of Spatial and Temporal Variation of Ground Motion for the Private Fuel Storage Facility ("Geomatrix Evaluation")	Tr. 5530	Tr. 5532
PFS Exhibit MM SWEC Calculation SC-21 (Evaluation of Cask Storage Pad Flexibility), Rev. 0	Tr. 5530	Tr. 5532
PFS Exhibit NN PFS Commitment Resolution Letter #37, August 7, 2001	Tr. 5752	Tr. 5753
PFS Exhibit OO Simulations for Holtec Beyond Design Basis Report (PFS Exh. 86C) (CD-ROM)	Tr. 5751-52	Tr. 10554
PFS Exhibit PP Excerpts from 03/05/02 Transcript of Deposition of Moshin R. Khan	Tr. 5751-52	Tr. 5753
PFS Exhibit QQ Static and Sliding Friction in Feedback Systems	Tr. 5751-52	Tr. 5753
PFS Exhibit RR Excerpts from DYNAMO Validation Manual	Tr. 5751-52	Tr. 5753
PFS Exhibit SS Excerpts from ANSYS Training and Validation Manual	Tr. 5751-52	Tr. 5753
PFS Exhibit TT Holtec Coefficient of Restitution and Linear Viscous Damping Calculation	Tr. 5751-52	Tr. 5753
PFS Exhibit UU SWEC Calculation G (B)-04, Rev. 9 (Stability Analyses of Cask Storage Pads)	Tr. 6136	Tr. 6137
PFS Exhibit VV Excerpts from SWEC Calculation G (B)-13, Rev. 6 (Stability Analyses of Canister Transfer Building)	Tr. 6136	Tr. 6137
PFS Exhibit WW Chart of Factor of Safety Versus Time for Seismic Stability of Pads	Tr. 6136	Tr. 6137

Appendix B Exhibits
Unified Contention Utah L/QQ (Seismic)

Exhibit Number And Description	Transcript Location	
	Identification or Marking of Exhibit	Admission of Exhibit (Or Other Status if Noted)
PFS Exhibit XX Excerpts from ASCE-4-86 (Seismic Analysis of Safety-Related Nuclear Structures and Commentary on Standard for Seismic Analysis of Safety-Related Nuclear Structures)	Tr. 6358-59	Tr. 6359
PFS Exhibit YY Attachment 6 to SWEC Calculation SC-6 (Finite Element Analysis of Canister Transfer Building)	Tr. 6359	Tr. 6359
PFS Exhibit ZZ PFSF SAR Table 5.1-1	Tr. 8969	Tr. 8969
PFS Exhibit AAA HI-STORM-100 FSAR Table 10.3.3a	Tr. 8969	Tr. 8969
PFS Exhibit BBB PFSF SAR Table 3.4-1	Tr. 8969	Tr. 8969
PFS Exhibit CCC PFSF SAR p. 3.4-2	Tr. 8969	Tr. 8969
PFS Exhibit DDD Excerpts from DOE-STD-1020-94 (Natural Phenomena Hazards Design and Evaluation Criteria for Department of Energy Facilities)	Tr. 7857-58	Tr. 7858
PFS Exhibit EEE Excerpts from 10/31/01 Transcript of Deposition of Walter J. Arabasz	Tr. 7857-58	Tr. 7858
PFS Exhibit FFF Excerpts from DOE Topical Report YMP/TR-003-NP, Preclosure Seismic Design Methodology for a Geologic Repository at Yucca Mountain (Rev. 2)	Tr. 7857-58	Tr. 7858
PFS Exhibit GGG Engineering Services Scope of Work for Laboratory Testing of Soil-Cement Mixes	Tr. 10835	Tr. 10837
PFS Exhibit HHH American Concrete Institute Report ACI 230.1R-90, "State-of-the-Art-Report on Soil Cement"	Tr. 10836	Tr. 10837
PFS Exhibit III Excerpts from 03/15/02 Transcript of Deposition of James K. Mitchell	Tr. 10836	Tr. 10837
PFS Exhibit JJJ PFSF SAR § 2.6.4.11	Tr. 10836	Tr. 10837

Appendix B Exhibits
Unified Contention Utah L/QQ (Seismic)

Exhibit Number And Description	Transcript Location	
	Identification or Marking of Exhibit	Admission of Exhibit (Or Other Status if Noted)
PFS Exhibit 84 PFSF SAR Fig. 1.2-1 PFSF General Arrangement	Tr. 5530-5531	Tr. 5532
PFS Exhibit 85 Excerpts from ICEC Calculation G (PO17)-2 (Storage Pad Analysis and Design)	Tr. 5530-5531	Tr. 5532
PFS Exhibit 86 Holtec PFSF Beyond Design Basis Scoping Analysis, Revision 1 (Holtec Proprietary Document)	Tr. 5850-52	Not Admitted Tr. 5855
PFS Exhibit 86A Holtec PFSF Beyond Design Basis Scoping Analysis, Revision 2 (Holtec Proprietary Document)	Tr. 9563	Not Admitted Tr. 9599
PFS Exhibit 86B Corrected p. 81 and 82 of Testimony of Krishna P. Singh and Alan I. Soler on Unified Contention Utah L/QQ	Tr. 9593	Tr. 9599
PFS Exhibit 86C Holtec PFSF Beyond Design Basis Scoping Analysis, Amended Revision 2 (per Board Order) (Holtec Proprietary Document)	Tr. 10543, 45-46	Tr. 10549
PFS Exhibit 86D Summary of Results from Holtec Report – “PFSF Beyond Design Basis Scoping Analysis”	Tr. 10543, 49	Tr. 10550
PFS Exhibit 87 Input Value for Case 8 – Table accompanying Answer 118 of KPS/AIS testimony	Tr. 5869-70	Not Offered ¹
PFS Exhibit 88 Excerpt from 03/05/02 Transcript of Deposition of Moshin R. Khan	Tr. 7145	Tr. 7248
PFS Exhibit 89 Excerpt from 03/05/02 Transcript of Deposition of Moshin R. Khan	Tr. 7179	Tr. 7248
PFS Exhibit 90 Presentation slide on Dr. Khan’s Opinion on Appropriate Contact Stiffness	Tr. 7199	Not Admitted Tr. 7249
PFS Exhibit 91 Presentation slide on Contact Stiffness vs. Reality	Tr. 7210	Not Admitted Tr. 7250-54

¹ Information provided in PFS Exhibit 87 is included in State Exhibit 179 and PFS Exhibit 86D.

