RAS 3996

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of:	)	Docket No. 72-22-ISFSI
PRIVATE FUEL STORAGE, LLC (Independent Spent Fuel Storage Installation)	)	ASLBP No. 97-732-02-ISFSI
	)	February 19, 2002

STATE OF UTAH'S KEY DETERMINATIONS FOR CONTENTION UTAH K/CONFEDERATED TRIBES B

As directed in the Board's Prehearing Memorandum and Order dated December 26, 2001, the State submits herewith for filing State of Utah's Key Determinations for Contention Utah K. Also enclosed is a complied list of exhibits (State Exhibit 38 through 84). The exhibits have been filed separately but concurrently with the pre-filed testimonies of Lt. Colonel Horstman (U.S.A.F. Retired) and Dr. Resnikoff.

DATED this 19th day of February, 2002.

Respectfully submitted,

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CERTIFICATE OF SERVICE

I hereby certify that a copy of STATE OF UTAH'S KEY DETERMINATIONS FOR CONTENTION UTAH K/CONFEDERATED TRIBES B was served on the persons listed below by electronic mail (unless otherwise noted) with conforming copies by United States mail first class, this 19th day of February, 2002:

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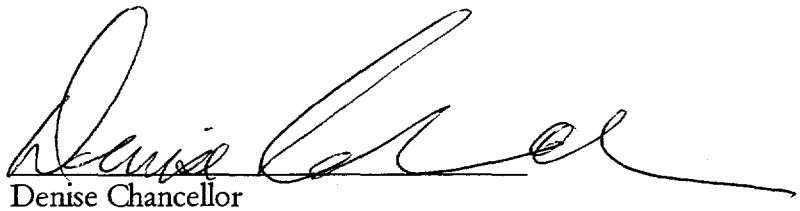

Denise Chancellor
Assistant Attorney General
State of Utah

STATE OF UTAH'S PREFACE TO PREFILED TESTIMONY OF DR. MARVIN RESNIKOFF FOR CONTENTION UTAH K

I. Qualifications of Dr. Marvin Resnikoff.

A. PhD in high-energy theoretical physics, University of Michigan, 1965.
B. Sr. Associate, Radioactive Waste Management Associates, technical consulting firm.
C. 27 years experience in nuclear waste management, transportation and storage.
D. Prepared technical reviews of spent fuel storage cask designs and independent spent fuel storage installations at various reactors.
E. Lecturer and author on transportation, storage and disposal of nuclear waste.

II. Methodology for estimating probability of aircraft crash impact to proposed PFS facility.

A. Has reviewed PFS application and related documents, and NRC, DOE methodology.
B. PFS has not used NUREG 0800 probability formula $P = C \times N \times A/W$, but has drastically changed it to $P = C \times N \times A/W \times R$, where R = the probability that a pilot would be unable to guide the crashing aircraft away from the PFS site before ejecting.
C. The formula used by PFS is not a standard or methodology recognized by NRC or DOE, nor has it been used evaluate previous license applications.
D. PFS relies on a subjective estimate of 14.5 % for R, resulting in a 85.5% reduction in crash impact probability from that obtained using the NUREG-0800 methodology.
E. The totally subjective conclusion of how a pilot would react in an emergency dwarfs the quantitative and conservative approach intended by the NUREG-0800 methodology.

III. Aircraft crashes from F-16 flights in Skull Valley.

A. Probability of 6.39E-06 crashes per year calculated using $P = C \times N \times A/W$.
B. $C = 3.39 \times 10^{-8}$ crashes/mile, using lifetime (1975-2000) F-16 crash history, and ACRAM data 15.9% mishaps in normal flight, 471.8 mph, normal flight miles = 47.16%.
C. N = 7,040 annual sorties from Horstman testimony.
D. W = 5 mile width of flight path from Horstman testimony.
E. PFS crash rate based on lowest 10 year average period (FY89-FY98) in F-16 history.
F. Statistical analysis shows F-16 crash rate increasing, not decreasing in recent years.
G. PFS analysis shows 22.3% of mishaps occur in normal flight phase during the 10 year period on which PFS based crash rate, yet PFS used lower ACRAM rate of 15.9 % based on 1976-93 data, thereby understating the crash rate for the 10 year period used by PFS .