Appendix B Exhibits
Unified Contention Utah L/QQ (Seismic)

Exhibit Number And Description	Transcript Location	
	Identification or Marking of Exhibit	Admission of Exhibit (Or Other Status if Noted)
PFS Exhibit 92 Presentation slide on Horizontal Displacement, Just Prior to Sliding, at Cask/Pad Interface	Tr. 7223	Tr. 9691
PFS Exhibit 93 Formula for Energy Absorption by a Spring	Tr. 7231-32	Not Admitted Tr. 7250-54
PFS Exhibit 94 Presentation slide on Vertical Contact Stiffness	Tr. 7244	Tr. 9692
PFS Exhibit 95 Excerpts from 03/08/02 Transcript of Deposition of Farhang Ostadan	Tr. 7338	Not Offered
PFS Exhibit 96 Excerpts from SHAKE2000 User's Manual	Tr. 7568	Not Offered
PFS Exhibit 102A Excerpts from 10/31/01 Transcript of Deposition of Walter J. Arabasz	Tr. 9174	Tr. 9336-37
PFS Exhibit 219 Diagram of Bouncing Cask	Tr. 9361	Not Offered
PFS Exhibit 220 Excerpts from ANSYS Training Manual	Tr. 9377	Not Offered
PFS Exhibit 221 Excerpts from ANSYS Training Manual	Tr. 9377	Tr. 9690
PFS Exhibit 222 Excerpts from IEEE Standard 384-1992, Criteria for Independence of Class 1E Equipment and Circuits	Tr. 9427-28	Tr. 9463
PFS Exhibit 223 Regulatory Guide 1.100, Seismic Qualification of Electric and Mechanical Equipment for Nuclear Power Plants (Rev. 2)	Tr. 9427-28	Tr. 9463
PFS Exhibit 224 Excerpts from 3/6/02 Deposition Transcript of Krishna P. Singh and Alan I. Soler	Tr. 9451	Tr. 9464
PFS Exhibit 225 Holtec Additional Cask Analyses for the PFSF	Tr. 9604	Tr. 10584-85
PFS Exhibit 225A Simulations for Additional Cask Analyses for the PFSF (CD-ROM)	Tr. 10543	Tr. 10587

Appendix B Exhibits
Unified Contention Utah L/QQ (Seismic)

Exhibit Number And Description	Transcript Location	
	Identification or Marking of Exhibit	Admission of Exhibit (Or Other Status if Noted)
PFS Exhibit 225B Results and input parameters from a run in Exh. 225	Tr. 10543, 92	Tr. 10597
PFS Exhibit 225C Slide with results from Visual Nastran Cask Stability Analyses	Tr. 10590	Not Offered ²
PFS Exhibit 225D Slides with results from Visual Nastran Cask Stability Analyses	Tr. 10787	Tr. 10788
PFS Exhibit 226 Excerpt from Appendix C to Multi-Cask Seismic Response at the PFS ISFSI, Holtec Calculation HI-971631	Tr. 9619	Tr. 9690
PFS Exhibit 227 05/29/02 E-mail message from P. Gaukler to D. Chancellor with ICEC attachments on Dynamic Pad Displacement	Tr. 10728	Tr. 10729
PFS Exhibit 228 Transcript of 03/15/02 Deposition of James K. Mitchell	Tr. 11046	Tr. 11184-85
PFS Exhibit 228A Errata to Transcript of 03/15/02 Deposition of James K. Mitchell	Tr. 11051-52	Tr. 11184-85
PFS Exhibit 229 Holtec Thermal calculation	Tr. 11068	Not Offered Tr. 11085-86
PFS Exhibit 230 SAR 2.6 – 42 to 2.6 – 44B (Soil Cement Mixes)	Tr. 11171-73	Tr. 11184-85
PFS Exhibit 231 Stone and Webster Calculation, Radiation Damping Applicable for Pads in the Vertical Direction	Tr. 11276	Tr. 11277
PFS Exhibit 232 Settlement Analysis for LaSalle County Nuclear Generating Station	Tr. 11276	Tr. 11277
PFS Exhibit 233 PFSF SAR Figure 2.6-5 Sheet 7 of 14 (Black and White)	Tr. 11778-79	Tr. 11953-54

² The information provided in PFS Exhibit 225C is included in PFS Exhibit 226D. See Tr. 10787.

Appendix B Exhibits
Unified Contention Utah L/QQ (Seismic)

Exhibit Number And Description	Transcript Location	
	Identification or Marking of Exhibit	Admission of Exhibit (Or Other Status if Noted)
PFS Exhibit 233A PFSF SAR Figure 2.6-5 Sheet 7 of 14 (Color)	Tr. 11841	Tr. 11953-54
PFS Exhibit 234 Regulatory Guide 1.132, Site Investigations for Foundations of Nuclear Power Plants (Rev. 1)	Tr. 11779	Tr. 11953-54
PFS Exhibit 235 PFSF SAR Figure 2.6-19 Locations of Geotechnical Investigations in Pad Emplacement Area	Tr. 11779	Tr. 11953-54
PFS Exhibit 236 Excerpts from 11/17/00 Transcript of Deposition of Steven F. Bartlett and Farhang Ostadan	Tr. 11780	Tr. 11953-54
PFS Exhibit 237 Joint Submittal of Unified Geotechnical Contention Utah L and Utah QQ	Tr. 11954	Tr. 11954
PFS Exhibit 238 Excerpts from "Presentation of Cone Penetration Testing Results of Soils at the PFS Facility" (Rev. 1), Report No. 05996.02-G (P)030), and Page 32 (Fig. 7) of SWEC Calc. G(B)-05-Rev. 2	Tr. 11955	Tr. 11964
PFS Exhibit 239 Interim Staff Guidance Memorandum No. 13, Real Individual, Revision 0	Tr. 12340	Tr. 12341
PFS Exhibit 240 10/29/01 Transcript of Deposition of Marvin Resnikoff	Tr. 12404	Tr. 12441
PFS Exhibit 241 PFSF Figure 1.1-2 from PFS SAR, with Buffer Zone marked in	Tr. 12548	Tr. 12566-67
PFS Exhibit 242 Excerpts from Holtec Report HI-971645, Radiation Shielding Analysis for the PFSF	Tr. 12548	Tr. 12566-67
PFS Exhibit 243 PFSF SAR Fig. 2.3-6 with locations of Buffer Zone and Nearest Resident marked in	Tr. 12548	Tr. 12566-67
PFS Exhibit 244 Excerpts from 1/02/01 Transcript of Deposition of Steven F. Bartlett	Tr. 12787-88	Tr. 12876

Appendix B Exhibits
Unified Contention Utah L/QQ (Seismic)

Exhibit Number And Description	Transcript Location	
	Identification or Marking of Exhibit	Admission of Exhibit (Or Other Status if Noted)
PFS Exhibit 247 April 2, 1999 Letter from John D. Parkyn (PFS) to Mark Delligati (NRC) re: Request for Exemption to 10 CFR 72.102(f)(1), Seismic Design Requirement	<u>See Joint Status Report on Utah L/QQ</u> ³	Pending Board Action ³
PFS Exhibit 248 August 24, 1999 Letter from John D. Parkyn (PFS) to Mark Delligati (NRC) re: Request for Exemption to 10 CFR 72.102(f)(1), Seismic Design Requirement	<u>See Joint Status Report on Utah L/QQ</u> ³	Pending Board Action ³
State Exhibit 91 Barry J. Solomon's Curriculum Vitae	Tr. 9342	Tr. 9342
State Exhibit 92 Steven F. Bartlett's Resume	Tr. 7296-97	Tr. 7297
State Exhibit 93 Excerpts from Section 3.8.5 (Foundations) of NUREG-0800	Tr. 11823-24	Tr. 11826
State Exhibit 94 PFSF SAR pg. 2.6 - 45 Rev. 21 and Figure 2.6 – 19 Rev. 22	Tr. 11823-24	Tr. 11826
State Exhibit 95 Excerpts from SWEC Calculation G(B)04-Rev. 9, Stability Analysis of Cask Storage Pads	Tr. 11823-24	Tr. 11826
State Exhibit 96 Excerpts from SWEC Calculation G(B)13-Rev. 6, Stability Analysis of Canister Transfer Building	Tr. 11823-24	Tr. 11826
State Exhibit 97 Excerpts from Regulatory Guide 1.132, Site Investigations for Foundations of Nuclear Power Plants (Rev. 1)	Tr. 11823-24	Tr. 11826
State Exhibit 98 Excerpts from 11/15/00 Transcript of Deposition of Paul J. Trudeau and Thomas Y. Chang	Tr. 11823-24	Tr. 11826
State Exhibit 99 Excerpts from 11/16/00 Transcript of Deposition of Steven F. Bartlett and Farhang Ostadan	Tr. 11823-24	Tr. 11826

³ See Joint Status Report of Utah Contention L/QQ Exhibits and other Open Items From Hearing Concerning Utah Contention L/QQ ("Joint Status Report on Utah L/QQ").

Appendix B Exhibits
Unified Contention Utah L/QQ (Seismic)

Exhibit Number And Description	Transcript Location	
	Identification or Marking of Exhibit	Admission of Exhibit (Or Other Status if Noted)
State Exhibit 100 Excerpts from EPRI Report EL-6800, Manual on Estimating Soil Properties for Foundation Design	Tr. 11823-24	Tr. 11826
State Exhibit 101 Excerpt from SWEC Calculation G(B)05-2, Document Bases for Geotechnical Parameters provided in Geotechnical Design Criteria	Tr. 11824	Tr. 11826
State Exhibit 102 Simplified Procedure for Estimating Dam and Embankment Earthquake-Induced Deformations, Journal of the Geotechnical Engineering Division, July 1978	Tr. 11824	Tr. 11826
State Exhibit 103 Figure: Laboratory Tests Commonly Performed to Determine the Anisotropy of the Soil	Tr. 11824	Tr. 11826
State Exhibit 104 Excerpts from "Design and Performance of the Foundation Stabilization Treatments for the Reconstruction of I-15 in Salt Lake City, Utah" by Steven R. Saye and Charles C. Ladd	Tr. 11824	Tr. 11826
State Exhibit 105 James Kenneth Mitchell's Curriculum Vitae	Tr. 11034-35	Tr. 11034-35
State Exhibit 106 PFSF SAR Sect. 2.6.4.11 (Rev. 22)	Tr. 11034-35	Tr. 11034-35
State Exhibit 107 Engineering Services Scope of Work for Laboratory Testing of Soil-Cement Mixes, ESSOW No. 05996.02-G010 (Rev. 0) 01/31/01	Tr. 11035-36	Not Admitted Tr. 11038 ⁴
State Exhibit 108 Excerpts from 03/06/02 Transcript of Deposition of Paul J. Trudeau	Tr. 11034-35	Tr. 11034-35
State Exhibit 109 Excerpts from 03/15/02 Transcript of Deposition of Anwar E. Z. Wissa	Tr. 11034-35	Tr. 11034-35
State Exhibit 110 Farhang Ostadan's Curriculum Vitae	Tr. 7269	Tr. 7270

⁴ Pre-filed State Exhibit 107 is identical to PFS Exhibit GGG except the later was admitted into the record with all of the proprietary markings removed. Tr. 11036.

Appendix B Exhibits
Unified Contention Utah L/QQ (Seismic)

Exhibit Number And Description	Transcript Location	
	Identification or Marking of Exhibit	Admission of Exhibit (Or Other Status if Noted)
State Exhibit 111 Figures and written commentary on damage to large objects after earthquakes (e.g. train engines, gasoline storage tanks and statues)	Tr. 7272	Not Admitted Tr. 7401-03
State Exhibit 112 Excerpts from 03/08/02 Transcript of Deposition of Farhang Ostadan	Tr. 7271-72	Tr. 7279
State Exhibit 113 Excerpts from 03/12/02 Transcript of Deposition of Wen-Shou Tseng	Tr. 7271-72	Tr. 7279
State Exhibit 114 Excerpts from 03/06/02 Transcript of Deposition of Paul J. Trudeau	Tr. 7271-72	Tr. 7279
State Exhibit 115 Excerpts from 03/08/02 Report by Dr. Vincent K. Luk, et. al., NRC Project on Seismic Behavior of Spent Fuel Storage Cask Systems: Seismic Analysis Report on HI-STORM 100 Casks at PFSF	Tr. 7271-72	Tr. 7285
State Exhibit 116 Excerpts from SWEC Calculation G (B)-04, Rev. 9 (Stability Analyses of Cask Storage Pads)	Tr. 7271-72	Tr. 7288
State Exhibit 117 Excerpts from SWEC Calculation G (B)-13, Rev. 6 (Stability Analyses of Canister Transfer Building)	Tr. 7272	Tr. 7288
State Exhibit 118 Excerpts from ASCE 4-98, Seismic Analysis of Safety-Related Nuclear Structures and Commentary	Tr. 7272	Tr. 7289
State Exhibit 119 Mohsin R. Khan's Curriculum Vitae	Tr. 7124-25	Tr. 7125
State Exhibit 120 Excerpts from 03/06/02 Transcript of Deposition of Krishna P. Singh and Alan I. Soler	Tr. 7124-25	Tr. 7125
State Exhibit 121 Excerpts from 11/15/01 and 11/16/01 Transcript of Telephone Deposition of Krishna P. Singh and Alan I. Soler	Tr. 7124-25	Tr. 7125
State Exhibit 122 ALTRAN Technical Report No. 01141-TR-001 Rev. 0, Analytical Study of HI-STORM 100 Cask	Tr. 71-2425	Tr. 7125