IV. Aircraft crashes from flights on the Moser Recovery Route ("MRR").

A. Probability of 1.36×10^{-6} calculated using $P = C \times N \times A/W$.
B. $C = 3.39 \times 10^{-8}$ crashes/mile from III. C. above.
C. N = 3436 annual sorties, based on one third of UTTR South sorties to be flown at night, returning to Hill AFB on MRR. (UTTR South sorties = 7,040 Skull Valley sorties increased by 182% to account for sorties entering UTTR South via other routes)
D. A= 0.1337 mi^2, determined by previous order.
E. W = 11.5 miles, from Crash Report.

V. Aircraft crash impacts from F-16 air-to-air combat training over the UTTR.

A. Probability of 2.74×10^{-7} crashes/year, calculated using $H = C \times A_c \times A_{eff}/A_p$ (total combined probability for restricted zones R-6402 and R-6406).
B. $C = 5.378 \times 10^{-6}$ crashes/$mi.^2$ /yr for R-6402; $C = 4.365 \times 10^{-5}$ crashes/$mi.^2$ /yr for R-

6406. These density crash rates were based on the lifetime F-16 crash rate and the ACRAM ratio for special ops (49.06%). The training hours for each area given in the PFS Crash Report were based on FY98; therefore they were updated to FY00 sortie data and adjusted for12 new F-16s assigned to Hill AFB (increase of 7,040/3,871 or 1.82).
C. The PFS density crash rates failed to consider lifetime crash data, special ops flight phase and FY00 sortie data.
D. A_c and A_p were considered at various altitudes ranging from 0 to 35,000 feet.

VI. Ordnance impacts to the PFS facility site.

A. Probability of 7.06 x 10^{-7} crashes/ year, calculated using P= C x N x A/W.
B. C = 3.39 x 10^{-8} crashes/ mile from III. C. above.
C. N= 831 (7,040 sorties x 11.8 % of F-16s carrying ordnance, from Crash Report p 82.)
D. A = 0.12519 mi^2, the effective area of the storage area and cannister transfer building.
E. W = 5 miles, from Horstman testimony.

VII. Total probability of aircraft or ordnance impacts to the PFS facility site.

8.99 x 10^{-6} crashes/year.

VIII. Consequences of aircraft or ordnance impact to the PFS facility.

A. An F-16 engine traveling at 420 knots could breach a Holtec HI-STORM 100 cask.
B. A jettisoned MK-84 or MK-82 bomb could breach a Holtec HI-STORM 100 cask.
C. At a distance of 100 meters, the dose equivalents due to inhalation range from 70 rems to 3,300 rems from release of cesium and CRUD, greatly exceeding the 5 rem exposure limits outlined in 10 CFR § 72.106 and the EPA Protective Action Guide.

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(Independent Spent Fuel Storage Installation)
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State of Utah List of Hearing Exhibits - Contention Utah K

State Exhibit Number	Description	Witness	Conte n-tion
38	Resume of Lt. Col. Hugh L. Horstman (USAF Ret.)	Horstman	K
39	Joint Declaration of James L. Cole, Jr., Wayne O. Jefferson, Jr., and Ronald E. Fly (December 30, 2000), attached to the Applicant's Motion for Summary Disposition of Utah Contention K and Confederated Tribes B (December 30, 2000)	Horstman	K
40	Map of Utah Test and Training Range (UTTR)	Horstman	K
41	Excerpt from UTTR Capabilities Guide [UT-45673, 45677]	Horstman	K
42	Annual Military Operating Area Usage Report for Sevier B MOA dated November 30, 1998	Horstman	K
43	Portion of IFR Enroute Low Altitude - U.S., dated May 20, 1999, showing locations of Sevier B and D MOAs.	Horstman	K
44	Annual Military Operating Area Usage Report for Sevier D MOA dated November 30, 1998	Horstman	K
45	Separate Annual Military Operating Area Usage Reports for R-6402A, R-6402B, R6406, dated November 30, 1998	Horstman	K
46	Statement by Utah First District Congressman, Representative James V. Hansen, Limited Appearance Session, Salt Lake City, June 23, 2000, Tr. 13-19	Horstman	K
47	Figure 1 of the PFS Crash Report	Horstman	K
48	Overlay to Figure 1 of the PFS Crash Report	Horstman	K
49	Undated news report stating that an additional twelve F-16 fighters have been assigned to the 388th Fighter Wing at Hill AFB	Hortsman	K
50	U.S. Air Force F-16 Crash Statistics for all F-16s, F-16A, F-16B, F-16C, F-16D, and F-16GLOC	Horstman	K