Appendix B Exhibits
Unified Contention Utah L/QQ (Seismic)

Exhibit Number And Description	Transcript Location	
	Identification or Marking of Exhibit	Admission of Exhibit (Or Other Status if Noted)
System for Sliding and Tip-Over Potential During High-Level Seismic Event, 12/11/01		
State Exhibit 123 Walter J. Arabasz's Curriculum Vitae	Tr. 9099	Tr. 9101
State Exhibit 124 November 19, 2001 Memorandum from Annette L. Vietti-Cook to William D. Travers re: Staff Requirements-SECY-01-0178-Modified Rulemaking Plan: 10 CFR Part 72 - -"Geological and Seismological Characteristics for Siting and Design of Dry Cask Independent Spent Fuel Storage Installations"	Tr. 9099	Tr. 9102
State Exhibit 125 "Revision of Seismic and Geologic Siting Criteria," by Andrew Murphy, et. al., 14 th International Conference on Structural Mechanics in Reactor Technology Lyon, France, August 17-22, 1997	Tr. 9099	Tr. 9111
State Exhibit 126 Memorandum dated August 22, 2001, from Richard Black of DOE to Technical Standards Program Managers re: Revised DOE Standard 1020-2001, Natural Phenomena Hazards Design and Evaluation Criteria for DOE Facilities, Project No. NPHZ-0001	Tr. 9099	Tr. 9111
State Exhibit 127 Excerpt from Report CNWRA 98-007, Seismic Ground Motion at Three Mile Island Unit 2 ISFSI Site in Idaho National Engineering and Environmental Laboratory – Final Report, June 1998	Tr. 9099-9100	Tr. 9112
State Exhibit 128 SECY-01-0178, Modified Rulemaking Plan: 10 CFR Part 72 - -"Geological and Seismological Characteristics for Siting and Design of Dry Cask Independent Spent Fuel Storage Installations," 09/26/01	Tr. 9100	Tr. 9102
State Exhibit 129 Excerpts from 11/09/01 Declaration of C. Allin Cornell	Tr. 12776-77	Tr. 12778
State Exhibit 130 Excerpts from 11/01/01 Transcript of Deposition of C. Allin Cornell	Tr. 12776-77	Tr. 12778

Appendix B Exhibits
Unified Contention Utah L/QQ (Seismic)

Exhibit Number And Description	Transcript Location	
	Identification or Marking of Exhibit	Admission of Exhibit (Or Other Status if Noted)
State Exhibit 131 Excerpts from 11/15/01 Transcript of Telephone Deposition of Krishna P. Singh and Alan I. Soler	Tr. 12777	Tr. 12778
State Exhibit 132 Excerpts from DOE Report, Natural Phenomena Hazards Design and Evaluation Criteria for Department of Energy Facilities, Jan. 1996	Tr. 12777	Tr. 12778
State Exhibit 134⁵ Marvin Resnikoff's Curriculum Vitae	Tr. 12350-52	Tr. 12354
State Exhibit 135 NRC Certificate of Compliance for Holtec International Inc.'s HI-STORM 100 Cask System 05/31/00	Tr. 12350-52	Tr. 12354
State Exhibit 136 PFS to NRC Letter, EIS Commitment Resolution Letter #13 (09/25/01)	Tr. 12351-52	Tr. 12354
State Exhibit 137 Excerpts from 11/15/01 Transcript of Telephone Deposition of Everett Lee Redmond II	Tr. 12351-52	Tr. 12354
State Exhibit 138 Excerpts from Holtec International's HI-STORM 100 Cask System Safety Evaluation Report	Tr. 12351-52	Tr. 12354
State Exhibit 139 Excerpts from Rev. 10 to Holtec's Topical Safety Analysis Report for the HI-STORM 100 Cask System	Tr. 12351-52	Tr. 12354
State Exhibit 140 Schematic Cross Section of HI-STORM 100 Cask Bottom	Tr. 12351-52	Tr. 12354
State Exhibit 141 Rough Calculations: Doses Emanating from Bottom of Tipped-Over Cask	Tr. 12351-52	Tr. 12354
State Exhibit 141A Amended Rough Calculations: Doses Emanating from Bottom of Tipped-Over Cask	Tr. 12351-52	Tr. 12354

⁵ Pre-filed State Exh. 133 was withdrawn and not officially marked for identification. Tr. 12777-78.

Appendix B Exhibits
Unified Contention Utah L/QQ (Seismic)

Exhibit Number And Description	Transcript Location	
	Identification or Marking of Exhibit	Admission of Exhibit (Or Other Status if Noted)
State Exhibit 142 PFSF SAR Fig. 4.2-2 (Rev. 12), Physical Characteristics of the HI-STORM Storage Cask	Tr. 12351-52	Tr. 12354
State Exhibit 143 Calculation of Neutron Dose at Elevated Concrete Temperatures	Tr. 12351-52	Tr. 12354
State Exhibit 168 PFSF SAR p. 2.6-50 and 2.6-51, Rev. 22	Tr. 5574	Tr. 10751
State Exhibit 169 Excerpts from ASCE 4-98, Seismic Analysis of Safety-Related Nuclear Structures and Commentary	Tr. 5581	Tr. 5598-99
State Exhibit 170 Excerpts from ICEC Calculation G(P017)-2, Storage Pad Analysis and Design	Tr. 5616-17	Tr. 5629
State Exhibit 171 Tables on Maximum Vertical Soil Bearing Pressures Dynamic Load Data, obtained from ICEC Calculation "Storage Pad Analysis Design," G (PO17)-2	Tr. 5616-17	Tr. 5629
State Exhibit 172 Calculation of impedance functions of the Storage Pads (Vs for 67 ft.) using the method in SC-21, PFS Exh. MM	Tr. 5686	Not Admitted Tr. 5708
State Exhibit 173 Holtec Report No. HI-2012640, Multi-Cask Response at PFS IFSFI from 2000-YR Seismic Event, Rev. 2 (Holtec Proprietary Document)	Tr. 5939-40, 49	Tr. 5976
State Exhibit 174 Excerpts from paper "Seismic Response Characteristics HI-STAR 100 Cask System on Storage Pads" by Dr. K.P. Singh, et. al	Tr. 6035	Tr. 6130-31
State Exhibit 175 PFSF SAR Figure 4.2-7, Cask Storage Pads, Rev. 22	Tr. 6172-73	Tr. 6185
State Exhibit 176 Holtec Report HI-971631, Multi-Cask Seismic Response at the PFS ISFSI (Holtec Proprietary Document)	Tr. 6185	Not Offered
State Exhibit 177 Calculation of impedance functions of the CTB mat using the method in SC-21, PFS Exh. MM	Tr. 6431	Not Offered

**Appendix B Exhibits
Unified Contention Utah L/QQ (Seismic)**

Exhibit Number And Description	Transcript Location	
	Identification or Marking of Exhibit	Admission of Exhibit (Or Other Status if Noted)
State Exhibit 178 Excerpts from Engineering Notebook No. 433, Review of Dynamic Soil Properties from G (PO18)-2, 11/19/01	Tr. 6622	Tr. 6724-25
State Exhibit 179 Supporting Information for Simulations Listed in Answer 118 of KPS/AIS testimony, Summary of Visual Nastran Analyses, 5/9/02	Tr. 6941-42	Tr. 7598
State Exhibit 180 NRC Memo re: Staff Requirements - SECY-01-0178: Modified Rulemaking Plan: 10 CFR Part 72 - "Geological and Seismological Characteristics for Siting and Design of Dry Cask ISFSIs," 11/19/01	Tr. 7951	Not Admitted Tr. 7951
State Exhibit 181 NUREG-1350, Appendix H: Dry Spent Fuel Storage Licensees	Tr. 7955	Tr. 7959-60
State Exhibit 182 Excerpt from Applicant's 7/13/01 Brief on the Regulatory Standard for Aircraft Crash Hazards at the Private Fuel Storage Facility	Tr. 7960	Not Offered Tr. 7966
State Exhibit 183 PFSF SAR p. 2.6-89 (Rev. 9), and Table 2.6-14 (page 2 of 14) (Rev. 0)	Tr. 8082	Tr. 8087
State Exhibit 184 Linda J. Martinez, Charles M. Meertens, and Robert B. Smith, Rapid deformation rates along the Wasatch fault zone, Utah, from first GPS measurements with implications for earthquake hazard, Geophysical Research Letters, Vol. 25, No. 4, 2/15/98, pp. 567-570	Tr. 8091-92	Tr. 9872-74
State Exhibit 185 Excerpts from Geomatrix Consultants, Inc., Fault Evaluation Study and Seismic Hazard Assessment, Rev. 1, Final Report, March 2001	Tr. 8225-26	Tr. 8344
State Exhibit 188 PFSF SAR Table 5.1-1, Rev. 0, Anticipated Time and Personnel Requirements for HI-STORM Canister Transfer Operations	Tr. 8983	Tr. 9056
State Exhibit 189 PFSF SAR p. 5.1-4 to 5.1-9, Rev. 2	Tr. 8986	Tr. 9056

Appendix B Exhibits
Unified Contention Utah L/QQ (Seismic)

Exhibit Number And Description	Transcript Location	
	Identification or Marking of Exhibit	Admission of Exhibit (Or Other Status if Noted)
State Exhibit 190 Excerpts from Topical Safety Analysis Reports for the Holtec International's Storage and Transfer Operation Reinforced Module Cask System (HI-STORM 100 Cask System), Holtec Report HI-951312	Tr. 8989	Tr. 9056
State Exhibit 191 06/28/01 Edition of Holtec Highlights Report	Tr. 8992	Tr. 9056
State Exhibit 192 PFSF SAR Fig. 4.7-1, Canister Transfer Building, Rev. 21	Tr. 8995	Tr. 9056
State Exhibit 193 Excerpts from 11/15/01 Transcript of Telephone Deposition of Krishna P. Singh and Alan I. Soler	Tr. 9029	Tr. 9056
State Exhibit 194 Article from Holtec International's Website re: Dry Storage Fuel Storage	Tr. 9079	Tr. 9082-83
State Exhibit 195 Response Spectra for Vertical Direction for 2,000-year return period earthquake	Tr. 9493	Tr. 9508, 9824
State Exhibit 196 Excerpts from SWEC Calculation G(P018)-3, Development of Time Histories for 2,000-Year Return Period Design Spectra	Tr. 9543	Tr. 9547
State Exhibit 197 Information package re "Background for issue on funding request for supporting HI work" faxed by Max DeLong to John Vincent, 3/19/98 (PFS Confidential Document)	Tr. 9733	Tr. 9781 Withdrawn and Replaced with State Exhibits 197A and 197B ⁶
State Exhibit 197A Information package re "Background for issue on funding request for supporting HI work" faxed by Max DeLong to John Vincent, 3/19/98 (Same as State Exhibit 197 except three page EPRI Report Summary omitted)	See Joint Status Report of Utah L/QQ	Tr. 9781

⁶ See Joint Status Report on Utah L/QQ.