State Exhibit Number	Description	Witness	Conte n-tion
51	Kimura, et al, *Data Development Technical Support Document for the Aircraft Crash Risk Analysis Methodology (ACRAM) Standard*, UCRL-ID-124837 (August 1, 1996), Lawrence Livermore National Laboratory, pages 4-1 to 4-6, Table 4.8	Horstman	K
52	F-16 Crash History Graph	Horstman	K
53	News article from Federation of American Scientists website, titled *Cohen: Joint Strike Fighter program must stay on schedule* (June 24, 2000)	Horstman	K
54	News Release from the United States Department of Defense, *JSF Contractor Award*, dated October 26, 2001 [UT-48538 to -48539]	Horstman	K
55	News Transcript from the United States Department of Defense, Live Interview of Edward Aldridge, dated October 26, 2001.	Horstman	K
56	Portions of Air Force Magazine, May 1999, Vol. 82, No. 5	Horstman	K
57	AF document ALSAFECOM 002-1996 (March 1996) [UT-48483 to -48486]	Horstman	K
58	Deposition transcript of Ronald E. Fly, December 12, 2000	Horstman	K
59	International Station Meteorological Climate Summary for Dugway Proving Ground (12/9/00), from Hill Air Force Base website	Horstman	K
60	AF Instruction 51-503, *Aircraft, Missile, Nuclear, and Space Accident Investigations* (April 5, 2000)	Horstman	K
61	Memorandum from Colonel Ronald G. Oholendt, USAF, for 75 CS/SCSRF (FOIA), dated October 26, 1999 [59803]	Horstman	K
62	Letter from Colonel Lee C. Bauer, USAF, dated December 28, 2000 [UT-45794 to -45795]	Horstman	K
63	Letter from Denise L. King, USAF, dated January 18, 2001	Horstman	K
64	Memorandum from AF Headquarters (July 18, 2001)	Horstman	K

State Exhibit Number	Description	Witness	Conte n-tion
65	Declaration of Lt. Colonel Hugh L. Horstman, Air Force (Retired) in Support of the State of Utah's Response to PFS's Motion for Summary Disposition of Contention Utah K and Confederated Tribes B (January 30, 2001)	Horstman	K
66	Excerpt from AFI 51-503 Aircraft Accident Investigation Report [58809, 58811]	Horstman	K
67	Excerpt from *Handbook of North American Birds*, Vols. 1 and 2, Yale University Press, 1962	Horstman	K
68	Letter from J. Kimball, Director, Utah Division of Wildlife Resources, attaching recent Waterbird Survey data in the vicinity of Timpie Springs Waterfowl Management Area (January 26, 2001)	Horstman	K
69	Notice from Air Force News website, *First no-notice AEF deployment underway* (July 8, 1997)	Horstman	K
70	Resume of Dr. Marvin Resnikoff	Resnikoff	K
71	Filings in U.S. Nuclear Regulatory Licensing Proceedings and Other Documents Relating to the Determination of the Probability of Aircraft Crashes Reviewed by Marvin Resnikoff, Ph.D.	Resnikoff	K
72	Probability of an Aircraft Crash from F-16s Transiting Skull Valley En Route to the UTTR South Range	Resnikoff	K
73	NRC Staff Posthearing Memorandum Regarding Aircraft Crash Probability Issue, April 30, 1980	Resnikoff	K
74	USAF Flying Safety Magazine, September 2001	Resnikoff	K
75	Jet Safety, Preventing Mishaps; Air Force Link Archive Aircraft Crash Reports, 2000-2001	Resnikoff	K
76	F-16 Crash Rate Calculations	Resnikoff	K
77	Probability of Aircraft Returning on Moser Recovery Route Crashing into the PFS facility	Resnikoff	K
78	Probability of Aircraft Conducting Air-to-Air Combat Training at the UTTR South Area to Crash into the PFS facility	Resnikoff	K

State Exhibit Number	Description	Witness	Conte n-tion
79	Probability of Jettisoned Ordnance Striking the PFS facility	Resnikoff	K
80	Resnikoff's Calculation of Projectile Path and Impact Angle	Resnikoff	K
81	Cumulative Probability of an Aircraft Crash and Ordnance Striking the PFS facility	Resnikoff	K
82	Resnikoff's Calculation of Minimum Velocity Needed to Penetrate a HI-STORM Cask with Jettisoned Ordnance	Resnikoff	K
83	Cesium Release [excerpts from NUREGs and other reports]	Resnikoff	K
84	Resnikoff's Calculation of Accident Plume Diagrams	Resnikoff	K