Appendix B Exhibits
Unified Contention Utah L/QQ (Seismic)

Exhibit Number And Description	Transcript Location	
	Identification or Marking of Exhibit	Admission of Exhibit (Or Other Status if Noted)
State Exh. 197B EPRI Report Summary, "Validation of EPRI Methodology of Analysis of Spent Fuel Cask Drop and Tipover Events," TR-108760, August 1997. (PFS Confidential Document)	See Joint Status Report of Utah L/QQ	Tr. 9781
State Exhibit 198 11/30/98 NRC Letter from Mark Delligatti to Dr. Krishna P. Singh re: Request for Additional Information on HOLTEC International's Application for Certification of the HI-STORM Cask System	Tr. 9765	Tr. 9781
State Exhibit 199 "Predicting the Structural Response of Free-Standing Spent Fuel Storage Casks Under Seismic Events," by Dr. Krishna P. Singh, et. al	Tr. 9771	Tr. 9788
State Exhibit 200 Public Works Research Institute, "Large Scale Three-Dimensional Shaking Table"	Tr. 9937	Not Admitted Tr. 9957-58
State Exhibit 201 Excerpt NRC Regulatory Guide 1.165, Identification and Characterization of Seismic Sources and Determination of Safe Shutdown Earthquake Ground Motion (March 1997)	Tr. 9958	Tr. 10069
State Exhibit 202 U.S. Department of Energy Topical Report YMP/TR-003-NP, Preclosure Seismic Design Methodology for a Geologic Repository at Yucca Mountain, Revision 2, August 1997	Tr. 9958	Tr. 10088-89
State Exhibit 203 Excerpts from Robert C. Kennedy and Stephen A. Short, "Basis for Seismic Provisions of DOE-STD-1020" (April 1994)	Tr. 9958	Tr. 10125
State Exhibit 204 Excerpts from Geomatrix Consultants Inc., Update of Deterministic Ground Motion Assessments, Revision 1 (April 2001)	Tr. 9958	Tr. 10125

Appendix B Exhibits
Unified Contention Utah L/QQ (Seismic)

Exhibit Number And Description	Transcript Location	
	Identification or Marking of Exhibit	Admission of Exhibit (Or Other Status if Noted)
State Exhibit 205 06/04/02 E-mail from Dr. Walter J. Arabasz to Ivan Wong attaching excerpts from J. Carl Steep, et. al., "Probabilistic Seismic Hazard Analyses for Ground Motions and Fault Displacement at Yucca Mountain, Nevada," and Ivan G. Wong and J. Carl Stepp, "Probabilistic Seismic Hazard Analyses for Fault Displacement and Vibratory Ground Motion at Yucca Mountain, Nevada"	Tr. 9958	Not Offered Tr. 10126
State Exhibit 206 Excerpts from Woodward-Clyde Federal Services, Seismic Hazards Evaluation of the Los Alamos National Laboratory, Final Report, 24 February 1995	Tr. 9958	Tr. 10126
State Exhibit 207 Excerpts from DOE-Standard-1020-2002: Natural Phenomena Hazards Design and Evaluation Criteria for Department of Energy Facilities, January 2002	Tr. 9958	Not Offered <u>See</u> Tr. 10082-88
State Exhibit 208 Table on Risk Reduction Ratio, Mean Return Period of Design Basis Earthquake (DBE) Ground Motions, and Target Performance Goal	Tr. 9958	Tr. 10087-88
State Exhibit 209 Excerpts from Safety Evaluation Report for System Not Directly Associated with Storage Casks for the Private Fuel Storage Facility (December 15, 1999), Safety Evaluation Report for the Private Fuel Storage Facility (September 29, 2000), Consolidated Safety Evaluation Report Concerning the Private Fuel Storage Facility (March 2002), and Modified Rulemaking Plan SECY-01-0178	Tr. 9958	Tr. 10149
State Exhibit 210 Interoffice memorandum from PJTrudeau to SMMacie re: Geotechnical Design Criteria (April 3, 1997)	Tr. 10292	Tr. 10337
State Exhibit 211 Interoffice Memorandum from SMMacie to PJTrudeau/NTGeorges re: Geotechnical Design Criteria (April 2, 1997)	Tr. 10333	Tr. 10337

Appendix B Exhibits
Unified Contention Utah L/QQ (Seismic)

Exhibit Number And Description	Transcript Location	
	Identification or Marking of Exhibit	Admission of Exhibit (Or Other Status if Noted)
State Exhibit 212 Enlargement of excerpt from PFSF SAR (Revision 22) Fig. 4.2-7, Cask Storage Pads	Tr. 10867	Tr. 10990
State Exhibit 213 Applied Geotechnical Engineering Consultants, Inc., letter to SWEC enclosing Soil Sample Test Results (3/27/2001)	Tr. 10877	Tr. 10990
State Exhibit 214 Excerpts from COBRA-SFS Analysis of the Holtec HI-STORM 100 Storage System Following a Tip-Over	Tr. 12285	Tr. 12306
State Exhibit 215 Figure 1.2.11, 100 HI-TRAC transfer cask with Pool Lid Cross Sectional Elevation View, from Holtec Report HI-2002444 (Revision 0)	Tr. 12522	Tr. 12529
State Exhibit 216 Figure 1.2.1, Cross-Section view of the HI-STORM 100 System, from Holtec Report HI-2002444, (Revision 0)	Tr. 12522	Tr. 12529
State Exhibit 217 06/25/02 Drawing Prepared by Marvin Resnikoff re Air Flow within HI-STORM 100 Cask	Tr. 12526	Not Admitted Tr. 12532, 637
State Exhibit 218 Excerpts from the EPA Manual of Protective Action Guides and Protective Actions for Nuclear Incidents (1991)	Tr. 12601	Tr. 12611-12
State Exhibit 219 Steven G. Wesnousky, Earthquakes, Quaternary Faults, and Seismic Hazard in California, Journal of Geophysical Research, November 10, 1986	Tr. 12727	Tr. 12741
Staff Exhibit P Vincent K. Luk, et. al., NRC Project on Seismic Behavior of Spent Fuel Storage Cask Systems: Seismic Analysis Report on HI-STORM 100 Casks at PFS, Rev. 1 (03/31/02)	Tr. 6761	Tr. 6762-63
Staff Exhibit Q John A. Stamatakis, et. al., Seismic Ground Motion and Faulting Hazard at PFS Facility in the Skull Valley Indian Reservation, Tooele County, Utah – Final Report (September 1999)	Tr. 8051-52	Tr. 8053
Staff Exhibit R Comparison of Western U.S. Hazard Curves	Tr. 8053	Not Admitted Tr. 8300-02

Appendix B Exhibits
Unified Contention Utah L/QQ (Seismic)

Exhibit Number And Description	Transcript Location	
	Identification or Marking of Exhibit	Admission of Exhibit (Or Other Status if Noted)
Staff Exhibit S SECY-98-071 Re Exemption to 10 CFR 72.102(f)(1) Seismic Design Requirement for 3 Mile Island Unit 2 Independent Spent Fuel Storage Installation, April 8, 1998	Tr. 8059-61	Tr. 8061
Staff Exhibit T NRC Memo and attachments from John C. Hoyle to L. Joseph Callan re: SECY-98-126 Rulemaking Plan: Geological and Seismological Characteristics for Siting and Design of Dry Cask Independent Spent Fuel Storage Installation 10 CFR Part 72, June 24, 1998	Tr. 8062	Tr. 8063
Staff Exhibit U NRC Letter and attachments from Richard A. Meserve to Dianne Nielson and Jay Silberg, November 27, 2001	Tr. 8063-65	Tr. 8066
Staff Exhibit V Holtec Sketch of HI-STORM Assembly	Tr. 12161	Tr. 12163
Staff Exhibit W Holtec International Report HI-2002444, Rev. 0, Figure 5.3.11: HI-STORM 100 Overpack Cross Sectional Elevation View	Tr. 12165	Tr. 12168
Staff Exhibit X PFSF SAR Figure 1.2-1, PFSF General Arrangement, Rev. 21	Tr. 12168	Tr. 12169-70
Staff Exhibit CC Section 3.7.2, Seismic System Analysis, Rev. 2, of NUREG-0800 (Standard Review Plan), (Aug. 1989)	Tr. 5744	Tr. 5744
Staff Exhibit DD Section 3.7.1, Seismic Design Parameters, Rev. 2, of NUREG-0800 (Standard Review Plan), (Aug. 1989)	Tr. 5744	Tr. 5744
Staff Exhibit EE Section 3.8.5, Foundations, Rev. 1, of NUREG-0800 (Standard Review Plan), (July 1981)	Tr. 6335	Tr. 6338
Staff Exhibit FF NRC Letter from E. William Branch to Dr. K.P. Singh attaching Certificate of Compliance for the Holtec International HI-STORM 100 Cask System (May 4, 2000)	Tr. 6482-86	Tr. 6666

Appendix B Exhibits
Unified Contention Utah L/QQ (Seismic)

Exhibit Number And Description	Transcript Location	
	Identification or Marking of Exhibit	Admission of Exhibit (Or Other Status if Noted)
Staff Exhibit GG NRC Memo to Daniel H. Dorman from S. Khalid Shaukat re: Review Panel Meeting on Seismic Behavior of Spent Fuel Storage Cask Systems (November 15-16, 2001), January 22, 2002	Tr. 7127-28	Tr. 7828
Staff Exhibit HH Excerpt from 5/4/02 Transcript of Deposition of Vincent Luk	Tr. 7784	Tr. 7802
Staff Exhibit II Excerpts from DOE-Standard-1020-2002: Natural Phenomena Hazards Design and Evaluation Criteria for Department of Energy Facilities, January 2002	Tr. 7870-71	Tr. 7873
Staff Exhibit JJ Excerpts from Scientific Notebook 353, Evaluation of PFS Earthquake Analysis for SER of PFSF License Application (SAR), 8/1/00	Tr. 8285-86	Tr. 8300-02
Staff Exhibit MM Declaration of Dr. Walter J. Arabasz dated December 6, 2001	Tr. 9830	Tr. 9836
Staff Exhibit NN October 6, 2000 letter from Sherwin Turk to the NRC Licensing Board, attaching Safety Evaluation Report Concerning the Private Fuel Storage Facility dated September 29, 2000	Tr. 9838	Tr. 9844
Staff Exhibit OO January 11, 2002 letter from Sherwin Turk to the NRC Licensing Board attaching Supplement No. 2 to the December 21, 2001 Safety Evaluation Report Concerning the Private Fuel Storage Facility	Tr. 9845	Tr. 9847
Staff Exhibit PP January 11, 2002 letter from Sherwin Turk to the NRC Licensing Board attaching Supplement No. 2 to the December 21, 2001 Safety Evaluation Report Concerning the Private Fuel Storage Facility (same as Staff Exhibit OO, with revisions highlighted)	Tr. 9855-56	Tr. 9882

Appendix B Exhibits
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Staff Exhibit QQ Excerpts from DOE-Standard-1020-2002: Natural Phenomena Hazards Design and Evaluation Criteria for Department of Energy Facilities, January 2002	Tr. 10016	Tr. 10020
Staff Exhibit RR Excerpts from R.K. McGuire and W.J. Arabasz, An Introduction to Probabilistic Seismic Hazard Analysis	Tr. 10027	Tr. 10027
Staff Exhibit SS NRC Letter from E. William Brach to Warren Bergholz, attaching License for Independent Nuclear Fuel and High-Level Radioactive Waste, License SNM-2508, March 19, 1999	Tr. 10175	Tr. 10176
Staff Exhibit TT Excerpts from Geomatrix Consultants, Inc., Fault Evaluation Study and Seismic Hazard Assessment, Final Report, February 1999	Tr. 10179	Tr. 10181
Staff Exhibit UU Excerpts from NRC Regulatory Guide 1.165, Identification and Characterization of Seismic Sources and Determination of Safe Shutdown Earthquake Ground Motion, March 1997	Tr. 10187	Tr. 10193
Staff Exhibit VV Letter from David J. Modeen to Dr. Andrew J. Murphy (May 24, 1994) and excerpts from NEI Draft Report on "Seismic Siting Decision Process"	Tr. 10194	Tr. 10196
Staff Exhibit XX Excerpts from Chapter 7 (Shear Strength) of "Soil Mechanics" by Tien Hsing Wu	Tr. 11390-91	Tr. 11397
Staff Exhibit YY Cask and Pad Sketch and plots of Relative Displacement Between Concrete Pad and Soil Cement Versus Time	Tr. 11520	Tr. 11539
Staff Exhibit ZZ Sketch by Dr. Goodluck I. Ofeogbu: Form of Soil Failure Mode under Cask Pads	Tr. 12015	Tr. 12022
Staff Exhibit 53 NUREG 1567, Standard Review Plan for Fuel Storage Facilities, March 2000	Tr. 12173	Tr. 12220

Appendix B Exhibits
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Exhibit Number And Description	Transcript Location	
	Identification or Marking of Exhibit	Admission of Exhibit (Or Other Status if Noted)
Staff Exhibit 54 Excerpts from 10 CFR Part 72 Statement of Consideration re List of Approved Fuel Storage Casks: Holtec HI STORM 100 Addition, 65 FR 25241 (May 1, 2000)	Tr. 12208-09	Not Admitted Tr. 12211
Staff Exhibit 55 Excerpts from Regulatory Guide 3.60, Design of an Independent Spent Fuel Storage Installation (Dry Storage), March 1997	Tr. 12224-25	Tr. 12226
Staff Exhibit 56 Excerpts from American Nuclear Society Standard Design Criteria for an ISFSI (Dry Storage Type), Dec. 31, 1984	Tr. 12226-27	Tr. 12231
Staff Exhibit 57 American Nuclear Society, Criteria for an Independent Spent Fuel Storage Installation (Dry Storage Type), Standard ANSI/ANS.57.9 (1992)	Tr. 12226-27	Tr. 12231
Staff Exhibit 58 Excerpts NUREG 1536, Standard Review Plan for Dry Cask Storage Systems, January 1997	Tr. 12231	Tr. 12235
Staff Exhibit 59 Final Environmental Impact Statement, NUREG-1714, pages 1-3, Figure 1.2 and 2-2, Figure 2.1	Tr. 12318	Tr. 12320
Staff Exhibit 60 PFSF SAR Chapter 2, Site Characteristics, p. 2.1-1 through 2.1-4, Rev. 0	Tr. 12337	Tr. 12338
Staff Exhibit 61 NRC Report, Tip-Over Thermal Analysis for Holtec HI-STORM Ventilated Concrete Spent Fuel Storage Cask, June 11, 2002	Tr. 12636-37	Not Offered Tr. 12637
Staff Exhibit 62 Color Map of Historic Seismicity and Nuclear Facilities in the United States, 06/16/02	Tr. 12644	Tr. 12651
Staff Exhibit 63 D.J. Waiting et. al., Technical Assessment of Structural Deformation and Seismicity at Yucca Mountain, Nevada (September 2001)	Tr. 12644	Tr. 12651
Staff Exhibit 64 Section 3.8.4, Other Seismic Category I Structures (Rev. 1, July 1981), of NUREG-0800	Tr. 12902	Tr. 12904

Errata Sheet for Applicant's Proposed of Fact and Conclusions of Law on Contention Utah L/QQ

Pg	¶	Ln	Correction
2		19	Utah L was admitted into the proceeding in March (?) <u>April</u> 1998
6		18	ad-and the Staff generally opposed admission of the contention
7		3	added <u>adding</u> a hypothetical analysis of the potential sliding of the cask storage pad
10		15	rebuttal testimony addressing the accelerations used <u>in</u> the dynamic analysis
10		25	including the rigidity of the pad, and {cheek— <u>and</u>
11		1	add other issues.}
11		6	Dr. Tseng also submitted rebuttal testimony regarding rigidity as <u>of</u> the
12		13	Idaho National {fill in rest} <u>Engineering and Environmental Laboratory ("INEEL")</u>
13		13	and serves <u>as</u> structural engineering consultant
13		22	He <u>has</u> over twenty-three years of experience
16		20	He has been involved in establishing seismic of design standards
18		6	Dr. <u>Ofoegbu</u> received a Ph.D. in Geological Engineering
18		17	with Dr. <u>Ofoegbu</u> . NRC Staff Testimony of Daniel J. Pomerening and Goodluck I. Ofoegbu
31		14	there are locations in the place <u>pad</u> emplacement area
36		25	In some spots it may be necessary to insert fill in below one
39		17-18	However, the issues of whether the 75,000 psi Youngs Modulus is static or dynamic is one of semantics and of not <u>no</u> concern here.
39		18-20	The PFS design has specified the parameters and which <u>that</u> the 75,000 psi Young's Modulus is to determine specifically if it is to be determined as to <u>at</u> a soil strain of 1.93%.
47		7	frequency of the HI-STORM 100 cask on the pad of <u>is</u> 111 hertz

**Errata Sheet for Applicant's Proposed of Fact
and Conclusions of Law on Contention Utah L/QQ**

49		19	the potential-affects <u>effects</u>
50		18	Further, the soil properties, including cohesion, were incorporated
51		13	One run showed the cask lifting up off <u>the</u> surface
53		24	In neither set of analyses was their <u>there</u> the potential for cask sliding
54		7	Findings 240 -241
62		9	2,000 <u>2,000</u> DBE
63		10	long statie term <u>static</u> pad settlement
67		5	soil/ <u>cement</u> . The crushing of the soil cement
75		12	spent fuel-rasks <u>racks</u> and casks
86		7	eq <u>earthquake</u> . The same is true for the PFSF foundations
89		12	earthquake with a MRF <u>P</u> of 5,000
93		1	The Commission uses risk annual frequency <u>frequencies</u>
98		9	ground motions and those fro the <u>for the</u> cask stability analysis
101		13	Each of t <u>These</u> errors resulted in an overestimation
117	53	Ln 7 w/in ¶53	factor of safety against sliding and bearing capacity <u>failure</u>
117	54	Ln 4 w/in ¶54	damping values used in development <u>of</u>
128-129	86	Ln 3 on pg. 129	by testing, Tr. 11165-66 (Mitchell), <u>and</u> , PFS intends
131	91	Ln 7 w/in ¶91	three-foot thick reinforced concrete <u>pad</u> , see Tr. 11134-37 (Bartlett))
159	152	Ln 1 w/in ¶152	Second, contrary to the Dr. Khan's claim
164	164	Fn 20	-The contract stiffness calculated in PFS Exh. 226
180-181	205	Lns 7-8 on pg.	comprise the abutting soil layers at the interface of the conditions at the PFSF but to envelope all possible conditions.

**Errata Sheet for Applicant's Proposed of Fact
and Conclusions of Law on Contention Utah L/QQ**

		181	
185-186	215	Ln 9 on p.g. 186	<u>At</u> the actual interfaces, the displacement
214	287	Ln 5 w/in ¶214	maximize "the dishing effect," assuming is <u>it</u> all
218	298	Ln 3 w/in ¶298	and on the motion of the casks, and <u>The</u> initial testimony
231	325	Ln 3 w/in ¶325	the response of at the mat of the CTB
238	346	Ln 5 w/in ¶346	Any small additional motion induces <u>d</u>
244	362	Ln 6 w/in ¶362	PFS Exh. 237 at 4-5. The <u>same</u> con-
273	432	Ln 1 w/in ¶432	Dr. Bartlett suggested s however
281	447	Ln 13 w/in ¶447	no adverse health o <u>r</u> safety impact
293	470	Ln 4 w/in ¶470	the SER it only concludes that
328	557	Ln 5 w/in ¶557	return periods on the order <u>of 10,000 years.</u>
328	558	Ln 1 w/in ¶558	Further, <u>the</u> ultimate issue
328	558	Ln 2 w/in ¶558	whether the facility d esign will provide reasonable assurance

Document #: 1272372 v.1